



Newsletter

July - August 2010

INTERNATIONAL REGULATORY DEVELOPMENTS

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EUROPE

Commission publishes Proposal on Increased Flexibility for NRMM

On 7 July 2010 the European Commission published their proposal for a co-decision Directive amending the NRMM (Non-Road Mobile Machinery) emissions Directive so as to increase the flexibility provisions. The proposal was originally intended to assist manufacturers during the economic crisis.

The Commission proposes to:

- increase the number of Stage IIIA engines for non-rail land-based machinery that can be placed on the market once Stage IIIB comes into force. The current figure (20% of the OEM's annual sales of equipment with engines in that engine category) will be increased to 50%.
- extend the existing flexibility scheme to engines for railcars (for the transition from Stage IIIA to IIIB only). When Stage IIIB comes into force, this will allow a manufacturer to continue to market Stage IIIA engines for up to 20% of their annual average sales over the last 5 years. There is no alternative fixed number of engines.
- allow each OEM to supply up to 12 Stage IIIA locomotive engines when Stage IIIB enters force.

Except for engines for locomotives and railcars, the alternative to the percentage figures will be a fixed number of engines: 200 engines of 37-56 kW, 175 engines of 56-75 kW, 250 engines of 75-130 kW and 125 engines of 130-560 kW.

The measures for the main category of engines will expire on 31 December 2013. No date is mentioned for either locomotives or railcars.

The proposal is available at http://ec.europa.eu/enterprise/sectors/mechanical/files/nrmm/comm_native_com_2010_0362_1_proposition_de_directive_en.pdf.

European Court upholds Limit on MMT

The European Court of Justice (ECJ) has rejected a challenge to the limit in the revised Fuel Quality Directive on the manganese-based fuel additive MMT, saying it does not violate EU principles on equal treatment and proportionality.

The ECJ rejected the claim that restrictions were unlawful. The judgment says that, when the Directive was adopted, "no public body or independent entity had undertaken a scientific assessment of risk" of MMT. It adds that studies had shown widely disparate conclusions. Therefore the EU was justified in using the precautionary principle "to take protective measures without having to wait for the reality and the seriousness of those risks to be fully demonstrated". It notes that the limit was set pending the development

of such test methodologies, which must be presented by December 2012.

The ECJ also rejected the complaint about a legal requirement that all fuel containing MMT bear the label "contains metallic additives". This was an appropriate way to ensure consumers' right to information, the judgment said.

European Commission Proposal to revise Tractors Legislation

The European Commission is proposing to simplify EU legislation on agricultural and forestry vehicles (tractors, trailers and towed equipment). If the proposal is accepted by Council and Parliament, 50 Directives would be replaced by one 'mother' Regulation, three delegated acts containing technical details and test procedures, and an implementing act for administrative aspects.

So far as emissions are concerned, the Commission says that they are not proposing to change the existing levels of protection. The only change is that the Regulation should refer to Directive 97/68/EC on emissions of Non-Road Mobile Machinery instead of having a specific one for tractors, "simplifying the current implementation process while keeping the key features for future developments."

The proposal is available at http://ec.europa.eu/enterprise/sectors/automotive/files/com-2010-395_en.pdf.

Roadworthiness Directives amended

On 8 July 2010, two amendments to the roadworthiness and roadside inspection Directives were published in the Official Journal.

Commission Directive 2010/47/EU amends the Directive on technical roadside inspections of the roadworthiness of commercial vehicles (Directive 2000/30/EC), adapting the standards and methods to technical progress and introducing a more detailed standardised inspection report. For petrol engine emissions the revision allows an On-Board Diagnostics (OBD) malfunction check to be used in place of the idle CO test and for diesel emissions a smoke limit of 1.5 m⁻¹ is introduced for Euro 4, IV, V and EEV vehicles. Commission Directive 2010/48/EU makes similar amendments to the main Directive on roadworthiness (Directive 2009/40/EC).

European Parliament approves Revised Industrial Emissions Directive

At second reading, the European Parliament plenary session on 7 July 2010 agreed the latest proposals for revision of the Integrated Pollution Prevention and Control (IPPC) Directive to strengthen pollution limits for industrial installations.

