



Newsletter

November - December 2008

INTERNATIONAL REGULATORY DEVELOPMENTS

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EUROPE

Heavy-duty Euro VI Emissions Regulation adopted by European Parliament

On 16 December 2008, the European Parliament voted to adopt a compromise package agreed with Council and the Commission on heavy-duty Euro VI emissions. The vote yielded a large majority in favour. Council will now formally ratify the proposal before the Regulation is published in the Official Journal.

Limit values for the current (ESC and ETC) tests cycles are shown below. Correlation factors are being developed to give new limits for the world-harmonised test cycles (WHSC and WHTC), to be set through the comitology (Technical Regulation). Particle number limits are also to be set through the comitology. The limits are “likely to reflect the highest levels of performance currently obtained with particle filters according to the best available technology”.

	CO	THC	NMHC	CH ₄	NOx	NH ₃	PM mass	PM ⁽¹⁾ number
	(mg/kWh)				(ppm)	(mg/kWh)	(#/kWh)	
ESC (CI engines)	1500	130			400	10	10	
ETC (CI engines)	4000	160			400	10	10	
ETC (PI engines)	4000		160	500	400	10	10	

(1) A number standard is to be defined in the comitology.

The implementation dates are earlier than the Commission had proposed: 31 December 2012 for new Type Approvals and 31 December 2013 for all registrations. The Commission committed to submit a comitology proposal by the end of 2009.

Durability requirements range from 160 000km or 5 years for smaller vehicles, to 700 000km or 7 years for the largest vehicles. Intermediate classes must meet a requirement of 300 000km or 6 years. Member States may give incentives for Euro VI vehicles until 31 December 2013. They may also give incentives for retrofitting in-use vehicles to meet the Euro VI emissions limits and for scrapping vehicles that do not comply. The incentives must not exceed the additional cost of the technical devices plus installation.

The comitology will include details for the use of Portable Emissions Measurement Systems (PEMS) to verify in-use emissions. Through comitology, the Commission can also, if they consider it appropriate, define a limit for NO₂ “reflecting the performance of then existing technologies” “without lowering the level of environment protection within the Community”.

Developments on Emissions Requirements for Agricultural Vehicles

The European Commission has issued 3 documents relating to tractor emissions: a proposal to amend the current emissions Directive for certain classes of tractor; a report on contributions received to their

consultation on a revised Regulation on Agricultural vehicles; and a draft proposal for a new Framework Regulation for tractors.

The Commission had, earlier in 2008, issued a public consultation on revision of the existing tractors Framework Directive (2003/37/EC) and its 23 separate daughter Directives. The main proposals would make the current EU Type Approval system operational for all vehicle categories used in agriculture and forestry. One element would be to use the non-road mobile machinery (NRMM) Directive for tractor emissions (the two Directives are currently aligned but separate). The Commission’s summary of the responses says that there is general support for the proposals. Some responses asked for the continuation of existing exemptions, such as vehicles produced in small series although others would like to see new specific exemptions introduced, for example for vehicles adapted for special forestry needs.

Following the publication of the consultation outcome, the Commission provided EU Member States with a draft of a new Framework Regulation. If adopted it will introduce mandatory whole-vehicle Type Approval for tractors and other agricultural vehicles and will also cover parts and equipment. The technical part will use references to UN-ECE Regulations where possible.

The Commission has also submitted a proposal for an amendment to the existing Directive on tractor emissions (2000/25/EC). The proposal would delay by 5 years the implementation of stages IIIB and IV for tractors of categories T2, C2 and T4.1*. The Commission is to review the justification for this delay by 31 January 2012. If the technical conditions that motivated this proposal are still valid, it will issue a report with proposals either to set alternative limits, to introduce additional flexibilities or to allow for a further delay limited to a maximum of five years.

The preamble to the proposal says that the NRMM technical review confirmed the feasibility of the emissions limits for the vast majority of engines intended for installation on non-road machinery and on agricultural tractors. However, for certain types of agricultural tractors an exemption was deemed necessary. It says that “Contrary to other issues where multiple options were indicated, the only conclusion of DG-JRC (the Commission’s Joint Research Centre, who conducted the review) was that the tractors in categories T2, T4.1 and C2 should be exempted from stages IIIB and IV of Directive 2000/25/EC. This conclusion received the support of some member states and no negative reaction.”

*T2: Wheeled tractors min. track width <1150mm, unladen mass >600kg, ground clearance ≤600mm. C2: Track-laying tractors equivalent to T2. T4.1: High clearance tractors (vineyard tractors).

Car CO₂ Compromise accepted by European Parliament

The European Parliament debated the proposed Regulation on Car CO₂ emissions on 16 December 2008. With the inclusion of a compromise package agreed with Council and the Commission, Parliament voted to adopt the revised proposal.

The compromise makes a number of changes to the Commission proposal, including phasing in the requirements, a graduated penalty scheme and incentives for technological innovations. The target remains a fleet average of 130g/km CO₂ to be reached by improvements in vehicles with a further 10g/km to be obtained by other technical improvements, such as better tyres or the use of biofuels. It will now apply to 65% of new cars in 2012, 75% in 2013, 80% in 2014 and 100% in 2015. The current CO₂ emissions figure for new cars is around 156g/km. Within the overall 130g/km target, the goals for individual manufacturers will vary using a vehicle mass-based function. Niche constructors that sell fewer than 300 000 cars per year will not be asked to contribute to the 130g/km limit, but will instead have to cut their emissions by 25% from 2007 levels. There is a new longer-term target of 95g/km by 2020.

Between 2012 and 2018, the penalty for manufacturers failing to meet their target will be €5 per vehicle for the first gram of CO₂ above the target, €15 for the second, €25 for the third and €95 from the fourth gram onwards. From 2019 it will be €95 for every gram above target. Until 2014 carmakers will be able to claim a credit of up to 7g/km towards their targets by introducing 'eco-innovations' such as LED lights and solar panels and will be able to claim "super credits" for cars that emit less than 50g/km in 2012.

Draft Directive on Hybrid Motorcycles

The European Commission has published a draft Directive amending 97/24/EC (the Directive on 2- and 3-wheel motor vehicles) to cover emissions and noise requirements of hybrids. The document amends Annexes II of Chapter 5 (emissions) and Annexes III and IV of Chapter 9 (noise). The amendment to the emissions requirements first defines a hybrid electric vehicle and then amends the test procedure to take account of hybrids with and without off-vehicle charging and with manual or automatic mode switching. Specific emissions testing regimes are defined for each of the 4 possibilities. The procedures are similar to those in ECE Regulation 83 for hybrid light-duty vehicles. Once agreed, the requirements should come into effect on 1 January 2010.

