AECC

Newsletter

January - February 2010

INTERNATIONAL REGULATORY DEVELOPMENTS

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EUROPE

Report on New EU Measures for Motorcycle Emissions

The European Commission's Directorate-General for Enterprise and Industry has published the final version of a report on possible new measures for motorcycles emissions. The report was produced by the Laboratory of Applied Thermodynamics (LAT) at Aristotle University of Thessaloniki, Greece.

As well as the potential for new emissions limits for motorcycles, tricycles, quadricycles and mopeds and for measurement of CO_2/fuel consumption, the report addresses durability, in-use conformity, on-board diagnostics and evaporative emissions control. Five scenarios have been modelled, ranging from continuation of current emissions limits to the introduction of the same emissions limits as Euro 5 cars for all powered two-wheelers.

The report says that by 2020, without changes to current legislation, Powered Two-Wheelers (PTWs) will emit more total HC emissions than all other vehicle categories and will also become much more important relevant contributors of CO emissions. Their contribution to NO_x and PM emissions also increases after 2013, as the introduction of DeNOx and DPF aftertreatment systems in passenger cars and heavy-duty vehicles will reduce emissions of those classes of vehicle. The contribution of PTWs to urban emissions increases to ~10% and 20% of total road transport NOx and PM emissions respectively by 2020.

The report also says that the contribution of tricycles and quadricycles to total road transport emissions cannot be considered negligible. In particular, quadricycles will be responsible for more than 35% of total PM from the sector in 2020. The report also comments that "it is absolutely critical that a durability regulation is introduced for PTWs, otherwise significant departures from the emission standard may occur at rather short distances (i.e. less than 5000 km)." The report (No. 08.RE.0019.V4) is at http://ec.europa.eu/enterprise/sectors/automotive/files/projects/report_measures_motorcycle_emissions_en.pdf.

Commission announces Workshop on Heavy-duty GHG Emissions

The European Commission's Directorate-General for Environment has announced that it is organising an international workshop on Greenhouse Gas certification methods for heavy-duty vehicles. It will be held at the Commission's Joint Research Centre in Ispra, Italy on 19-20 April 2010.

DG-Environment says that a reliable and realistic method is needed to certify the fuel consumption and CO_2 emissions of complete heavy-duty vehicles. The Commission has started the development of a method and is aware of similar activities in other parts of the world. It is organising the workshop because there is a common interest in ensuring mutual awareness, consistency and synergy of these activities.

New European Commission creates Climate Change Directorate

Following the formal endorsement of the new European Commission by the European Parliament, the new Commission has created a Directorate-General on Climate Action (DG-CLIM).

The new Directorate brings together climate-related units from existing Commission departments on the environment, external relations and industry. The Environment Directorate will remain responsible for air quality legislation and other environmental issues, including industrial emissions and the integrated pollution prevention and control (IPPC) Directive, but protection of the ozone layer will move to DG-CLIM.

At the same time, DG Transport and Energy was split into two Directorates - DG Energy and DG Mobility and Transport (DG-MOVE).

Commission rejects Italian PM_{10} Air Quality Derogations

The European Commission has rejected 11 out of 12 of Italy's second request for more time to meet air quality targets for particulate matter (PM_{10}) in the regions of Campania, Puglia and Sicilia. Most of Italy's earlier requests were rejected last year.

On 1 February 2010, the Commission approved a time extension for one zone in the region of Campania. The other 11 zones did not qualify for various reasons. The Commission said that four of them have already met EU air quality standards.

Possible Commission Actions to reduce Transport CO_2 Emissions

The European Commission is considering CO_2 emissions standards for lorries and road pricing to help further reduce transport's greenhouse gas emissions, according to a statement by a Commission official at a European Parliament briefing on the Copenhagen Climate Summit on 12 January 2010.

DG-JRC Report shows Benefits of Infrastructure Charging

The overall benefit of charging trucks for the pollution they cause outweighs the limited negative price impact on consumers, according to a new report from the EU's Joint Research Centre (DG-JRC).

The JRC's analysis aimed to calculate the cost of the proposed 'Eurovignette' road charging Directive for international transport operations. The base case and four other scenarios assumed that vehicles meet Euro IV emissions standards. A sixth scenario assumes the vehicles meet Euro V standards. The report concludes that the impact of the planned charges on final product prices is "negligible", but charges based on different pollution levels will accelerate fleet renewal. Shifting to a less polluting technology, e.g. from Euro IV to Euro V has a significant impact on emissions and the resulting charges for pollution, so it leads to cost savings for operators in the long term.

Source: Christidis and Brons, Impacts of the proposal for amending Directive 1999/62/EC on road infrastructure charging: An analysis on selected corridors and main impacts; *DG-JRC Working Papers on Energy, Transport and Climate Change* N.3, http://ftp.jrc.es/EURdoc/JRC54766_TN.pdf.

Report on Emissions of Ozone Precursors

The European Environment Agency has issued a new report assessing the progress made in the emissions of ozone precursors across Europe.

The report says that the aggregated emissions of ground-level ozone precursor pollutants (NOx, non-methane volatile organic compounds, methane and CO) decreased by 39% across Europe between 1990 and 2007. This decrease has been achieved mainly as a result of the introduction of catalytic converters for vehicles and to a lesser extent by a switch from petrol-fuelled cars to more diesel cars. Together these changes have significantly reduced emissions of NO_x and CO from the road transport sector, the main source of ozone precursor emissions.

The EU is still some way from meeting its target to reduce emissions of two ozone precursors (NO_2 and NMVOC) for which emissions limits exist under the National Emissions Ceiling Directive. A number of individual Member States anticipate missing their ceilings for one or either of these two pollutants.

The EEA assessment is available at http://themes.eea.europa.eu/IMS/IMS/ISpecs/ISpecification20081014123013/IAssessment1250178184476/view_content

Ships Slow to implement Low-Sulfur Fuel Requirement

The European Commission says that very few ships have been certified as complying with the new EU limit on the sulfur content of fuels used while at berth in European ports. The new limit entered force on 1 January 2010.

Ships using heavy fuel oil at sea must switch to lighter fuels such as gas oil when berthed in EU ports to meet a 0.1% limit on sulfur in fuel. Ships that are not designed to use these fuels must undergo technical modifications to eliminate safety risks. Some ships have still not completed the modifications and the vast majority is not certified, the Commission says.

New Car CO_2 Emissions for 2008

On 12 January 2010, the European Commission issued their report on 2008 CO_2 emissions from new passenger cars (COM/2009/0713 final).

Average CO_2 emissions in 2008 were 153.5 g/km, a decrease of 3.3% or 5.2 g/km from previous year.

Table 1: Average CO_2 emissions from new passenger cars by fuel

gCO_2/km	2000	2001	2002	2003	2004	2005	2006	2007	2008
All fuels	172.2	169.7	167.2	165.5	163.4	162.4	161.3	158.7	153.5
Petrol	177.4	175.3	173.5	171.7	170.0	168.1	164.9	161.6	156.6
Diesel	160.3	159.7	158.1	157.7	156.2	156.5	157.9	156.3	151.1
Alter. fuel	208.0	207.4	179.2	164.7	147.9	149.4	151.1	140.0	137.0

Both petrol and diesel vehicles improved by more than 5 g/km in comparison to 2007. Since 2000, petrol vehicles improved by 11% while diesel vehicles only by 6%. On the other hand, alternative fuel vehicles (AFV) improved by 34% since year 2000. AFV now account for 1.3% of new passenger car registrations.

Germany renews Incentives for EEV and Euro VI Trucks

The German Transport Ministry has announced the renewal of state funding for the purchase of Euro VI trucks when they become available and for EEV (Enhanced Environmentally-friendly Vehicle) trucks. The investment grant will be up to a maximum of €2 220 for Euro VI, with up to €1 650 for EEVs. Applications will be accepted until 1 July 2011.

Netherlands extends Particulate Filter and EEV Subsidies to End of 2010

The Netherlands has announced that it is extending until 31 December 2010 all five subsidies for cleaner engines and Diesel Particulate Filters (DPF) under its Traffic Air Quality Programme.

The five subsidy programmes cover grants for:

- retrofitting DPFs to existing cars.
- retrofitting DPFs on Euro 3 trucks (<225 kW).
- purchase of new vans with OEM particulate filter.
- purchase of new trucks with an EEV engine or vans that meet the EEV + standard.
- retrofitting of a particulate filter on a mobile machine. This scheme is extended with a number of additional categories such as compressors, generators, pumps and pile drivers.

Fitment of a particulate filter will also be necessary to meet the sustainability criteria in tenders for government contracts.