The revision combines seven existing air pollution directives, notably the Large Combustion Plant Directive and the Integrated Pollution Prevention and Control (IPPC) Directive, which obliges around 52 000 industrial and agricultural installations to obtain environmental permits. The permits include limits for pollutants such as SO₂, NO_x, VOCs and dust. Installations will have until 2016 to comply with stricter limits based on the implementation of "Best Available Techniques" (BAT). Member States will, however, be able to deviate from the standard for certain technical reasons or local circumstances if they can prove that the costs of implementation would be disproportionate compared to the environmental benefits.

The final version now ratified by Parliament also includes longer transition periods for large combustion plants (LCPs). Member States can put in place "transitional national plans" to give LCPs until July 2020 to meet the requirements. In addition, older plants can continue to operate beyond this date if their operating hours do not exceed 17 500 hours after 2016 and they close by the end of 2023. The European Commission must assess the need for minimum emissions limits for individual activities every 3 years.

EU delays Review of National Emissions Ceilings Directive

The review of the EU air quality legislation that was supposed to have been completed in 2005, and was then promised for 2008, may not be finalised until 2013, the European Commission has told the press.

On 14 July 2010 a spokesperson for Environment Commissioner Janez Potočnik, told reporters that no final decision has been made on the review of the National Emissions Ceilings (NEC) Directive, but other EU air quality law is due for review in 2013 and it would be "an appropriate moment to look at all in a coordinated and coherent way."

The NEC Directive requires EU countries to bring emissions of SO₂, NO_x, volatile organic compounds (VOC), and ammonia below certain limits for 2010. The most recent data published by the European Environment Agency showed that about half of EU Member States expected to exceed the NEC limits in 2010. However, in a submission to the United Nations' Long-range Transboundary Air Pollution Convention, the European Environment Agency more recently said that, compared with 2007 levels, overall EU emissions of SO₂ in 2008 fell by 20%, NO_x by 6.8% and VOCs by 3.2% (see article below). The European Union was within its limits for most substances under the UN Convention by 2008. The one exception was nitrogen oxides, which are produced primarily by road transportation and energy generation.

EU Emissions Inventory Report

On 12 July 2010, the European Environment Agency (EEA) published the European Union air pollutant emission inventory report for 1990 to 2008. The report is prepared under the UN-ECE Long-range Transboundary Air Pollution (LRTAP) Convention.

NO_x emissions from road transport have decreased by 40% since 1990, mainly due to the introduction of three-way catalytic converters in passenger cars and stricter regulation of emissions from heavy goods vehicles across Europe, the report says. Road transport nevertheless remains the most important source of the ozone precursors NO_x and CO, contributing 41% and 34% respectively of EU-27 emissions in 2008. In general, emissions from road transport fell significantly in a number of Member States, including France, Spain and the UK, partly reflecting reduced freight transport on roads in the second half of 2008 due to economic recession.

In 2008 EU-27 emissions of PM_{2.5} fell by 13 % and PM₁₀ by 8% compared to 2000. But emission trends have not improved much in the last five years, with emissions increasing slightly (by 0.2%) in 2008 compared to 2007. The report shows that, emissions of CO and NMVOCs continued a downward trend.

The report is available at www.eea.europa.eu/publications/european-union-emission-inventory-report.

Review of EU's Environmental Policy

In a report published on 10 August 2010, the European Commission said that the European Union is falling short in many areas of environmental policy despite years of planning and target setting.

The 2009 Environment Policy Review contained evaluations of EU environmental progress against 32 indicators and found that there had been "good performance," or that the EU was on track to meet targets, in only four areas. These were reduced emissions of greenhouse gases under the Kyoto Protocol and increases in the share of energy generated from renewable sources, the area of agricultural land being farmed organically, and the recycling of packaging waste.