Motor Vehicle Framework Directive amended

Regulation (EC) 1060/2008, amending the motor vehicle Framework Directive (2007/46/EC) was published on 31 October 2008. It replaces several Annexes to take account of legislation introduced since the publication of the Directive, including the Euro 5 and 6 emissions Regulation. The new Annexes include updated lists of the applicable regulatory acts for various types of vehicle.

European Parliament Vote on the Fuel Quality Directive

On 17 December 2008 the European Parliament accepted a set of compromise amendments on the Fuel Quality Directive. Key elements are:

- the maximum sulfur content of non-road fuel will be 10ppm from 1/1/2011, although there is an allowance for contamination by heating oil in transit.
- the maximum biodiesel content of diesel fuels will be increased to 7%, with higher blends permitted.
- the ethanol content of petrol will be 10% max.
- the manganese-based fuel additive MMT will be limited to 6mg/l from 1/1/2011, then 2mg/l from 1/1/2014, with a review by the end of 2012.

Proposed Fuel Vapour Recovery Directive

On 4 December 2008 the Commission issued a proposal for a Directive to introduce Stage II petrol refuelling vapour recovery at EU filling stations. Petrol pumps will need to be fitted with equipment that can recover 85% or more of petrol vapour from vehicle refuelling. It will be required at all new or refurbished service stations with an annual petrol throughput greater than 500m³ per year and at all service stations situated underneath residential accommodation.

Commission Report on Fuel Quality in EU

The Commission issued their 5th annual report on EU fuel quality on 1 December 2008. The report covers the reporting year 2006. The share of <10ppm and <50ppm sulfur fuels increased significantly from 2001 to 2006 for EU-15. From 2005, it was mandatory for all fuel to meet the <50ppm S level, and for fuels of <10ppm S to be available in all Member States.

	EU average Sulfur Content, ppm						EU15	EU10
	2001	2002	2003*	2004*	2005*	2006#	2006*	2006#
<i>Petrol</i>	68	51	37	38	19	18	18	18
<i>Diesel</i>	223	169	125	113	25	22	22	17

* Excludes France, who failed to report in 2003 to 2005.

Excludes Malta, who failed to report in 2006.

EU average includes EU10 country data from 2004.

EU making Progress in reducing Ozone Precursor Emissions and PM₁₀

Aggregated emissions of tropospheric (ground-level) ozone precursors have reduced by 37% across the 32 Member States of the European Environment Agency (EEA)* between 1990 and 2006. Within most countries reductions have occurred for the aggregated emissions of NO_x and non-methane volatile organic compounds (NMVOC), but the emissions of these two pollutants have increased in 7 countries. NO_x has contributed 38% and NMVOC 40% of the total observed reduction of precursor emissions. This reduction of emissions is mainly due to the introduction of three way catalytic converters for cars and increased penetration of diesel-fuelled vehicles.

Emissions of primary particulate matter (PM₁₀) and secondary particulate precursors have been reduced by 44% across the EEA-32 region between 1990 and 2006. Emissions reductions for the secondary particulate matter precursors account for the vast majority of the total reduction in this period. The reductions in total emissions of particulate matter between 1990 and 2006 have been mainly due to the introduction or improvement of abatement measures across the energy, road transport, and industry sectors coupled with other developments in industrial sectors such as fuel switching from high-sulfur containing fuels to low-sulfur fuels. Emissions of primary PM₁₀ and secondary PM₁₀ precursors are expected to decrease in the future as vehicle technologies are further improved and emissions from stationary combustion sources are controlled. Despite this, it is expected that in many urban areas across the EU, PM₁₀ concentrations will still be well above EU limit values. Substantial further reductions in emissions will therefore be needed to reach the air EU's Air Quality Directive limit value.

* The 27 EU Member States plus Iceland, Liechtenstein, Norway, Switzerland and Turkey.

Thirteen Member States expect to exceed NO_x Emissions Ceilings

A new report from the European Environment Agency (EEA) says that despite significant emissions reductions in recent years, only 11 EU Member States expect to remain within their emission limits for all four air pollutants set by the EU National Emission Ceilings (NEC) Directive. The NO_x ceiling remains the most difficult to comply with, due in part to the fact that demand for road transport has grown faster than anticipated. 13 Member States have reported that they expect to miss their NO_x ceiling.

The report presents country-specific and EU-wide information for the four pollutants covered by the NEC

Directive: sulfur dioxide (SO₂), nitrogen oxides (NO_x), non-methane volatile organic compounds (NMVOCs) and ammonia (NH₃). The Directive covers emissions from all sources arising as a result of human activities within the territory of the Member States and their exclusive economic zones, except emissions from international maritime traffic and aircraft emissions beyond landing and take-off. The report is at http://reports.eea.europa.eu/technical_report_2008_9/en.

Nine EU Member States apply for Air Quality Derogations

Nine EU Member States have applied to delay compliance with EU air quality limits on particulate matter from 2005 until mid-2011. Governments had until the end of October to request derogations under the revised CAFE air quality Directive. Requests have been submitted by the Netherlands, Denmark, Spain, Belgium, France, Greece, Hungary, Poland and the Slovak Republic. The Commission says it expects "several" more late submissions.

Ozone Pollution remains a Health Hazard in Europe

A new World Health Organisation (WHO) report says that current policies are not sufficient to significantly reduce the impacts of ozone pollution on human health in the EU over the next decade.

Emissions of ozone's main precursors - nitrogen oxides and volatile organic compounds - are declining in Europe and are expected to continue this trend. But this is counteracted by a global increase in background ozone levels from non-EU countries lacking stringent emissions measures. The report concludes existing measures will only reduce premature mortality in Europe by some 600 cases per year, down from 21000, between 2000 and 2020. Implementing ambitious climate policies could achieve "markedly larger" reductions of around 40%, the authors say. The report is at www.euro.who.int/InformationSources/Publications/Catalogue/20081017_1.

Swiss proposals for Car Environmental Labelling and Taxation

Switzerland has outlined details of its plan to introduce a new environment label that will serve as the basis for a federal tax incentive for "clean" vehicles.