Danish Limits on Gas Engine Emissions

Denmark has released details of a Draft Order introducing emissions limits for HC, NOx, and CO for gas engines which use biogas and for engines and turbines which use gas oil, diesel oil, vegetable oil and fuel oil. For gas engines, an odour limit is also introduced. The limit values apply to engines which were brought into operation after 6 November 2005.

An emission limit for formaldehyde (22 mg/m^3) is also introduced for natural gas-fired engines. This applies to new and replacement gas engines brought into operation after a date to be set in 2010. Engines brought into operation before the deadline must comply with the limit by 1 January 2015.

New Dutch Rules on Boiler Emissions

New stricter rules on emissions of NOx, SO_2, fine dust and hydrocarbons from heating equipment (boilers, turbines, and engines used as emergency generators) will come into force on 1 April 2010, according to the new Dutch decree on emission standards for medium-sized heating plants. The emission limits are specified for each type of fuel and will apply immediately to new equipment installed after the decree comes into force. Existing equipment will have approximately eight years to meet the emissions requirements.

Swiss Brochure on Particulate Filters for Construction Machinery

The Swiss Federal Office for the Environment has issued a new brochure on 'Particle Filters for Construction Machinery'. The brochure summarises the health concerns on particulate and the benefits of particulate filters. It also provides links to the Swiss list of approved filters. The brochure is available in French, German and Italian at
www.bafu.admin.ch/publikationen/publikation/01070/index.html

German UBA Report on 2009 Air Quality

The German Federal Environmental Agency (UBA) has issued its preliminary assessment of air quality in Germany during 2009.

In many cities and metropolitan areas NO_2 concentrations were often higher than the limit of 40 µg/m^3 to be observed from 2010. Particulates (PM_{10}) at many locations also exceeded the limits that have been in place since 2005. 23 of a total of 408 monitoring stations showed more than 35 days with PM_{10} daily average over 50 µg/m^3. At the Stuttgart Neckartor measuring station the annual average PM_{10} limit of 40 µg/m^3 was also exceeded.

The preliminary analysis of 2009 air quality is at:
www.umweltbundesamt.de/uba-info-medien/mysql_medien.php?anfrage=Kennummer&Suchwort=3895.

Annual NO_2 Limits already Exceeded in Stuttgart and London

By 21 January 2010 Stuttgart's air quality monitoring station at Hohenheimer Straβe had already recorded 30 exceedences of the 200 µg/m^3 hourly NO_2 limit. This is twelve more than the permitted annual level.

The State Agency for Environment, Measurements and Nature Conservation (LUBW) says that the cause is mainly diesel-powered vehicles, "above all modern Euro 3 and 4 diesels, through the oxidation catalyst installed as standard which results in a substantial proportion of emissions directly emitted as NO_2." It says that NO_2 levels equivalent to petrol vehicles will only be achieved when Euro 6 enters force.

Current particulate matter and NO_2 measurements for Baden-Württemberg are at http://mnz.lubw.baden-wuerttemberg.de/messwerte/aktuell/regD9NO2.htm.

Meanwhile, London has also breached the annual NO_2 limits. Monitoring stations show that four areas have already exceeded the number of permitted exceedences for NO_2. One (Brixton Road, Lambeth) has already recorded 140 exceedences. The Campaign for Clean Air in London, said that the Mayor needs to implement a central London Low Emission Zone as soon as possible.

Denmark says it will meet EU Particulate Air Quality Standard

New figures from the Danish National Environmental Institute (DMU) show the nation will comply with the EU air pollution target for PM_{10} earlier than expected.

EU Member States must reduce annual concentrations of PM_{10} (particulate matter <10 µm diameter) to below 40 µg/m^3 on average. Particle levels in the most polluted area of Copenhagen did not exceed 30 µg/m^3 on average, the new figures show. Since 2006, the ministry pointed out, tax breaks for purchases of diesel cars with particle filters (DPFs) have led to more than 100 000 such vehicles being sold. Other measures include the introduction of urban "environmental zones" where the oldest and most polluting heavy vehicles must be equipped with DPFs.

Calls for Milan Ecopass Exemptions to be abolished

The former Milan commissioner for Mobility and the Environment, Edoardo Croci has suggested abolishing the exemptions in the city's Ecopass system for Euro 4 cars and Euro V goods vehicles without particulate filters. Croci is now a member of the 'Milano respira' group which includes politicians and medical experts. The group proposed establishing a Low Emission Zone within the city's bypass.

NORTH AMERICA

California issues LEV-3 Proposal

On 10 February 2010, the California Air Resources Board (CARB) revealed its draft proposal for new 'LEV-3' emissions standards. CARB says that, despite great progress in achieving cleaner air in California, major reductions of criteria pollutant emissions are still required to achieve air quality standards.

CARB says that the primary objective of the proposed standards is to require fleet average SULEV-level emissions performance from new vehicles by model year 2022. Proposed modifications from 2014 include:

- NMOG (non-methane organic gases) and NOx will be combined and in a single tighter limit;
- tighter PM standards;
- durability increased to 150 000 miles (241 402 km);
- reference fuel to include up to 10% ethanol;
- revised evaporative emission limits;
- new full useful life requirements for the supplemental test procedure (SFTP); and
- increased 50°F test limit when run on E85 fuel.

It is not proposed to change the standards for engine-certified medium-duty vehicles, but there are changes for those certified on chassis dynamometers.

The 3 current LEV, ULEV and SULEV emissions categories will be extended to 6. These are to be used for fleet average compliance with the new standards.

Table 2. Proposed LEV III NMOG+NOx Emission Standards

Vehicle emission category	Existing NMOG standards [a] (g/mi)	Existing NO_x standards [a] (g/mi)	Combined NMOG+NO_x standards (g/mi)	Proposed NMOG+NO_x emission standards [b] (g/mi)
LEV	0.090	0.070	0.160	0.160
ULEV	0.055	0.070	0.125	0.125
ULEV70	-	-	-	0.070
ULEV50	-	-	-	0.050
SULEV	0.020	0.010	0.030	0.030
SULEV20	-	-	-	0.020

[a] *These emission certification levels are for a 120,000-mile durability basis*
[b] *These proposed emission certification levels are for a 150,000-mile durability basis*

Annual fleet average limits have yet to be defined.

CARB also provides a list of the technologies that it says have the potential to enable compliance with these limits. The list covers upgraded catalysts, HC adsorbers, lean NOx aftertreatment, EGR, heated catalysts and catalytic radiator treatments in addition to engine design and turbocharger modifications, secondary air injection and engine management.

For medium-duty vehicles that are certified using chassis dynamometer procedures, CARB proposes replacing the current LEV and ULEV standards with new ULEV and SULEV standards for NMOG+NOx:

Table 4. Medium-Duty Vehicle Chassis Emission Standards

Emission Category	NMOG+NOx (g/mi) 8,500-10,000 lbs. GVW	NMOG+NOx (g/mi) 10,001-14,000 lbs. GVW
ULEV	0.200	0.317
SULEV	0.145	0.200

CARB will require that all vehicles in the lower weight class be certified to the chassis dyno standards. Fleet average requirements would be 0.170 g/mile for the lighter class and 0.230 g/mile for the heavier class.

CARB also plans to reduce the current LEV-2 PM limit of 10 mg/mile to around the current 'actual' levels of 2 to 4 mg/mile. The final figure is dependant on current test work. CARB notes that "One important determination will be whether the proposed PM standard would effectively require particulate filters for gasoline direct injection technology, which is expected to become widespread as manufacturers comply with federal GHG regulations from model years 2012-2016. Staff has received input from a number of manufacturers suggesting that a standard of 3 mg PM/mile can be met for gasoline direct injection engines without requiring the use of particulate filters".

The proposal does not include a separate mandatory particle number standard. CARB "acknowledges that the PM particle count emitted from motor vehicles poses a separate health effect from those of PM mass emissions and that reductions in PM mass have the potential to increase the number of particles emitted. However, issues related to emission testing variability and uncertainty in the health assessment science make the regulatory assessment for a PM count standard difficult at this time." An optional PM number standard of about 10^{12} particles/mile is being considered, though. This could be chosen by manufacturers instead of the PM mass standard.

The CARB proposals are available at: www.arb.ca.gov/msprog/levprog/leviii/meetings/030210/lev_iii_discussion_paper_2-10.pdf.

US-EPA issues Final Rule on Air Toxics from Stationary Diesel Engines

On 17 February 2010, the US Environmental Protection Agency (EPA) issued its final rule setting CO standards that are intended to reduce emissions of a range of hazardous pollutants (including aldehydes, benzene, 1,3-butadiene, and PAHs) from stationary diesel engines. Such engines, says EPA, are used in industrial facilities to generate electricity for compressors and pumps and in emergencies to produce electricity for flood and fire control pumps. Emergency engines used at most residences, hospitals and other institutional facilities, and commercial facilities such as shopping centres are not covered by this rule.