For a range of other indicators, from energy consumption by transportation and conservation of habitats and species to the presence of pollutants in the environment, the European Union's performance was either average, with the "overall problem remain[ing] despite some mixed progress," or poor and "worrying," the Commission said. Performance was rated "worrying" for 21 of the indicators, in particular for those related to biodiversity and to environment and health, covering exposure to pollution and production of toxic chemicals.

European Commission announces Environmental Research Funding for 2011

The European Commission has announced that in 2011 a total of €240 million will be spent on environmental research under the EU's seventh research framework programme (FP7). Of this €240m, €70m will go to climate change research. Another €70m will be allocated to cleaner production processes while €100m will be set aside for research into resource efficiency. A further €210m is foreseen for developing alternative materials for greener industrial production.

The €415m research budget for transport will focus on a limited number of priorities including more efficient railway services, eco-innovation in shipbuilding and the European Green Car Initiative. Joint undertakings such as the EU's hydrogen technology initiative are not covered.

UK announces Funding for 150 more Low-CO₂ Buses

The UK Transport Minister has announced an additional £15 million (€17.8 million) of funding for the purchase of over 150 new low CO₂ buses in England.

Bus operators and local authorities can bid for the money which they can then use towards the additional initial cost of buying low carbon buses. The funding will cover 90% of the difference between the cost of a Low Carbon Emissions Bus (LCEB) and the cost of its standard diesel equivalent. In this context an LCEB is one giving a 30% reduction in its Greenhouse Gas Emissions compared to a Euro III diesel bus of the same passenger capacity. These buses will all meet at least Euro V EU emissions standards.

In the first round of this 'Green Bus Fund' competition, run in 2009, 24 bidders shared £30 million to support the purchase of around 350 new low carbon buses.

Ozone, NO₂ and PM₁₀ remain a Problem in France

France is not really improving air quality in regards to ozone, NO₂, and particulate matter, the Secretary of State for Ecology said on 28 July 2010 when presenting a plan to reduce particles by 30% by 2015.

The Air Quality report for 2009 shows a slight increase in NO₂ between 2008 and 2009. Ozone concentrations during the summer of 2009 confirmed the upward trend observed, particularly in the south-east, the report said. PM₁₀ also increased in both rural and city areas. The latter is explained by an increased use of coal, oil and wood for heating, due to a particularly cold winter in 2009.

Ms. Jouanno, the Secretary of State, presented a plan to reduce particles by 30% by 2015. The plan aims to

tackle areas of highest emissions; the first is the combustion of wood (40% of emissions). The government wants to, for example, encourage the renewal of wood heaters through tax credits, review the environmental performance of boilers, and enforce the ban on open burning. The other major sector is transport. At a national level transport is responsible for only 14% of PM₁₀ emissions, but this rate may jump up to 70% in large cities. One idea is to experiment with "zones of priority actions for air" (ZAPA) also known as Low Emission Zones (LEZ) where, for example, access for trucks is limited. Ms. Jouanno said such zones in other countries have reduced the rate of particles by 30%. As for cars, Ms. Jouanno said, the progressive implementation of the Euro 5 standard requiring particle filters should normally allow to resolve the issue of new vehicles. "The problem is that it takes 15 years to renew the park," she acknowledged.

Belgium's Walloon Region lagging behind on Air Quality

Belgium's French-speaking Walloon region is below average EU performance on six of 20 green indicators including PM₁₀ concentrations, according to a report issued by the regional government on 25 June 2010. Nevertheless, the report says that the annual limit of 40 µg/m³ was met in all the measuring stations and only three have exceeded the daily limit value of 50 µg/m³ on more than 35 days. The report is available (in French) at

<http://etat.environnement.wallonie.be/index.php?page=le-tableau-de-bord-2010>.

France, Germany and UK call for 30% Greenhouse Gas Reduction Target

Ministers from France, Germany and the UK have issued a joint call for the EU to raise its greenhouse gas emissions reduction target to 30% by 2020.

Writing in the *Financial Times*, UK Energy and Climate Change Minister Chris Huhne, German Environment Minister Norbert Röttgen and French Environment Minister Jean-Louis Borloo argued that the current 20% target will not be enough to drive green innovation and keep Europe in the race for clean technologies.