The Swiss Federal Office of Environment said it plans to put forward a legislative proposal in the first half of 2009. The proposed label will show how different car models compare in terms of energy efficiency and pollutant emissions. The label should be ready for use by 1 January 2010. A proposal currently before the Swiss Parliament would allow buyers of vehicles with

low impact ratings to claim a rebate on the purchase cost. The rebate would be financed through an increase on Switzerland's federal automobile tax.

Changes to German Road Tolls and Car Taxation

On 7 December 2008, the German Federal Minister of Transport, Building and Urban Affairs, announced that an agreement with the Federal States had been reached on changes to the MAUT road tolls for heavy goods vehicles (HGVs). As of 1 January 2009, heavy goods vehicles equipped with modern and clean technology will pay considerably less than those vehicles with high levels of emissions. The toll levels are based on the emissions standards to which the vehicle is homologated, but in addition, Euro III HGVs with retrofit particulate filters (DPF) will pay the same toll as Euro IV vehicles and Euro II ones retrofitted with a DPF will pay the same as Euro III vehicles.

In a separate announcement, the German Chancellor detailed plans to support the domestic car industry by lowering taxes on low-emissions cars. New cars will be exempt from the motor vehicle tax for one year - Euro 5 and Euro 6 cars for two years. The exemption will apply from the date of Cabinet approval until 31 December 2010. From 2011 the tax will, as planned, be based on CO₂ emissions.

PM-related Legal, Retrofit and Tax Developments in the Netherlands

The European Court of Justice (ECJ) has annulled a European Commission decision to reject tougher emissions limits for fine particles proposed by the Netherlands for new diesel cars and light vans. A Dutch proposal made in 2005 would have effectively banned new diesel vehicles emitting more than 5mg/km of particulate matter (the current Euro 4 limit is 25mg/km). The ECJ said that the Commission, in order to determine whether there was a specific problem of ambient air quality in the Netherlands, did not properly take account of all the relevant data. The court said that the decision must be annulled so the Commission may again evaluate the measures on the basis of all the relevant scientific evidence.

The Dutch government has also announced changes to its motor vehicle tax system (BPM) affecting privately-owned light-duty diesel vehicles with PM emissions of 5mg/km or less. From 1 January 2009 the current particulate emission differentiation will be replaced, for legal reasons, by a reduction in BPM of €600 for diesel passenger cars and diesel delivery vans (owned by private individuals) with particulate emissions of 5mg/km or less. In 2010 the figure will be reduced to €300 and in 2011 it will be removed. The

level of reduction in 2009 is the same as which previously applied. The Dutch authorities say the aim of the proposal is to maintain the incentive for choosing a diesel car with a factory fitted soot filter.

In a further move, the Dutch Environment Ministry (VROM) has announced that it plans to extend its entire subsidy package for particulate filters and cleaner engines for one year until 31 December 2009. VROM says that in 2008, some 145000 vehicle owners have benefited from €66 million in subsidies for the purchase of a particulate filter or a truck with a cleaner engine. In the past year, the sales of trucks and buses complying with Euro V or the EEV standard has greatly increased. There has also been an increase in the supply of new vans with original-equipment particulate filters. For 2009 the available budgets are as follows:

• passenger cars with retrofit particulate filter (SRP)	€11,8 million
• trucks with retrofit particulate filter (SRV)	€14,8 million
• particulate filters on mobile machinery (SRMW)	€6 million
• new trucks and buses with Euro V/EEV engine	€9 million
• new taxis and vans with particulate filter (STB)	€18 million

Tighter Emissions Limits for Dutch Combustion Plants

The Dutch Environment Minister has announced that air pollutant emission limits for medium-sized combustion plants will be tightened to help the Netherlands meet EU air pollution and climate goals. New limits will apply for NO_x, SO_x, PM and HC emissions. They should enter into force before summer 2009, the Minister said. All new installations will have to comply immediately; existing installations will have a transition period until the end of 2018.

Flemish Decision on Incentives for Diesel Retrofit

On 17 December 2008, the Government of Flanders, the Dutch-speaking region of Belgium, decided to grant a subsidy for the installation of soot filters in Euro 3 light-duty diesel vehicles. The level of subsidy will be 80 % of the total invoice amount, with a maximum of €400. It will be payable to any individual who fits a Euro 3 vehicle with an unused particulate filter. The filter must be of a brand and type that is type-approved as suitable for the specific vehicle by RDW (Netherlands) or by the Belgian Federal Mobility Service (Dienst Voertuigen van de Federale Overheidsdienst Mobiliteit). The premium will be granted within the limits of the budget appropriations.

Czech Republic to increase Tax on pre-Euro 3 Cars

The Czech Environment Ministry has announced that from January 2009 purchasers of second-hand cars that do not meet at least Euro 3 emissions standards will pay a levy of between CZK 3 000 and CZK 10 000 (€116-€386). The revenue will fund used car disposal. Out of more than 4.4 million cars in the Czech Republic, 1.45 million are older than fifteen years and do not therefore meet any of the Euro emissions standards. Their owners will pay a CZK 10 000 fee during the first re-registration after 1 January 2009. One million cars of an average age of 10-15 years only meet the emissions limits Euro 1 or Euro 2. Registering these vehicles to new owners will cost CZK 3 000 to CZK 5 000. The Ministry said road traffic was the biggest contributor to air pollution in the Czech Republic, especially for particulate matter.

Spain reports Increasing NO₂ Exceedences

Air pollution across Spain and particularly in the large cities is generally worsening according to data for 2007 contained in the government's latest annual 'state of the environment' report. The number of monitoring stations reporting ozone and NO₂ concentrations exceeding ambient air quality standards increased compared to the previous year. In Madrid, safety levels were exceeded for ozone, NO₂ and particulate matter but an improvement was recorded for CO. The report is at www.mma.es/portal/secciones/info_estadistica_ambiental/estadisticas_info/memorias/2007/index.htm.

Updated Swiss Non-Road Emissions Inventory

The Swiss Environment Ministry (BAFU) has published an updated emissions inventory from the non-road sector. Calculations were done on eight application areas (construction, industry, agriculture, forestry, gardening & leisure, navigation, railways and army). Agriculture and construction are the biggest contributors to fine particles (PM) and NO_x emissions. Nevertheless, industry emissions are not negligible, mainly from forklifts and snow groomers. For HC and CO, most of the emissions come from agricultural machinery and gardening and forestry equipment. Compared to road traffic, pollutant emissions from the non-road sector are disproportionate, the report says. Non-road applications consume 8% of the energy, but their contribution to pollution varies from 19% (for CO) to 39% (for fine particles). This is due to non-road sector emissions requirements which are less stringent and have been introduced later and to less

efficient emissions control technologies for machinery and equipment. Beside HC emissions from small engines, particles from agriculture need to be reduced as a priority, BAFU says, noting that while particulate filters have been broadly mounted onto construction equipment thanks to the 2002 Ordinance on Air Protection, it has just started for agriculture tractors.