The rule applies to stationary diesel engines that are:

- used at area sources of air toxics emissions constructed or reconstructed before 12 June 2006, or
- used at major sources of air toxics emissions with a site rating of ≤500 hp, constructed or reconstructed before 12 June 2006, or
- used at major sources of air toxics for non-emergency purposes and which have a site rating of >500 hp, constructed or reconstructed before 19 December 2002.

The limits for non-emergency engines are 23 ppm CO or a 70% CO reduction for engines above 500 hp (373 kW), 49 ppm CO or 70% CO reduction for 300 to 500 hp engines, and 230 ppm CO for 100 to 300 hp.

EPA says that to meet these requirements, emissions controls such as oxidation catalysts will need to be installed on the largest engines. Stationary engines >300 hp must also be equipped with a crankcase filtration system to reduce metallic emissions. Emergency engines will have to comply with operating requirements to limit emissions. Details are at www.epa.gov/ttn/oarpg/t3/fr_notices/rice_neshap_021710.pdf.

EPA will, by 10 August 2010, issue final emissions standards for existing stationary engines that burn gasoline, natural gas and landfill gas.

US-EPA strengthens Ozone Standard

On 7 January 2010, the US Environmental Protection Agency proposed stricter standards for ozone.

The agency is proposing to set the primary, health-based, standard at between 0.060 and 0.070 ppm measured over eight hours. EPA is also proposing a separate secondary standard to protect the environment, especially plants and trees from damage occurring from repeated ozone exposure. The existing 8 hr ozone standard, set in March 2008 is 0.075 ppm.

EPA estimates that the proposal will yield health benefits between $13 billion and $100 billion (9 to 70 billion Euros) and will help reduce premature deaths, aggravated asthma, bronchitis cases and hospital and emergency room visits.

US strengthens NO_2 Air Quality Standard

On 25 January 2010, the US Environmental Protection Agency announced a new national air quality standard for nitrogen dioxide. EPA said that the new one-hour standard "will protect millions of Americans from peak short-term exposures, which primarily occur near major roads. Short-term exposures to NO_2 have been linked to impaired lung function and increased respiratory infections, especially in people with asthma."

The agency set the new one-hour standard for NO_2 at a level of 100 parts per billion (ppb). EPA also is retaining the existing annual average standard of 53 ppb. The agency is also establishing new monitoring requirements in urban areas that will measure NO_2 levels around major roads and across the community. Monitors must be located near roadways in cities with at least 500 000 residents. Larger cities and areas with major roadways will have additional monitors. Community-wide monitoring will continue in cities with at least 1 million residents. New monitors must begin operating by 1 January 2013. Details are at www.epa.gov/air/nitrogenoxides.

US-EPA releases Draft Documents Related to PM Air Quality

The Office of Air Quality Planning and Standards (OAQPS) of the US Environmental Protection Agency has issued for public comment two draft documents that describe the analyses that are being conducted as part of the review of the National Ambient Air Quality Standards (NAAQS) for Particulate Matter.

The two documents are *Particulate Matter Urban-Focused Visibility Assessment - Second External Review Draft,* (www.epa.gov/ttn/naaqs/standards/pm/data/20100121UFVAforCASAC.pdf) and *Quantitative Health Risk Assessment for Particulate Matter - Second External Review Draft* (www.epa.gov/ttn/naaqs/standards/pm/data/20100209RA2ndExternalReviewDraft.pdf).

California suspends Enforcement of Off-Road Fleet Regulation

The California Air resources Board (CARB) announced on 11 February 2010 that it is suspending enforcement of the compliance deadline for the off-road fleet regulation, which was due to start on 1 March 2010. The suspension is being granted to provide economic relief to the construction industry in California. CARB will continue assessing the effects of the recession on the industry and this may result in further modifications to the off-road fleet regulations.

California Law on Catalyst Recycling Records

A new California law, effective from 1 January 2010, requires recyclers to keep records for two years on automotive catalytic converter purchases. Recyclers are required to keep details of the seller and the delivery vehicle and a signed document indicating that the seller is the owner. The new law is intended to discourage theft of catalytic converters.

California publishes Retrofit Visibility Guide and Procedures

The California Air resources Board (CARB) has released details of the procedures that off-road fleet owners will have to use to request an exemption from retrofitting their off-road equipment on the grounds of visibility impairment. Last October CARB released an interim visibility policy which does not allow for any additional masking of the operator's vision field from the installation of a verified retrofit device.

Harmonisation of California Greenhouse Gas Standards

The California Air Resources Board (CARB) has adopted a regulation that will harmonise the State's light-duty vehicle greenhouse gas (GHG) standards

with the US EPA's Federal requirements. The two standards attain the same GHG emissions levels by 2016 but differ slightly in detail.

The California regulation allows cars that comply with the federal standards for model years 2012 to 2016 to also comply with California's standards for each of those years. It also includes provisions for compliance in the 2009 to 2011 model years, before the federal measures come into force. This allows California and the other states that have adopted the California standard to combine car sales to assess compliance.

In addition the Ministry of Environment for British Columbia (Canada) has signed an agreement with California to cooperate on implementing greenhouse gas emissions standards and to share information and resources to support consistent application of vehicle emissions standards. This will include cooperation on vehicle test data and determination of greenhouse gas emissions from light-duty passenger vehicles.

US Universities to study Impacts of Climate Change on Air Quality

The US Environmental Protection Agency is awarding grants of nearly $17 million (€12.4 million) to 25 universities across the country to study the public health and environmental consequences of climate change, including effects on air quality.

The grants cover the effects of Climate Change on four issues: allergies, air quality, water resources, and carbon sequestration. The grants on air quality will help understand how weather variability, land use decisions, and industrial technology could impact ozone and fine particle pollution over the next 40 years. EPA says the research will help guide the formation of new air quality management systems and mitigation strategies for air quality. Information about the grants is at www.epa.gov/ncer/climate.

US-EPA launches New Rulemaking Website

The US Environmental Protection Agency (EPA) has launched a new web site (www.epa.gov/rulemaking) to allow the public to participate in rulemaking.

The online Rulemaking Gateway provides information as soon as work begins and provides updates on a monthly basis as new information becomes available. Time-sensitive information, such as notice of public meetings, is updated on a daily basis. It also allows users to search for EPA rules that relate to specific interests, including children's health; environmental justice; and state, local and tribal government. The new site is intended to complement www.regulations.gov, the federal government's main portal for tracking rules from all federal agencies.

Renewable Fuel Standards for the US and for British Columbia

The 2010 US National Renewable Fuel Standard was finalised by the Environmental Protection Agency (EPA) on 3 February 2010.

The 2010 standard sets required renewable fuel volume at 12.95 billion gallons (49 billion litres). This amount is to include 24.6 million litres of cellulosic ethanol, 4.35 billion litres of biomass-based biodiesel, and 3.6 million litres of advanced biofuel, with the remainder being corn starch-derived ethanol. Life-cycle greenhouse gas reductions are defined for various types of fuel.

British Columbia's Ministry of Energy, Mines, and Petroleum Resources has also announced the enactment of its 'Renewable and Low Carbon Fuel Requirements Regulation', which sets standards to achieve a 10% reduction in the carbon intensity of transportation fuels from current levels by 2020. This is also based on a life-cycle approach. It also phases in the renewable diesel fuel requirement with a 3% target for 2010, 4% for 2011, and 5% by 2012.

SOUTH AMERICA

Chile creates Environment Ministry

On 12 January 2010, Chile's President Michelle Bachelet signed into law legislation to create the country's first Environment Ministry. The law (No. 20417) also creates the Superintendencia del Medio Ambiente, or Environmental Regulator's Office, to enforce regulations, as well as an independent evaluation service responsible for ensuring that new investment projects comply with environment rules.

Colombia plans Tougher Emissions Standards, Strengthened Enforcement

This year Colombian environmental officials plan to strengthen their regulation of air pollution, to implement a law punishing environmental offenders, and to prepare for the effects of climate change, the Minister of the Environment has told reporters.

Colombia will tighten its emissions standards for buses in the capital, Bogota, and second-largest city, Medellin, direct from the current Euro II standards to Euro IV, according to Environment Minister Carlos Costa Posada. Buses in the rest of the country will have to comply with Euro IV standards by 2013. As of January 2010, the diesel fuel in Bogota is supposed to contain no more than 50 ppm of sulfur, down from 300 ppm in 2009. Posada said he also expects Colombia to develop new standards for emissions from other vehicles during 2010.

Mexico to set Fuel Economy Standards

Mexico's Energy Ministry announced on 5 January 2010 that it will establish minimum fuel economy standards for new cars and heavy trucks, along with tougher rules on importation of used cars from the US, as part of an energy savings plan. The ministry's National Commission for the Efficient Use of Energy will develop the new rules and publish them shortly, the Ministry said in a statement. Authorities will also set fuel economy limits for vehicles used by the federal government.

Chile Switches to Low-Sulfur Diesel

Tighter fuel sulfur standards (50 ppm max.) came into force throughout Chile on 1 January 2010. Diesel sold in the greater Santiago area has been limited to 50 ppm sulfur since July 2004.

The fuel will allow wider use of Euro 4 light vehicles and will allow the incorporation of post-treatment emissions systems, such as Diesel Particulate Filters (DPFs), in new and existing buses and trucks, said Alvaro Sabag, Executive Director of Chile's National Environment Commission (CONAMA). Studies carried out by CONAMA and the Ministry of Transport suggest such measures could reduce emissions of coarse (PM_{10}) and fine ($PM_{2.5}$) particulate matter by 90% and 99% respectively, helping cities throughout Chile fulfil air quality improvement plans.

Gasoline sulfur levels are expected to fall to 15 ppm in the Santiago Metropolitan Region in the coming months and diesel sulfur should be down to 15 ppm in early 2011. Since 1 January 2010, all the new public transport buses entering the Santiago metropolitan area must meet the Euro III standard and have factory-fitted DPFs. On 6 January 2010 the first batch of 680 buses was already in operation.

Peru delays 50 ppm Sulfur Diesel

The Peruvian government has given fuel wholesalers and retailers an additional two months - until 1 March 2010 - to change diesel fuel supplies in the capital Lima and in neighbouring Callao to 50 ppm sulfur. The delay is reported to be needed by local refiners to complete upgrades.

Changes to Brazilian Fuels

Brazil's government has announced a temporarily cut in the mandatory amount of ethanol blended into petrol. The reduction, from 25% to 20%, is due to low supplies of ethanol, the Energy Ministry said on 11 January 2010. The reduction will be in force for 90 days from 1 February 2010.

Meanwhile Brazil's biggest oil company Petrobras has agreed a new timetable for the introduction of 50 ppm sulfur (Euro 4) and 10 ppm sulfur (Euro 5) diesel fuel. The distribution of 50 ppm diesel fuel will comply with a timeline agreed by Petrobras, the Ministry of the Environment, IBAMA (the Brazilian environmental institute responsible for regulation and control of environmental policies), ANFAVEA (the Brazilian vehicle manufacturers' association), CETESB (the São Paulo environmental organisation), the national petroleum agency (ANP) and the Environment Institute with the Federal Prosecutor's Office.

The 50 ppm fuel is currently being supplied to captive urban bus fleets in Rio de Janeiro, the São Paulo metropolitan region, Curitiba, Salvador, Belo Horizonte and Porto Alegre. Since May 2009, the fuel has also been supplied to Fortaleza, Recife and Belém metropolitan regions. In January 2011, 50 ppm S fuel will replace the current 500 ppm S fuel supplied to captive urban bus fleets throughout the State of São Paulo and the State of Rio de Janeiro Metropolitan Regions. 10 ppm S diesel will be available for new vehicles from January 2013.

ASIA-PACIFIC

Australia proposes moving to Euro 5 and Euro 6

On 8 January 2010, Australia's Federal Transport Minister announced proposals to introduce Euro 5 standards from 2012 and Euro 6 from 2016.

Industry and other stakeholders were asked to comment on the draft Regulation Impact Statement (RIS) by 1 March 2010, prior to the government making a final decision. The draft RIS is available at: www.infrastructure.gov.au/roads/environment/index.aspx.

The Minister said that "While the air quality in our major cities has improved significantly in recent years, the growth in the number of vehicles means we must continually monitor our standards and where possible deploy new, more effective technologies. For example, Sydney still records as many as 25 high-pollution days a year. Australia's mandatory vehicle emission standards together with stringent fuel quality standards are widely recognised as the most cost-effective way of improving urban air quality."

At the same time as the Euro 5/6 statement, it was announced that new regulations to reduce CO_2 emissions from new vehicles will be the subject of a separate RIS due for release in early 2010.

Hong Kong announces Replacement Grants and Green Transport Fund

The newly announced Hong Kong budget includes a pilot 'Green Transport Fund' and one-off grants to replace old diesel vehicles.

The HK$300 million (€28.5 million) green fund will be for operators of buses, taxis, minibuses and ferries to introduce electric or hybrid models or green-transport systems. Full details have yet to be defined.

A scheme to replace Euro II commercial diesel vehicles will also be rolled out, despite a poor uptake of the grants launched in 2007 to phase out pre-Euro and Euro I diesel vehicles. So far only about 14 000 such vehicles have been replaced, so about 38 000 remain on the streets. The scheme for pre-Euro and Euro I vehicles will, though, be extended for a year after the 31 March 2010 deadline expires if operators prove to the Environmental Protection Department that a deposit for a new vehicle has been paid.

For the new scheme, HK$540 million (€51 million) has been allocated, to run over 36 months from July 2010. The government has set a target of removing up to one-third of the 28 000 Euro II vehicles in the city. The grant amounts to 18% of a vehicle's taxable value.

To avoid the problems of the previous scheme it has been suggested by environmental officials that the government will propose an increase in licensing fees for old and polluting vehicles. In a separate statement the Secretary for the Environment, Mr Edward Yau said that the government is preparing legislation against idling vehicles with an aim to introduce it into the Legislative Council for scrutiny within this legislative year. The government is also examining the views collected in last year's consultation on the proposed new Air Quality Objectives (AQOs) and related measures such as low emission zones, to decide on how best to implement the proposals.

India to miss Target Date for 'Euro3' Fuel but introduce Fuel Economy Rating

India is now expected to phase in the nationwide introduction of fuels meeting 'Euro 3' standards by October 2010 instead of its deadline of 1 April 2010.

The Petroleum Ministry wrote to oil companies asking them to file an affidavit in the Supreme Court by 31 January 2010, to seek deferment of the introduction of Bharat Stage III petrol and diesel, which is supposed to be made available in the entire country except for the 11 metropolitan areas where the stricter Bharat IV norms will apply.

The Society of Indian Automobile Manufacturers (SIAM), though, has warned that the 'greener models' their members have developed and sold in the market could suffer damage if they run on current fuels. SIAM said they have already made representations to the government that if fuel is not available, then implementation of the new emissions norms should be postponed by three to six months in those regions where fuel is not available or across the country.

The Indian Ministry of Power has also announced that from the start of 2010, cars will receive a star rating for fuel efficiency. Initially the labelling will be voluntary, but after 1 year labelling will become mandatory under a strict grading system. The proposed label will not only suggest what fuel economy the new car could give ideally but also tell the buyer how the car performs when compared to other models in the same category. These categories will be created on the basis of the vehicle's weight. The standards for rating will be improved periodically.

Emissions and Control Strategies in India

A recent paper attempts to estimate the emissions from on-road vehicles in Chennai, India.

Estimated emissions in 2005 were (tons/day):

CO	VOC	NOx	PM	CO_2	CH_4	N_2O
431	119	46	7	4575	29	0.41

The estimation revealed that two and three-wheelers emitted about 64% of the total CO emissions and heavy-duty vehicles accounted for more than 60% and 36% of the NO_x and PM emissions respectively. About 19% of total emissions were start-up emissions.

The paper further examines various mitigation options to reduce vehicular emissions. It concludes that advanced vehicular technology and augmentation of public transit would significantly reduce emissions.

Source: K.S. Nesamani, Estimation of automobile emissions and control strategies in India; *Science of the Total Environment,* doi:10.1016/j.scitotenv.2010.01.026.

High Levels of Pollution in Islamabad

According to data recorded at the Air Quality Monitoring Laboratory of the Pakistan Environmental Protection Agency, the overall air quality index (covering SO_2, CO and NO_2) in Islamabad in early January 2010 reached 133.1 instead of the permissible limit of fifty. $PM_{2.5}$ was also recorded as reaching 145 µg/m^3, compared to the permissible limit of 35 µg/m^3. A dry spell, unchecked pollution and smoke emitted by vehicles, brick kilns and industries are blamed.

Nine Chinese Provinces to Delay Adoption of Standard III Petrol

F+L Asia reports that nine provinces in China have decided to postpone the implementation of the new state-standard III petrol due to the price differential between state-standard II and III products.

AFRICA

South Africa proposes New Tax on High CO_2 Vehicles

Among the 2010/11 Budget tax proposals tabled by South African Finance Minister Pravin Gordhan, is one to impose a specific CO_2 emissions tax on new vehicles from 1 September this year.