Russia may delay Euro 3, 4 & 5 but put Import Duties on Older Vehicles

Russia's Energy Ministry has submitted to the Government a draft bill seeking to postpone the introduction of the Euro 3 emissions standard for cars for two years, according to a report in *Tass*. If the bill is approved, the Euro 3 standard will be introduced in 2011. The bill also envisages postponing the introduction of the Euro 4 and Euro 5 emissions standards until 2012 and 2015, respectively. Russian oil refineries have not yet completed the upgrades necessary to supply sufficient amounts of Euro 3 standard gasoline to domestic consumers in 2009.

Meanwhile the Russian government commission on protective measures in foreign trade and customs and tariff policy has recommended imposing a 30% import duty on cars that are between 1 and 3 years old, with a proportional increase in the minimum duty per 1cc of engine displacement. Similar duties have been proposed for cars that have been in use from 3 to 5 years, the government said in a statement. Rates would be from €2.5 to €5.7 per cc for cars, from €2 to €4.4 per cc for trucks, and €3 per cc for buses.

The commission also recommended imposing a zero import duty on buses under 5 years old with Euro IV emission class engines and a 25% duty on buses with engines that do not comply with Euro IV standards. The commission also considered it possible that new truck tractors with engines complying with Euro IV and higher standards could be imported duty-free.

Denmark announces Ship Emissions Reduction Plan

Denmark's Environment Ministry has announced a partnership with the Danish Shipowners' Association to further reduce sulfur emissions from ships. A joint statement issued on 12 November 2008 sets a 90 % reduction as a main goal, but as yet no deadline appears to have been set. The initiative comes in response to new standards for fuel sulfur and NO_x emissions confirmed by the International Maritime Organisation (IMO) in October 2008. The Ministry also announced an action plan intended to encourage the oil industry to meet the new standards and to develop "common initiatives in technology and research".

NORTH AMERICA

California passes Emissions Requirements for Existing HD Vehicles

On 12 December 2008 California became the first US State to force existing large diesel trucks to clean up their exhaust emissions. The rules regulate emissions of NO_x and particulate matter (PM). About a million vehicles are affected, at least half of them from other states or countries but travelling into California. The regulation generally requires the installation of verified retrofit particulate filters in 2011-2014, followed by a longer phase-in of NO_x reductions. The NO_x reductions require, by 2023, emissions performance equivalent to the 2010 heavy-duty limits for new vehicles. It is expected that this requirement will largely be met through accelerated fleet turnover, but there will also be options for verified PM+NO_x retrofits or NO_x-only retrofits for 2007-2009 model year trucks.

The California Air Resources Board estimates that the regulations will cost about \$5.5 billion (€4 billion), but puts the health benefits of cleaner air at \$48 billion to \$69 billion (€35 billion to €50 billion) over 20 years.

New York proposes Retrofit Requirements for State Trucks

The New York Department of Environmental Conservation has proposed regulations that will require the use of best available retrofit technology and ultra-low sulfur fuel on heavy-duty diesel vehicles owned or operated by or on behalf of the State.

The regulation will apply to heavy-duty vehicles (gross vehicle weight >8500lb., approximately 3.85 tonnes). Several categories of off-road equipment, including earth movers, farm tractors and railway locomotives are exempted from the regulation. To comply, vehicles will have to be fitted with the EPA or California ARB-verified retrofit device that offers the greatest reduction in particulate mass for the specific engine. NO_x reductions must also be considered if suitable devices are available at reasonable cost. As an alternative to retrofitting, the vehicle must be fitted with a certified engine meeting the US EPA 2007 standard for particulates. About 30000 trucks will be retrofitted at a cost of \$195 million (€154 million). The proposed regulation also requires that affected vehicles have their engine control modules software updated to reduce off-cycle NO_x emissions.

British Columbia to fund Clean Diesel School Buses

The Ministry of Education for British Columbia, Canada, has announced that it will provide \$10.4

million dollars (€6.3 million) to school districts in the Province to help purchase 86 new clean diesel buses. The funding will replace buses over a specific age and mileage: 15 years and 400 000km for buses to carry 78 to 84 passengers; 12 years and 325 000km for those carrying between 24 and 72 passengers; or 10 years and 250 000 km for minibuses. The new buses will, the Province says, reduce PM emissions by 90%.

Final US Regulations for Heavy-duty OBD

The US Environmental Protection Agency (EPA) has issued the final Regulation on On-board Diagnostic Systems (OBD) for on-road heavy-duty vehicles. OBD systems monitor the correct functioning of the emissions control components and alert the driver to any fault. The system also stores information to assist in diagnosis and repair of the malfunction. The EPA requirements are consistent with those of California, although there are some minor differences.

The requirements apply to both diesel and gasoline heavy-duty engines. For vehicles of over 14000lb. (6.35 tonnes), from 2010 all major emissions control systems, including Diesel Particulate Filters (DPF) and NO_x reduction systems such as Selective Catalytic Reduction (SCR) must be monitored and malfunctions must be detected before emissions exceed defined thresholds. From 2013, all on-road engines for all manufacturers must be OBD certified.

For diesel vehicles under 14000lb., there are new emissions thresholds for monitoring DPFs from 2010. These replace a requirement to detect a major functional failure. EPA says it believes that a more stringent requirement is both appropriate and feasible. The Regulation also increases the NO_x threshold limits for such vehicles from the 2007 model year, because EPA believes that thresholds based on a factor above the appropriate NO_x standards are not feasible at these very low emissions levels.

US EPA Progress Report on Vehicle and Engine Compliance Activities

The US EPA's Office of Transportation and Air Quality (OTAQ) has released its first progress report on vehicle and engine compliance activities.