New passenger cars would be taxed based on their certified CO_2 emissions at 75 Rand (€7.3) for each g/km above 120 g/km. This emissions tax will be in addition to the current luxury tax on new vehicles. According to a table in the document, the emissions tax on vehicles emitting between 300 g/km and 450 g/km of carbon dioxide - a category that includes many 4x4s and large-engined luxury cars - will range from R13 500 up to R24 750 (€1 309 to 2 400).

The Treasury says that the tax will be extended to commercial vehicles once CO_2 standards have been set for these vehicles.

South Africa's Petroleum Industry discusses Cleaner Fuel Standards

The South African Petroleum Industry Association (SAPIA) is reported to have begun talks with the government regarding a possible new standard for cleaner vehicle fuel. An advisor to SAPIA said that "This will lay out the vision for the next 20 years and which we hope will be ready for discussion with stakeholders early in 2010".

South Africa's fuels currently meet Euro II standards. Several governmental departments are involved in discussions of cleaner fuel standards, including the Department of Energy, Department of Environmental Affairs, Department of Transport, and Department of Trade and Industry. The specifications would be drawn up under the Bureau of Standards and would be enforced through regulations under the Petroleum Products Act.

MIDDLE EAST

OECD Report on Israeli Tax could discourage Environmentally Friendly Cars

Israel should rethink its 90% tax on purchases of new cars because it could discourage purchases of cleaner models, the Organization for Economic Cooperation and Development said in its Economic Survey of Israel released on 20 January 2010.

The OECD said the country increased its tax on new car purchases from 75% to 90% in July 2009 while attempting to give it an environmental "twist." Israel maintained a 30% tax rate on hybrid cars and introduced a 10% rate on electric vehicles. The tax can now be offset by rebates of up to 15 000 shekels (€2 910), depending on the vehicle's emissions characteristics. Noting that Israel lacks a variety of transportation alternatives, the report said high taxes are unlikely to induce many to abandon car ownership. "And they probably encourage many to replace cars less frequently, slowing the introduction of newer, more environmentally friendly, models," the report said. OECD said there are better ways to accomplish environmental objectives, such as fuel taxes, congestion charges, tolls, and parking fees.

GENERAL

UN Climate Change Chief announces Resignation

The head of the UN Framework Convention on Climate Change (UNFCCC), Yvo de Boer, has said he will step down in July 2010. The Dutch former environment official, who has run the Secretariat since 2006, will join KPMG in London. He was also considering part-time work at universities in the United States and the Netherlands. UN Secretary-General Ban Ki-moon will decide on a replacement in the coming months to head the Bonn-based Secretariat of UNFCCC.

Consultancy says Climate Change would benefit from cutting Black Carbon

Policymakers could reap multiple benefits from cutting Black Carbon emissions, according to a consultancy study published by the European Liquid Petroleum Gas Association (AEGPL).

Black Carbon is responsible for 16% of global warming, second only to CO_2, according to the study. Its atmospheric lifespan of weeks rather than years means emissions cuts could deliver rapid climate benefits. Air quality would also improve, say the authors. More research is needed on strategies for tackling black carbon, they add. The study was funded by SHV Gas, a member of the AEGPL. Gaseous fuels such as LPG emit far less soot than diesel or biomass, which are the main sources of black carbon today, AEGPL says. The report can be found at www.aegpl.eu/content/default.asp?PageID=78&DocID=1029.

RESEARCH SUMMARY

Health Effects of Emissions

Health Effects Report on Traffic-Related Pollution

On 13 January 2010 the US-based Health Effects Institute (HEI) released a special report on the health effects of traffic-related air pollution. HEI says the report is the most comprehensive and systematic review of the worldwide traffic emissions and health science to date.

The report is based on a systematic review and analysis of over 700 worldwide studies. It found that sufficient evidence was found that exposure to traffic-related air pollution causes asthma exacerbation in children. There was "suggestive evidence" of a causal relationship with onset of children asthma, non-asthma respiratory symptoms, impaired lung function, total and cardiovascular mortality, and cardiovascular morbidity, although the data were not sufficient to establish a causal relationship.

While difficult to quantify, the health effects of traffic-related air pollution appear to be most severe along highways. The report noted that the zones most impacted by traffic-related pollution are up to 300 to 500 metres from highways and other major roads, and calculated that for large cities in North America that would include 30% to 40% of the population.

The HEI Special Report is available at http://pubs.healtheffects.org/view.php?id=334.

NO_2 and $PM_{2.5}$ associated with Pneumonia Risk

This Canadian study finds that long-term exposure to traffic pollution increased the risk of hospitalisation for pneumonia, a leading cause of sickness and death among older adults. The authors postulate that long-term exposure to air pollution may have increased individuals' susceptibility by interfering with immune defences intended to protect the lung from pathogens.

Source: Neupane et al, Long-Term Exposure to Ambient Air Pollution and Risk of Hospitalization with Community-acquired Pneumonia in Older Adults, *American Journal of Respiratory and Critical Care Medicine,* Vol.181. pp.47-53, doi:10.1164/rccm.200901-0160OC.

Childhood Asthma and Air Pollutants

This paper assesses the association between chronic outdoor air pollution exposure and asthma among children in metropolitan areas across the US. It finds that children in counties with ozone and, to a less consistent degree, particulate matter levels in the highest quartile were more likely to have current asthma and/or a recent asthma attack than children residing in counties with the lowest pollution levels.

Source: Akinbami et al, The association between childhood asthma prevalence and monitored air pollutants in metropolitan areas, United States, 2001–2004; *Environmental Research,* doi:10.1016/j.envres.2010.01.001.

Air Pollution and Atherosclerosis

Researchers from Switzerland, Spain and California have investigated the association between outdoor air quality and the progression of subclinical atherosclerosis (thickening of the arteries). Annual progression of carotid artery media thickness (CIMT) among those living within 100 m of a highway was accelerated or more than twice the population mean.

Source: Künzli et al, Ambient Air Pollution and the Progression of Atherosclerosis in Adults, *PLoS one,* Vol.5 No.2 e9096, doi:10.1371/journal.pone.0009096.

Traffic-related Pollution and Cardiovascular Mortality

This study from Taiwan investigates the relationship between cardiovascular mortality and traffic-related air pollutants. A single-pollutant model showed that cardiovascular mortality was significantly associated with NO_2 (lagging by 2 days), and with propane, iso-butane, and benzene (lagged 0 days).

Source: Dai-Hua Tsai et al, Traffic-related air pollution and cardiovascular mortality in central Taiwan; *Science of the total Environment,* doi: 10.1016/j.scitotenv.2010.01.044.

Air Pollution affects Postal Workers

A study from Greece investigates the effects of air pollution exposure on mail carriers - an occupational group that suffers from respiratory symptoms and lung function impairment. The findings suggest that air pollution is a contributing factor for the occurrence of rhinitis and lung function impairment in mail carriers.

Source: Karakatsani et al, Ambient air pollution and respiratory health effects in mail carriers; *Environmental Research,* doi:10.1016/j.envres.2009.11.002.

Concentration-response Factors for Ultrafine Particles

Eleven European experts from the disciplines of epidemiology, toxicology, and clinical medicine took part in an 'expert panel elicitation' to specify concentration-response functions and uncertainties for ultrafine particles (UFP) in urban air. The lack of studies on long-term exposure to UFP was rated as the most important source of uncertainty. Effects on hospital admissions were considered more uncertain.

Source: Hoek et al, Concentration Response Functions for Ultrafine Particles and All-Cause Mortality and Hospital Admissions: Results of a European Expert Panel Elicitation; Environmental Science & Technology, Vol.44, Iss.1,pp.476-482, doi: 10.1021/es9021393.

Air Quality

Air Quality Trends in Finland

The trends in the atmospheric concentrations of the main pollutants in urban, industrial and rural environments across Finland have been estimated for the period of 1994-2007. During the study period, the concentrations of SO_2, CO and NOx declined considerably and widely. NO_2 reductions were not as large as would be expected on the basis of emission trends, or from NOx concentrations.

Source: Anttila et al, Trends of primary and secondary pollutant concentrations in Finland in 1994-2007; *Atmospheric Environment*, Vol.44 Iss.1 pp.30-41, doi:10.1016/j.atmosenv.2009.09.041.

Evaluating the Impact of Air Quality Measures in Italy

This research investigated the effectiveness of different technical and non-technical air quality management measures at the regional level in Italy. It found that some of the most commonly adopted measures do not always produce the highest emissions reductions. Incentives for new diesel heavy-duty vehicles accounted for 31.4% of the total

reduction in NOx emissions from Italy's transport sector, despite only one region adopting it.

Source: D'Elia et al, Technical and Non-Technical Measures for air pollution emission reduction: The integrated assessment of the regional Air Quality Management Plans through the Italian national model. *Atmospheric Environment* Vol. 43 pp.6182-6189, doi:10.1016/j.atmosenv.2009.09.003.

NOx and NO_2 Modelling in Japan

A new paper by JARI, Toyota and the Petroleum Energy Center reports on a roadside air quality simulation model study measuring temporal and spatial variation of NO and NO_2 at roadsides.

Source: Minoura et al, Observation of the primary NO_2 and NO oxidation near the trunk road in Tokyo; *Atmospheric Environment,* Vol.44 Iss.1 pp.23-29, doi:10.1016/j.atmosenv.2009.10.003.

Ozone Levels from Ethanol as a Fuel

A new simulation study says that ethanol used as a vehicle fuel may cause more ozone-related health problems than petrol, especially in winter. From 0°C to 41°C in bright sunlight, use of E85 raised the concentration of ozone in the air by up to 7 parts per billion (ppb) more than petrol. At cold temperatures, from 0°C to -37°C, E85 was found to raise ozone concentrations by up to 39 ppb more than petrol.

Source: Ginnebaugh, presentation at the American Geophysical Union meeting, San Francisco, 15 December 2009; http://news.stanford.edu/news/2009/december14/ozone-ethanol-health-121409.html

Measurement of Ultrafine Particles in a Tunnel

This study from Taiwan measured ultrafine particle levels and their size distributions in the Hsuehshan tunnel. Observations showed Aitken (nucleation) mode particles markedly formed by coagulation growth in the tunnel middle section and exit section.

Source: Cheng, Liu and Chen, On-road measurements of ultrafine particle concentration profiles and their size distributions inside the longest highway tunnel in Southeast Asia; *Atmospheric Environment* Vol.44 No.6 pp.763-772, doi:10.1016/j.atmosenv.2009.11.040.

Impact of Ship Emissions in Alaska

The impact of ship emissions on air quality in Alaska National Parks and Wilderness Areas is investigated in a paper from the University of Alaska and NOAA. The authors found that air quality follows certain predetermined patterns associated with local meteorological conditions and ship emissions.

Source: Mölders et al, Influence Of Ship Emissions On Air Quality And Input Of Contaminants In Southern Alaska National Parks And Wilderness Areas During The 2006 Tourist Season; *Atmospheric Environment,* doi:10.1016/j.atmosenv.2010.02.003.

Characterisation of Particulate

Nanoparticles from Biodiesel and Bioethanol-blends

In a new paper from Korea, the use of biofuel-blended diesel fuel was found to reduce the total number of particles emitted; but biodiesel-diesel blends resulted in more emissions of particles smaller than 50 nm, when compared with the use of conventional diesel fuel. The use of a mixed fuel of biodiesel and bioethanol (B15/E5) was more effective for the reduction of particle number and particulate mass, compared to a B20 biodiesel blend.

Source: Kim and Choi, The effect of biodiesel and bioethanol blended diesel fuel on nanoparticles and exhaust emissions from CRDI diesel engine; *Renewable Energy* Vol.35 No.1 pp.157-163 doi:10.1016/j.renene.2009.04.008.

Nanoparticle Emissions with Alternative Diesel Fuels

This study examines nanoparticle emissions from a heavy-duty diesel engine using three different fuels (fossil diesel fuel meeting EN590; rapeseed methyl ester (RME); and GTL - synthetic gas-to-liquid fuel). For RME, the non-volatile core particle size was larger than for EN 590 and GTL fuels, and the concentration dependence on engine load was clearly different.

Source: Heikkilä, Virtanen, Rönkkö, Keskinen, Aakko-Saksa and Murtonen, Nanoparticle Emissions from a Heavy-Duty Engine Running on Alternative Diesel Fuels; *Environmental Science & Technology,* Vol. 43 No.24 pp 9501–9506, doi: 10.1021/es9013807.

Roadside Particle Numbers and Characteristics

The particle number concentration, aerosol black carbon (BC) concentration and size distribution of traffic-related aerosols were measured near two major roads in Kuopio, Finland. Insoluble constituents were dominant in the Aitken mode particles, whereas organic compounds dominated the nucleation mode.

Source: Tiitta et al, Roadside aerosol study using hygroscopic, organic and volatility TDMAs: Characterization and mixing state; *Atmospheric Environment* Vol.44 Iss.7 pp 976-986, doi:10.1016/j.atmosenv.2009.06.021.

Engine Development and Emissions Measurement

PM Emissions from Euro 1 to Euro 4 with DPF

This paper from Aristotle University of Thessaloniki, examines the impact of emissions control and fuel technology development on emissions from diesel cars meeting Euro 1 to Euro 4 standards and Euro 4 with the addition of a diesel particulate filter (DPF).

The cars were tested over both the legislative and real-world driving cycles. The results showed that vehicle technologies from Euro 2 to Euro 4 exceeded the NOx and PM emissions levels over at least one real-world cycle. Solid particle numbers remained rather constant at an average of 0.86×10^{14}/km except for the Euro 4 + DPF vehicle, where a significant reduction (>3 orders of magnitude) was achieved.

Source: Tzamkiozis; Ntziachristos and Samaras, Diesel passenger car PM emissions: From Euro 1 to Euro 4 with particle filter; *Atmospheric Environment* Vol.44 No.7 pp.909-916, doi:10.1016/j.atmosenv.2009.12.003.

Effect of Biodiesel Blends on Emissions

Three new papers report on the effect on emissions of five biodiesels from different feedstocks (rapeseed, soy, sunflower, palm, and used fried oils) blended with diesel at 10% vol. ratio (B10), tested on a Euro 3 common-rail passenger car. One paper covers regulated emissions and particle numbers, a second covers carbonyls and the third examines PAHs.

Sources (all in press from *Environmental Pollution*):
1: Fontaras et al, Effects of low concentration biodiesel blends application on modern passenger cars. part 1: Feedstock impact on regulated pollutants, fuel consumption and particle emissions; doi:10.1016/j.envpol.2009.12.033.

2: Fontaras et al, Effects of low concentration biodiesel blends application on modern passenger cars. part 2: Impact on carbonyl compound emissions; doi:10.1016/j.envpol.2009.11.021.

3**:** Karavalakis et al, Effects of low concentration biodiesel blends application on modern passenger cars. Part 3: Impact on PAH, nitro-PAH & oxy-PAH emissions; doi:10.1016/j.envpol.2009.12.017.

Emissions from Oxygenate/Biodiesel Blends

The effects of several blended fuels on NOx and particulate were investigated. The authors say that on the whole, compared with Euro V diesel fuel, the blended fuels could lead to reductions of both NO_x and PM, with biodiesel-methanol blends being more effective than the biodiesel-ethanol blends.

Source: Zhu, Cheung, Zhang and Huang, Emissions characteristics of a diesel engine operating on biodiesel and biodiesel blended with ethanol and methanol; *Science of the Total Environment,* Vol.408 Iss.4 pp.914-921, doi: 10.1016/j.scitotenv.2009.10.078

Effect of Diesel-Diglyme Blends on NOx and PM

A new paper investigates particulate emissions of a 4-cylinder DI diesel engine when using ultra-low sulfur diesel base fuel with diglyme (bis (2-methoxyethyl) ether) as the oxygenate. The study showed that with increasing oxygen in the fuel blends, smoke opacity, particulate mass concentration, NOx concentration and brake specific particulate emissions were reduced but the proportion of soluble organic fraction was increased. Particle number concentration was higher for the blended fuels and geometric mean diameter was smaller, compared to ultralow-sulfur diesel.

Source: Di et al, Experimental investigation of particulate emissions from a diesel engine fuelled with ultralow-sulfur diesel fuel blended with diglyme; *Atmospheric Environment*, Vol.44 No.1, pp.55-63, doi:10.1016/j.atmosenv.2009.09.039.

Modelling Vehicle Aerosol Number Distributions

A paper from the CEREA laboratory in Paris uses numerical modelling to try to explain the phenomena leading to the formation and evolution of aerosol number distributions in the vicinity of a vehicle exhaust. The most influential parameters were found to be the fuel sulfur content, semi-volatile organic emissions and the mass and initial diameter of the soot particles emitted. The authors conclude that some key issues such as exhaust plume turbulence need to be investigated further to improve understanding of ultrafine particle formation.