The report covers data collected in 2007 for all mobile sources. These data include test results from model year 2007 certification activities plus other types of compliance reports and tests. It highlights the fact that, in 2007, OTAQ issued over 3500 certificates of conformity to vehicle and engine manufacturers and comments that light-duty vehicles are being certified at very clean levels, with most vehicles meeting the Tier 2 Bin 5 emissions requirements with a significant compliance margin. However, even in the relatively

mature light-duty area, more than 2.5 million vehicles were affected by emissions-related voluntary recalls.

The report (www.epa.gov/otag/about/420r08011.pdf) lists all vehicle and engine categories regulated by EPA (on-road and non-road) with effective dates, their population by industry sector, and their contribution to mobile source emissions and to air pollution. Compliance life timelines are shown for light-duty and for heavy-duty and non-road applications.

US Engine Manufacturers prepare to meet 2010 Emissions Standard

The US-based Engine Manufacturers Association (EMA) has issued a statement confirming that its members see no technological barriers to meeting the US Environmental Protection Agency's 2010 emissions standard for heavy-duty diesel engines, and are on schedule to meet the standard.

The EMA statement was issued after the Owner-Operator Independent Drivers Association called for a delay to the standards "due to the high added cost of NOx emission control systems". The call has not been supported by other industry groups. Navistar, who supported the drivers' association call, is the only engine manufacturer who intends to meet the 2010 standards without the use of urea-SCR technology.

Californian Air Pollution costs over \$28 Billion per Year

California is losing \$28 billion annually in health-related costs because of air pollution in and around Los Angeles and in its San Joaquin Valley, according to a report released on 12 November 2008.

The two regions are among the nation's dirtiest in terms of air pollution. The results are a variety of costs associated with poorer health, ranging from missed work days to premature deaths. In Los Angeles the cost of air pollution exceeds \$1250 (€1000) per person per year and in the San Joaquin Valley it is more than \$1600 (€1280) per person annually, according to the report. One reason the costs are less in the more populous Los Angeles area is because winds off the Pacific Ocean push pollution east, researchers said. San Joaquin Valley's air pollution is trapped by mountains, creating a "soup bowl" effect where harmful emissions keep mixing. Emissions from fossil fuel combustion are seen as the main problem.

Source: Hall, Brajer & Lurmann, The benefits of meeting Federal Clean Air Standards in the South Coast and San Joaquin Valley Air Basins; California State University Fullerton, November 2008. http://business.fullerton.edu/centers/iees/reports/Benefits_of_Meeting_Clean_Air_Standards_11-13-08.pdf.

California Report on Fine PM-related Premature Deaths

California Air Resources Board (CARB) has released a report *'Methodology for Estimating Premature Deaths Associated with Long-term Exposure to Fine Airborne Particulate Matter in California'* updating the relative risk factor describing the association between PM_{2.5} and premature death. It also provides an updated threshold level for this relationship. Based on the new factor of 10% increase in the risk of premature death per 10µg/m³ increase in PM_{2.5} exposure and an updated threshold value of 5µg/m³, CARB estimates that exposure to PM_{2.5} contributes to about 18 000 premature deaths state-wide annually. See www.arb.ca.gov/research/health/pm-mort/pm-mort.htm

Study on Diesel Pollution in Pittsburgh

According to a study commissioned by the Allegheny County Board of Health from Carnegie Mellon University, large amounts of diesel exhaust from the buses and trucks in downtown Pittsburgh, Pennsylvania, carry a significant cancer risk. The study found elevated levels of 12 pollutants, including those found in diesel exhaust, benzene from coke production facilities in Clairton and Neville Island, and formaldehyde, which was found across the County. Diesel particulate-related pollution was found to dominate the risk, especially in downtown areas.

US increases Renewable Fuel Standard

The US Environmental Protection Agency has announced that the 2009 renewable fuel standard will be 10.21%. The 2008 standard was 7.76%. Based on the standard, each refiner, importer and non-oxygenate blender of gasoline determines the minimum volume of renewable fuel that it must ensure is used in motor vehicle fuel.

SOUTH AMERICA

Peruvian Government facing Difficulties in Efforts to reduce Air Pollution

The Peruvian Government has strongly criticised decisions of the congressional Transportation Commission to modify Legislative Decree 843 of September 1996 to allow the continued import of some used cars, and to end the mandatory car inspections in Lima, the capital, because of a legal dispute between the municipal government and a private company. Bill 02740-2008-CR, approved on 18 November 2008 by the commission, extends until 2012 the import of older used vehicles. Used car imports through the Tacna Free Trade Zone, in southern Peru, were scheduled to end mid-December.

The government also appears to be headed toward new delays in reducing the amount of sulfur in diesel fuel. Several norms, regulations and laws demand the reduction of sulfur in diesel fuel from current levels of up to 5 000ppm to 50ppm by 1 January 2010. Peru is unlikely to meet the 50ppm target as modernisation of the country's oil refinery in Talara is currently stalled.

Measurement of PAH Levels in Ecuador

Over a period of one year, researchers measured PAH continuously at two residential sites in Quito, Ecuador, plus PAH and traffic patterns for one week near a busy roadway. They found that morning rush-hour traffic and temperature inversions caused daily PAH maxima between 06:00 and 08:00. SO₂, NO_x, CO, and PM_{2.5} behaved similarly. At the residential sites PAH levels during inversions were 2- to 3-fold higher than during the afternoon, and 10- to 16-fold higher than 02:00 – 03:00 when levels were lowest. In contrast, at the near-roadway site, PAH concentrations were 3 to 6-fold higher than at the residential sites, and the effects of inversions were less pronounced. Cars and buses accounted for >95% of PAH at the near-road site. PAH concentrations near roads were comparable to other polluted cities.

Source: Brachtl et al, Spatial and temporal variations and mobile source emissions of polycyclic aromatic hydrocarbons in Quito, Ecuador; *Environmental Pollution*, [doi:10.1016/j.envpol.2008.09.041](https://doi.org/10.1016/j.envpol.2008.09.041).

ASIA-PACIFIC

Road Map for Cleaner Fuels and Vehicles in Asia

The Clean Air Initiative for Asian Cities (CAI) and the Asian Development Bank launched their Road Map for Cleaner Fuels and Vehicles in Asia at the Better Air Quality 2008 workshop, held in Bangkok from 12-14 November 2008. The report recommends steps to improve fuel quality and vehicle emissions for creating better air quality in the region. The report recommends that sulfur in gasoline and diesel is reduced to enable the use of advanced emissions control technologies. This will enable Asia to adopt vehicle emissions standards similar to those in Japan, Europe and the USA. The report also recommends that after the phase out of leaded gasoline, decisions are made on the use of octane enhancers.