Source: Albriet et al, Modelling aerosol number distributions from a vehicle exhaust with an aerosol CFD model; *Atmospheric Environment* Vol.44 No.8 pp.1126-1137, doi:10.1016/j.atmosenv.2009.11.025

Hydrogen-Diesel Dual-Fuelling and Effect of SCR

A paper from Tata Motors and Anna University-Chennai reports an investigation into the performance and emission characteristics of a direct injection diesel engine in dual fuel (diesel-hydrogen) modes. To reduce NOx emissions, a Selective Catalytic Reduction converter was used with the hydrogen port fuel injection mode. NOx emissions were reduced by up to 74% for 1.1 ratios of the flow rates of ammonia and NO.

Source: Saravanan and Nagarajan, An insight on hydrogen fuel injection techniques with SCR system for NOx reduction in a hydrogen-diesel dual fuel engine; *International Journal of Hydrogen Energy* Vol.34 No.21 pp.9019-9032, doi:10.1016/j.ijhydene.2009.08.063.

Effect of Port-injected Methanol on Diesel Emissions

A paper from Hong Kong Polytechnic University reports on a study to investigate the effect of port-injected methanol on the performance and emissions of a diesel four-cylinder engine operating at three engine speeds and five engine loads for each speed.

Source: Cheung et al, Investigation on the Effect of Port-Injected Methanol on the Performance and Emissions of a Diesel Engine at Different Engine Speeds; *Energy & Fuels*, Vol.23 No.11, pp.5684-5694, doi: 10.1021/ef9005516.

A further paper reports that this 'fumigation' methanol resulted in a significant increase in HC, CO and NO_2 emissions, but a decrease in NOx, particulate mass and particle number. Unburned methanol, formaldehyde and BTX (benzene, toluene and xylene) emissions increased but ethyne, ethene and 1,3-butadiene decreased. A diesel oxidation catalyst significantly reduced emissions of most pollutants when exhaust gas temperatures were sufficiently high.

Source: Zhang, Cheung, Chan and Yao, Experimental investigation of regulated and unregulated emissions from a diesel engine fueled with Euro V diesel fuel and fumigation methanol; *Atmospheric Environment* Vol.44 Iss.8 pp1054-1061, doi:10.1016/j.atmosenv.2009.12.017.

Characteristics of Aldehyde and Methanol Emissions

In this paper formaldehyde, acetaldehyde and methanol emission characteristics and conversion efficiencies over a three-way catalytic converter were investigated on a three-cylinder spark-ignition engine running on M85 (15% gasoline/85%methanol).

Source: Wei et al, Aldehydes and Methanol Emission Mechanisms and Characteristics from a Methanol/Gasoline-Fueled Spark-Ignition (SI) Engine; *Energy & Fuels*, Vol.23 No.12, pp.6222-6230, doi: 10.1021/ef900721v.

Emissions from US School Buses with Retrofits

A remote sensing device was used to obtain on-road and in-use gaseous emissions measurements from three fleets of US schools buses representing current emission retrofit technologies. Each fleet's CO, HC, NO and NO_2 mean data are reported.

Source: Burgard and Provinsal, On-Road In-Use Gaseous Emission Measurements by Remote Sensing of School Buses Equipped with Diesel Oxidation Catalysts and Diesel Particulate Filters; *Journal of the Air & Waste Management Association*, Vol.59 No.12 pp.1468-1473, http://secure.awma.org/journal/Abstract.aspx?id=2176.

New Model for estimating Ship Emissions

EU-supported research from VITO (Belgium) and TRT (Italy) has established a new model to calculate air pollution emissions from ships. An analysis of the different elements of a ship's journey indicated that the cruising phase produced 99% of emissions for main engines and 80% for auxiliary engines.

Source: Schrooten. et al, Emissions of maritime transport: A European reference system; *Science of the Total Environment*. Vol.408 Iss.2, pp.318-323. doi:10.1016/j.scitotenv.2009.07.037.

Emissions Interactions

Road Transportation Sector & Atmospheric Warming

A new study led by NASA's Goddard Institute for Space Studies analyses the net climate impacts of emissions, including CO_2, N_2O, methane, organic carbon, black carbon, nitrate, sulfate, and ozone, from 13 different economic sectors.

Their study finds that on-road transportation is and will remain the greatest net contributor to atmospheric warming now and in the near term. The authors say that reducing emissions from on-road transportation yields both rapid and longer-term climate benefits and has additional benefits for human health.

Source: Unger et al, Attribution of climate forcing to economic sectors. *Proceedings of the National Academy of Science*, doi:10.1073/pnas.0906548107

Integrating Climate Change into Air Quality Policy

A further paper has been published suggesting the potential benefits in integrating air quality and climate change policy. It predicts that accounting for the climate impact of certain air pollutants in the EU, USA and China could complement policies designed to reduce the air quality impacts of these pollutants.

Source: Rypdal et al., Climate and air quality-driven scenarios of ozone and aerosol precursor abatement; *Environmental Science and Policy* Vol.12 Iss.7, pp.855-869, doi:10.1016/j.envsci.2009.08.002.

Land Transport Impacts on Atmosphere and Climate

A paper from Institutes across Europe provides an overview of past, present and future emissions from land transport. It covers their impacts on atmospheric composition and air quality, on human health and on climate change, and discusses options for mitigation.

The paper says that vehicle exhaust emissions control has contributed to improved air quality and reduced health impacts in industrialised countries. In developing countries however, pollutant emissions have been growing strongly, adversely affecting many populations. In addition, ozone and particulate matter change the radiative balance and hence contribute to global warming on shorter time scales.

Source: Uherek et al, Transport Impacts on Atmosphere and Climate: Land Transport; *Atmospheric Environment,* doi: 10.1016/j.atmosenv.2010.01.002.

Impact of Climate Change on Air Quality

The possible effects of climate change on air quality have also been studied by the UK's Meteorological Office Hadley Centre and Cambridge Environmental Research Consultants.

The researchers modelled the situations in London and Glasgow. For London, results averaged over a number of sites predicted a fall in NOx and a rise in ozone, but only small changes in NO_2 and PM_{10}. For Glasgow, the changes in all four chemical species were small. Large scale background ozone values showed a decrease due to climate change.

Source: Athanassiadou et al, An assessment of the impact of climate change on air quality at two UK sites, *Atmospheric Environment,* doi:10.1016/j.atmosenv.2010.02.024.

FORTHCOMING CONFERENCES

6th International Exhaust Gas and Particulate Emissions Forum

9-10 March 2010, Ludwigsburg, Germany

Details at www.forum-emissions.com

Experts from vehicle and engine manufacturers, suppliers, development suppliers and science will report on the most recent status and the forthcoming concepts regarding exhaust gas emissions reduction. Discussion topics will include particle counters, sensor technology and OBD.

International Advanced Mobility Forum 2010

9-10 March 2010, Geneva, Switzerland

Details at www.iamf.ch/en

Topics include advanced powertrain technologies; energy storage in the vehicle and its fuelling infrastructure; advanced vehicle technologies; and market introduction of new technologies.

Diesel Engine Calibration Seminar

9-10 March 2010, Shoreham-by-Sea, UK

Details at SeminarInfo@ricardo.com

11th Annual European Fuels Conference

9-12 March 2010, Paris, France

Details at www.wraconferences.com/2/4/articles/69.php

There will also be a pre-conference Alternative Fuels Symposium and a post-conference CO_2 & Energy Efficiency Forum.

7th Green Ship Technology Conference

16-17 March 2010, Copenhagen, Denmark

Details at www.lloydslistevents.com

The conference will highlight developments in technology to reduce the environmental impact of shipping (including curbing air emissions), and help ship-owners and operators achieve greater efficiencies and energy savings.

Seminar on Diesel Particulate Filter Application and Calibration

16-17 March 2010, Shoreham-by-Sea, UK

Details at SeminarInfo@ricardo.com

Catalyst Preparation 4 the 21st Century

18 March 2010, London, UK

Details at www.rsc.org/ConferencesAndEvents/conference/alldetails.cfm?evid=104863

A 1-day symposium on catalyst preparation with high level speakers from academia and industry will highlight developments in areas such as in situ characterisation of catalyst preparation, fuel-cell catalysts, materials preparation, nanocatalysts, gas-to-liquids and the energy sector.

Diesel Emissions Conference/AdBlue Forum Asia

23-25 March 2010, Beijing, China

Details at www.integer-research.com/decasia

Key regulators, Asian vehicle manufacturers and leading emissions reduction technology suppliers will explore the most successful strategies to meet Asian diesel emissions legislation now and in the future.

FAD NO_2 Workshop 2010: Simultaneous particulate matter and NO_2 Reduction - a conflict?

24-25 March 2010, Dresden, Germany

Details at www.fad-diesel.de/index.php?option=com_content&task=view&id=77&Itemid=151

Day 1 will cover metrology and measurement methods for the detection of NO_2 in the exhaust of diesel engines. Day 2 will cover the development of emissions legislation concerning NO_2 and the ending in 2010 of the transitional period for the introduction of NO_2 air quality limits, including industry preparedness and the goal of more efficient exhaust gas treatment.

Dual-Fuel (Gaseous/Diesel) Engines: Opportunities, Challenges and Strategies to Expand the Market

30-31 March 2010, Brussels, Belgium

Details at www.DualFuelStrategies.com

This workshop will bring together high-level regulatory experts, manufacturers and operators of dual-fuel engines to explore new strategies to open the world-wide markets for dual-fuel gaseous/diesel engine technologies. The aim is to provide a strategy and framework to create legal certification procedures for dual-fuel engines.

The European RTD Framework Programmes (FP7): From Economic Recovery to Sustainability

13-14 April 2010, Valencia, Spain

Details at www.r2sconference.eu

The conference will bring together stakeholders from different public private partnerships and will give an overview of the latest developments in the smart investments of the European Economic Recovery Plan, including the Factories of the Future, Energy Efficient Buildings, and Green Cars initiatives.

SAE 2010 World Congress

13-15 April 2010, Detroit, Michigan, USA

Details at www.sae.org/congress

International Workshop: Towards a Greenhouse Gas Certification Method for Complete Heavy-duty Vehicles and their Components

19-20 April 2010, Ispra (Milan), Italy

The European Commission has started work, with a consortium of contractors, on a method to certify the fuel consumption and CO_2 emissions of heavy-duty vehicles. This international workshop is being organised because of the need to ensure awareness, consistency and synergies of worldwide activities.

31st International Vienna Motorsymposium

29-30 April 2010, Vienna, Austria

Details at www.övk.at/index_en.htm

The symposium will cover the latest results in worldwide engine and powertrain development, future legislation, new engines, fuels and powertrain components, hybrid technology, CO_2 reduction and exhaust emissions control.

AVL Large Engines TechDays

5-6 May 2010, Graz, Austria

Details at www.avl.com

Busworld Asia

6-8 May 2010, Shanghai, China

Details at www.busworld.org

Leapfrogging Opportunities for Air Quality Improvement

10-14 May 2010, Xi'an, Shaanxi Province China

Details at www.dri.edu/leapfrogging-opportunities-for-air-quality-improvement

Major topics will include methods for regional and urban emission inventories, ambient and source characterisation techniques, air quality modelling applications, emissions control technologies, and air pollution and health effects.

Diesel Particulates and NOx Emissions Short Course

17-21 May 2010, Leeds, UK

Details at www.engineering.leeds.ac.uk/cpd/AutoDieselParticulatesUK.shtml

18th International Symposium on Transport and Air Pollution

18-19 May 2010, Dübendorf, Switzerland

Details at www.empa.ch/plugin/template/empa/*/86139/---/l=2

The aim of the symposium will be to bring together scientists, users and policy makers to assess the current scientific knowledge of air pollution due to emissions from transportation systems.

Motorisation Diesel, face au défi de la compétitivité / Diesel engines, facing the competitiveness challenges

26-27 May 2010, Rouen, France

Details at www.sia.fr/evenement_detail_motorisations_diesel_face_au_1044.htm

The diesel engine is considered as one of the future methods for low CO_2 emissions, but the price of reducing pollutant emissions is one of growing complexity. New approaches will be necessary to continue development of these engines.

33rd FISITA World Automotive Congress

30 May - 4 June 2010, Budapest, Hungary

Details at www.fisita2010.com

Top experts from the automotive community around the world will review the latest technical breakthroughs and innovations and show the world that our future mobility depends on engineers.

9th International Symposium on Combustion Diagnostics

8-9 June 2010, Baden-Baden, Germany

Details at www.combustion-diagnostics.com

Developers make use of a combination of sophisticated tools from simulation, and from indicating and visual instrumentation. These are not limited to the combustion chamber, but also require verification along the entire gas exchange, fuel mixture generation and exhaust aftertreatment path.

Metrology of Airborne Nanoparticles, Standardisation and Applications (MANSA)

8-9 June 2010, Teddington, UK

Details at www.npl.co.uk/events/mansa

This meeting will cover the major applications, including vehicle emissions measurement, that stand to benefit from improved comparability and accuracy, and will cover the scope for future metrology research and standardisation through ISO and CEN. Discussions will focus on measurement of airborne number concentration, size distribution, surface area and related measurands. Recent and future instrument inter-comparisons will be presented.

5th Emission Control 2010

10-11 June 2010, Dresden, Germany

Details at http://141.30.185.60/index3.php?SECTION=EC2010&LNG=en

The main emphasis of the conference will be on measures to reduce emissions of Otto and Diesel engines, together with energy and heat management.

CIMAC (International Council on Combustion Engines) Congress 2010

14-17 June 2010, Bergen, Norway

Details at www.cimac.com

12 technical sessions include product development – diesel engines and environment, fuel & combustion.

6th Diesel Emissions Conference & AdBlue Forum Europe 2010

15-17 June 2010, Frankfurt, Germany

Details will be at www.integer-research.com

Automotive News Europe Congress

22-23 June 2010, Bilbao, Spain

Details at www.autonews.com/Assets/html/10_anec/default.htm

The theme of this year's Congress is "Solutions After a Crisis: Navigating Out of a European Downturn." Industry is facing challenges and opportunities that are greater than ever. The conference will address the issues of vehicle emissions, now at the top of the industry's agenda, and capacity adjustments.

Engine Expo 2010

22-24 June 2010, Stuttgart, Germany

Details at http://www.engine-expo.com/

Throughout the Expo an Open Technology Forum will take place. Topics will include engine developments, "what's next for catalytic converter technology", SCR vs. EGR and hybrid technology.

3rd International MinNOx (Minimising NOx emissions through exhaust aftertreatment)

29-30 June 2010, Berlin, Germany

Details at www.iav.com/us/4_events/iav_conferences.php?we_objectID=16007

IAV is asking for papers on NOx storage catalysts and SCR, EGR systems, diagnostics, combustion processes, system integration and cost optimisation, fuel and environmental impacts, and practical experience with use in mass production. Applications should cover direct-injection spark ignition engines, commercial vehicles and off-road vehicles.

Busworld Russia

30 June - 2 July 2010, Nizhny Novogorod, Russia

Details at www.busworldrussia.ru

14th ETH Conference on Combustion Generated Nanoparticles

1-4 August 2010, Zurich, Switzerland

Details at www.lav.ethz.ch/nanoparticle_conf

The conference provides an interdisciplinary forum for experts in various fields to discuss new scientific findings on combustion-generated nanoparticles, methods to characterize such particles for research, type-approval, diagnostics, manufacturing control, and in-use compliance testing. In addition, the progress of internal and external emissions control of internal combustion engines and other combustion technologies, as well as health effects due to combustion-generated nanoparticles and their effects on climate will be discussed.

VPPC 2010: Vehicle Power and Propulsion Conference

1-3 September 2010, Lille, France

Details at http://vppc2010.univ-lille1.fr

The 2010 Vehicle Power and Propulsion Conference will be held in the framework of the French network on hybrid electric vehicles (HEVs). The conference aims to provide a forum for sharing knowledge, experience and creative ideas in vehicle power and propulsion in order to develop and promote "clean technology" for future transportation systems.

Diesel Emissions Conference India 2010

8-9 September 2010, New Delhi, India

Details will be at www.integer-research.com

22nd International AVL Conference 'Engine & Environment:

9-10 September 2010, Graz, Austria

Details at www.avl.com

This year's topic is "The Innovative Internal Combustion Engine in the Context of Powertrain Electrification – A Major Key to Long-Term CO_2 Reduction?"

23rd World LP Gas Forum

28 September – 1 October 2010, Madrid, Spain

Details at www.wlpgasforum-aegpl2010.com

IFZ 8th International Motorcycle Conference

4-5 October 2010, Cologne, Germany

Details at www.ifz.de/e-events-conferences-8intmotorcycle.htm

The theme of the conference will be 'Safety – Environment – Future'. Environmental aspects will include motorcycle emissions and standards and measurement procedures. The conference will take place prior to the 7th International Motorcycle and Scooter exhibition INTERMOT Köln 2010.

19th Aachen Colloquium "Automobile and Engine Technology"

4-6 October 2010, Aachen, Germany

Details at www.aachener-kolloquium.de/index_e.htm

The congress will provide a wide range of technical presentations addressing current challenges of the vehicle and powertrain industry. Programme-related test vehicles, prototypes and aggregates from participating companies and institutions will be presented on the ika test track.

SAE 2010 Commercial Vehicle Engineering Congress and Exhibition

5-6 October 2010, Rosemont, Illinois, USA

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