The report is at www.cleanairnet.org/fuelroadmap.

Rising Vehicle Pollution in New Delhi

According to a study by India's Central Pollution Control Board (CPCB), *National Ambient Air Quality Status-2007*, New Delhi is battling with rising levels of Respirable Suspended Particulate Matter (RSPM). Even after the city converted to natural gas fuels in

2003, levels of nitrogen dioxide (NO₂) and respirable suspended particulate matter have increased. Levels of RSPM initially fell in 2005 to 110µg/m³ from 128µg/m³ in 2003 but went up to 154µg/m³ in 2007. The Pollution Control Board says that the increase is due to large-scale construction activity and a large and increasing number of vehicles. More than 1000 vehicles are being added to Delhi roads daily. In 1998, diesel vehicles formed about 2% of the total vehicles. Now they form about 30% of the new car sales.

Recent Developments in China

The Beijing Environmental Protection Board has identified their next environmental priorities as strict implementation of the Euro 4 vehicle standards that went into effect in 2008; work toward the adoption of Euro 5 vehicle standards and 10ppm sulfur fuels, perhaps by 2012; and reduced in-use emissions.

The reduction in in-use emissions is seen as being accomplished by an upgraded inspection and maintenance programme; an increase in the number of remote sensing devices from about 20 to around 40; using the newly-opened emissions laboratory to conduct an in-use compliance test programme, recognising that Euro 4 vehicles are required to meet the standards in use for 100000km; and forcing the scrapping of 300000 'pre Euro' light-duty vehicles and 100000 Euro 2 and older diesel trucks. These two classes of 'yellow sticker' vehicles are currently restricted from use during the normal business day.

In addition to these developments in Beijing, Shanghai has decided to proceed with adoption of Euro 4 emissions standards and fuels in October 2009.

China also introduced new motorcycle emissions standards from 1 July 2008 for new Type Approvals and 1 July 2009 for all models. The standards require Euro 3 emissions levels plus durability requirements (12000, 18000 or 30000km depending on engine size and maximum speed), plus evaporative standards.

Impact of Olympic Restriction on Beijing Air Quality

NASA researchers have analysed satellite data that show how key pollutants responded to the Olympic restrictions. The measures taken by the Chinese authorities included temporarily shutting down some factories and traffic restrictions including limiting use of older cars. During the two months when restrictions were in place, the levels of NO₂ fell by nearly 50% and carbon monoxide (CO) by about 20%. The reductions only became noticeable, however, when the investigators focused tightly on the Beijing area. After the authorities lifted the traffic restrictions, the levels of these pollutants increased again.

Jakarta Announces Tough Stance on Emissions

Jakarta's Environment Management Board (BPLHD) says that private vehicles in the city must pass an exhaust emissions test and receive a certification sticker in 2009. The board says it is making all the necessary preparations to implement a bylaw on air pollution and air quality control, although no date has yet been set for it. The bylaw stipulates owners of vehicles without emissions test stickers will be fined a maximum of Rp 2 million (€130). The law will initially apply to private owners but in the longer term will be applicable to owners of all kinds of vehicles.

MIDDLE EAST

Israel moves to 10ppm Sulfur fuel

Israel's National Infrastructure Ministry has signed an administrative order requiring oil refineries and importers to begin marketing fuel that meets the Euro 5 standard from 15 December 2008. By the end of that month, fuel that does not meet the standard will no longer be permitted to be sold in the country. Under the new regulations, gasoline with 10ppm sulfur content will be marketed locally. At present, the allowed sulfur content is 50ppm. Diesel for public transport will also have a 10ppm max. sulfur content.

RESEARCH

Air Quality, Emissions and Health

Study on Traffic Pollution and Respiratory Health

Researchers in Rome conducted a study evaluating the association of different indices of traffic-related air pollution (traffic intensity, distance from busy roads, area-based PM emissions and estimated NO₂ concentrations) with respiratory health in adults. The prevalence of asthma was associated only with (self-reported) traffic intensities. Rhinitis was strongly associated with all traffic-related indicators. The results for asthma were weak, possibly due to ascertainment problems, the researchers concluded.

Source: Cesaroni et al, Comparison between various indices of exposure to traffic-related air pollution and their impact on respiratory health in adults; *Occupational and Environmental Medicine* 2008;65(10):683-690).

Action needed on Ground-Level Ozone

Air pollution caused by ground-level ozone will become a serious threat to human health and food security within the next century unless action is taken on a global scale, according to a recent report. The report concludes that the worldwide implementation of legislation and technologies currently adopted will be critical if further increases in ozone are to be avoided.

Sources of ozone pollution not yet regulated include international shipping and aviation, both of which are expected to grow rapidly over the next decade. In the EU, emissions of NO_x from shipping are projected to exceed land-based emissions by 2020.

Source: Royal Society report (2008), Ground-level ozone in the 21st century: future trends, impacts and policy implications. <http://royalsociety.org/document.asp?tip=0&id=8039>.

Indoor Air Quality in Antwerp

A new paper from authors at the University of Antwerp, VITO, and the University of the Witwatersrand, South Africa characterises indoor air in Antwerp, Belgium. Linear relationships between the particulate matter elemental composition, SO₂ and O₃ levels indoors and outdoors could be established. No linear relationships between indoor and outdoor NO₂ and particulate mass concentrations were found.

Source: M. Stranger, S.S. Potgieter-Vermaak and R. Van Grieken, Particulate matter and gaseous pollutants in residences in Antwerp, Belgium, *Science of the Total Environment*, doi:10.1016/j.scitotenv.2008.10.019.

Effects of Soot and Aerosols

Improved PM Exposure Modelling

A new paper from Belgian and Dutch researchers says that activity-based models offer a technique to establish a dynamic exposure assessment to air pollution. The results for exposure to PM₁₀ and PM_{2.5} reveal large differences between a static approach and this dynamic one, mainly due to underestimation of the number of hours spent in the urban region by the static method. The authors conclude that dynamic modelling contributes to a much more accurate exposure assessment that can help evaluate policies to reduce public exposure to air pollution.

Source: Beckx et al, A dynamic activity-based population modelling approach to evaluate exposure to air pollution: Methods and application to a Dutch urban area; *Environmental Impact Assessment Review*, doi:10.1016/j.eiar.2008.10.001.

Emissions Measurement

Nucleation Mode Particles

A recent study analysed nucleation mode particles from three different diesel vehicles operating on ultra-low sulfur diesel. The three vehicles were a 2003 model-year vehicle equipped with a Diesel Oxidation Catalyst (DOC), whilst the other two vehicles, both 2007 model year, utilised a diesel particulate filter (DPF) with different NO_x control technologies installed upstream. One used a Selective Catalytic Reduction (SCR) system; the other had a Lean NO_x Trap (LNT).

The researchers observed a solid carbon particle nucleation mode accompanying normal soot emissions in the case of the two 2007 model year vehicles. This mode is most prominent at idle, but also

appears at speeds below about 48km/h. It is, say the researchers, highly sensitive to the level of exhaust gas recirculation (EGR). At higher speed operation, no nucleation mode particles were observed.

The overall conclusion of the study was that the DPF installed on each of these vehicles was effective in trapping both nucleation and soot accumulation mode particles with filtration efficiencies above 99%.

Source: De Filippo & Maricq, Diesel Nucleation Mode Particles: Semivolatile or Solid?; *Environmental Science & Technology* vol. 42, no. 21, pp.7957-7962, 2008. [doi: 10.1021/es8010332](https://doi.org/10.1021/es8010332).

Calculating Emissions from Shipping

A new study provides data on pollutant and global warming emissions from shipping at sea and in port.

The Norwegian researchers calculated the time spent at sea and in port in 2004 for seven sizes of ships and 15 ship types. Global emissions inventories were calculated for CO₂, NO₂, SO₂, CO, CH₄, VOCs, N₂O, Black Carbon (BC) and Organic Carbon (OC). Bulk carriers, container vessels and oil tankers accounted for about half of the total air emissions of the world's fleet, with 95% of these emissions occurring when vessels were at sea. Shipping was estimated to have contributed 5-15% of surface ozone over W. Europe.

Source: Dalsøren et al. Update on emissions and environmental impacts from the international fleet of ships. The contribution from major ship types and ports; *Atmospheric Chemistry and Physics Discussions*, 8: 18323-18384 (2008). www.atmos-chem-phys-discuss.net/8/18323/2008/acpd-8-18323-2008.pdf.

Mutagenicity Testing of Diesel Exhaust from Biofuels

A team of German and American researchers has compared the mutagenic effects of diesel exhaust emissions from rapeseed oil, rapeseed methyl ester (RME, biodiesel), natural gas-derived synthetic fuel (gas-to-liquid, GTL), and a reference petrodiesel fuel generated by a heavy-duty truck diesel engine using the European Stationary Cycle (ESC).

The rapeseed oil particle extracts increased the mutagenic effects by factors of up to 17 compared with the reference diesel. The rapeseed oil condensates caused up to three times stronger mutagenicity, whilst RME extracts had a moderate but significantly higher mutagenic response in certain assays. GTL samples did not differ significantly from the reference diesel. Regulated emissions (HC, CO, NO_x, and particulate matter) remained below the limits except for an increase in NO_x exhaust emissions of up to 15% from the tested biofuels.

Source: Krahl et al, Comparison of exhaust emissions and their mutagenicity from the combustion of biodiesel, vegetable oil, gas-to-liquid and petrodiesel fuels; *Fuel*, [doi: 10.1016/j.fuel.2008.11.015](https://doi.org/10.1016/j.fuel.2008.11.015).

Comparison of Emissions from Urban Buses

A paper from the University of Madrid compares buses with two exhaust aftertreatment technologies: the combination of a diesel particulate filter and an

exhaust gas recirculation system and the combination of a selective catalytic reduction catalyst and urea. On-board emissions measurements were conducted under real-world driving conditions on a specific bus route in the city of Madrid using diesel and biodiesel.

Source: López, Jiménez, Aparicio and Flores, On-road emissions from urban buses with SCR+Urea and EGR+DPF systems using diesel and biodiesel; *Transportation Research Part D: Transport and Environment*; Vol. 14 Issue 1, January 2009, pages 1-5, [doi: 10.1016/j.trd.2008.07.004](https://doi.org/10.1016/j.trd.2008.07.004).

GENERAL

Soot could speed Arctic Melting

On 2 December 2008, experts at the UN Climate Change Conference in Poznań, Poland warned that soot is darkening ice in the Arctic and speeding a melt that could make the ocean around the North Pole ice-free in summer well before 2050. They said the fight against warming in the Arctic should be redirected to focus more on cutting the industrial pollution from soot, ozone and methane in Europe, North America and Russia. Reductions in these pollutants, they said, would have a greater impact in the next two decades than curbing emissions of CO₂.

ICCT Issues New Report on MMT

The International Council on Clean Transportation (ICCT) has released a new report on the manganese-based fuel additive MMT: *Methylcyclopentadienyl Manganese Tricarbonyl: A science and policy review*.

The report notes that during 2008, Health Canada released a draft risk assessment for manganese that would reduce allowable ambient concentrations to no more than 0.05µg/m³, a level substantially tighter than has previously been in effect and equivalent to the current EPA standard. The agency has not stated a timeline for final adoption of the proposal.

The report, which includes a summary of restrictions in countries around the world, is at http://theicct.org/documents/MMT_ICCT_2009.pdf.

FORTHCOMING CONFERENCES

7th International Colloquium Fuels

14-15 January 2009, Stuttgart/Ostfildern, Germany

Details at www.tae.de/fuels

The conference includes four sessions on emissions and their control and two on combustion processes and fuel requirements.

Partikelfilter-Nachrüstung von Dieselmotoren / Particle Filter Retrofitting of Diesel Engines

19-20 January 2009, Munich, Germany

Details at www.hdt-automotive.de

Topics include the morphology, composition and biological attributes of combustion particles, filtration mechanisms and performance, operating conditions, measurement procedures, legislative developments, and Low Emissions Zones.

Symposium on International Automotive Technology (SIAT)

21-23 January 2009, Pune, India

Details at <http://siat.araiindia.com>

The theme of SIAT 2009 is Eco-Mobility. The conference will focus on the key areas such as alternative fuels, automotive testing, durability, emissions, engines, and vehicle evaluation.

7th International CTI Forum Exhaust Systems

26-29 January 2009, Düsseldorf, Germany

Details at www.exhaustsystems-forum.com

Themes will include emissions laws in international comparison, alternative fuels and effects on emissions, worldwide emissions strategy for diesel engines in passenger cars, and current systems to reduce particulate and NOx.

Alternative Antriebe für Automobile / Alternative Propulsion Systems for Automobiles

29-30 January 2009, Munich, Germany

Details at www.atzlive.de

Promising and potential configurations of propulsion systems will be discussed from the point of view of an effective energy management. On the second day, OEM leaders will show the development strategies for the most advanced configurations.

EU Sustainable Energy Week

9-13 February 2009, Brussels and around the EU

Details at www.eusew.eu/

A broad focus on renewable energy, but some events on transport fuels and sustainable mobility.

Greenport 2009

25-26 February 2009, Naples, Italy

Details at www.green-port.net

This conference will provide delegates with a comprehensive and detailed Operational Guide that mixes shared experiences and academic analysis with case studies and innovative proposals.

15th Fuels & Lubes Asia

4-6 March 2009, Hanoi, Vietnam

Details at www.fuelsandlubes.asia

International Advanced Mobility Forum 2009 – Energy for Transportation 2050

10-12 March 2009, Geneva, Switzerland

Details at www.iamf.ch

Subject areas to be discussed include fuel strategies for future transport needs; biofuels, natural gas, CTL, & GTL; advanced internal combustion engines; auxiliary systems for improved efficiency; new powertrain concepts; and concepts of multi-modal mobility and options for future cargo transport.

Green Ship Technology 2009

24-25 March 2009, Hamburg, Germany

Details at www.lloydslistevents.com

CAPoC8 Eight International Congress on Catalysis and Automotive Pollution Control

15-17 April 2009, Brussels, Belgium

Details at www.ulb.ac.be/sciences/cpmct/capoc8

The conference covers all topics related to applications and requirements of catalysis in automotive emissions control - catalyst and sorption technologies, particulate emissions control, off-cycle emissions and unregulated pollutants, materials for catalysts, washcoat and fuel-borne catalysts.

SAE 2009 World Congress

20-23 April 2009, Detroit, Michigan, USA

Details at www.sae.org

Challenge Bibendum 2009

26-29 April 2009, Rio de Janeiro, Brazil

Details at www.challengebibendum.com

Challenge Bibendum gathers entrepreneurs, industrialists and scientists to share technologies, visions and roadmaps with policymakers and media.

Additives 2009: Fuels and Lubricants for Energy Efficient and Sustainable Transport

27-30 April 2009, York, UK

Details at www.rsc.org/Additives2009

The meeting aims to provide a multi-disciplinary forum to share ideas for future developments in the science and technology of fuels and lubricants.

5th AVL International Commercial Powertrain Conference

28-29 April 2009, Graz, Austria

Technical sessions will cover emissions compliance, hybrid powertrains, alternative fuels and electronic systems including OBD.

30th International Vienna Motor Symposium

7-8 May 2009, Vienna, Austria

Details at www.xn--vk-eka.at

The symposium covers worldwide engine and powertrain development, future legislation, new engines, fuels and powertrain, hybrid technology, CO₂ reduction, and exhaust emissions control.

Diesel Engine Technology Seminar

11-12 May 2009, Lyon, France

Details at

www.sae.org/servlets/pdEvent?OBJECT_TYPE=PDEventInfo&PAGE=getPDEventInfo&EVT_NAME=93014

This course will explain the fundamental technology of diesel engines and continue with aspects of engine design and emissions control design. An overview of developing technologies for the future with a comprehensive section on exhaust aftertreatment is also included.

FISITA 2010: Automobiles and Sustainable Mobility

30 May - 4 June 2010, Budapest, Hungary

Details at www.fisita2010.com

The main topics will include environment-friendly vehicles and powertrains, vehicles standards, regulations and legislation and special questions for buses and trucks.

(Particle) Emissions of 2-stroke Scooters – science, problems, solutions & perspectives

11-12 June, 2009, Monza/Milan, Italy

The main topics will be research and reduction of emissions, development of aftertreatment devices for gaseous emissions and for (nano)particulates, lube oils & fuels, CO₂ emissions and fuel consumption, toxicity & health effects, alternative powertrains, and legislation & inventories.

SAE 2009 Powertrain, Fuels and Lubricants Meeting

15-17 June 2009, Florence, Italy

Details at www.sae.org

13th ETH Conference on Combustion-Generated Nanoparticles

22-24 June 2009, Zurich, Switzerland

Deadline for abstracts is 20 March 2009

PTNSS International Congress on Combustion Engines

22-24 June 2009, Opole, Poland

Details at www.ptnss.pl/kongres

The Congress covers a wide range of topics in the research fields as the design, manufacture, research and ecological effect of internal combustion engines and fuel use.

12th EAEC European Automotive Congress

29 June - 1 July 2009, Bratislava, Slovakia

Details at <http://www.eaec2009.com>

Five parallel sessions allow over 100 presentations and discussions on topics of "Powertrain Efficiency", "Vehicle for the next Decade" and "Production and Transportation Systems".

42nd IUPAC Congress: Chemistry Solutions

2-7 August 2009, Glasgow, Scotland

Details at www.rsc.org/ConferencesAndEvents/RSCConferences/IUPAC2009/index.asp

Deadline for abstracts is 16 January 2009

Symposia topics include catalysis for a sustainable future, biofuels, chemistry addressing climate change, and chemistry and the hydrogen economy.

9th International Conference on Engines and Vehicles (ICE2009)

13-18 September 2009, Capri, Naples, Italy

Details at www.sae-na.it/iceconf.html

Conference topics include fuel injection and combustion processes, alternative fuel power systems, powertrain technology, and exhaust aftertreatment and emissions.

SAE Heavy-duty Diesel Emissions Controls Symposium

15-17 September 2009, Gothenburg, Sweden

Details at www.sae.org/events/training/symposia/hddec/

SAE 2009 Commercial Vehicle Engineering Congress and Exhibition

6-8 October 2009, Rosemont, Illinois, USA

Details at www.sae.org/events/cve/

Deadline for abstracts is 27 February 2009

APAC 15 – Asia-Pacific Automotive Engineering Conference

26-28 October 2009, Hanoi, Vietnam

Details at www.vsa.org.vn/

Deadline for abstracts is 20 February 2009

15th Small Engine Technology Conference

3-5 November 2009, Penang, Malaysia

Details at www.setc2009.com/

Deadline for abstracts is 31 January 2009

The conference will have presentations relating to small power sources and applications such as motorcycles, scooters, marine, agricultural and garden equipment, ATVs and portable generators.