Proposed Austrian Emissions Limits for Boilers, Heating and CHP Systems

Austria has notified the EU of proposed emissions limits and efficiency requirements for 'small firing installations' of up to 400 kW for room heating and/or the production of hot water and for heat generating and combined heat and power systems, together with quality requirements for petroleum fuels.

The proposals will set limits on CO and NO_x for most such equipment. Depending on the calorific output and fuel used, there would also be limits for organic gaseous carbon (OGV), non-methane hydrocarbons (NMHC), SO₂, dust (particulate) emissions and/or smoke. The regulation can be downloaded from <http://ec.europa.eu/enterprise/tris/pisa/app/search/index.cfm?fuseaction=getdraft&inum=1587177>.

NORTH AMERICA

EPA withdraws Emissions Approval for 200 000 Small Off-Road Vehicles

The US Environmental Protection Agency has found that the sale and import of up to 200 000 small off-road vehicles relied on false or incomplete tailpipe emissions data. EPA has withdrawn its emissions approval of the import and sale of the affected gasoline-powered off-road motorcycles and all terrain vehicles. The California Air Resources Board has also voided its executive orders covering the same vehicles that were sold in California.

The action to void emissions certificates affects the companies that manufactured and imported these vehicles. EPA says that consumers who own models covered by the voided certificates are not responsible for the wrongdoing and can continue to use their vehicles. EPA issued the certificates in 2006 and 2007 to the US counterparts of four of China's largest manufacturers of these types of vehicles: Hensim USA, Loncin USA, Peace Industry Group, and Seaseng. The certificates were issued based on applications compiled by their consultant, MotorScience Enterprise. EPA says it believes MotorScience Enterprise intentionally submitted false or incomplete emissions information. The Chinese manufacturers are Chongqing Hensim Group Co., Chongqing Longting Power Equipment Co., Zhejiang Peace Industry and Trade Co., and Zhejiang Chisheng Industry and Trading Co.

US proposes Caribbean Marine Emissions Control Area

EPA, the US Environmental Protection Agency, has submitted to the International Maritime Organization (IMO) a proposal to designate portions of the coastal waters around the US Virgin Islands and Puerto Rico as an Emission Control Area (ECA). This would result in the control of NO_x, SO_x, and PM emissions from all ships operating in the area. The proposal follows IMO's agreement in March this year to the designation of North American coasts as an ECA.

From 2015, the fuel used by all vessels operating in ECAs must not exceed 0.1% (1000 ppm) sulfur. Starting in 2016, new engines on vessels operating in

these areas must use emissions controls that achieve an 80% reduction in NO_x emissions.

IMO members are expected to consider the latest proposal at the Marine Environmental Protection Committee meeting starting on 27 September 2010.

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

Complementing its final rule on Hazardous Air Pollutants (HAPs) from existing compression-ignition stationary engines, published in March this year, the US Environmental Protection Agency has now issued its 'final rule' on the reduction of HAPs from existing stationary spark-ignition (SI) engines.

The rule covers emissions from existing engines where the total power of the engines on a site located at what EPA designates as a 'major source' is less than or equal to 500 horsepower. (A 'major source' of HAP emissions is generally a stationary source that emits or has the potential to emit 10 tons per year or more of any single HAP or 25 tons per year or more of any combination of HAP). It also applies to existing engines on any site that is located at an 'area source' (a stationary source that is not a 'major source'). EPA estimates that more than 330 000 stationary SI engines are used in the US to generate electricity or to power equipment used in oil and gas production, industrial, agricultural or other facilities.

The regulations are formulated in terms of CO or formaldehyde emissions as surrogates for a range of hazardous air pollutants.

Further details are at www.epa.gov/ttn/oarpg/new.html.

Environmental Organisations want EPA to Regulate Non-road GHG Emissions

One day after the US Senate upheld the Environmental Protection Agency's authority to regulate greenhouse gas (GHG) emissions, a coalition of environmental groups filed a lawsuit challenging the EPA's failure to address GHG emissions from ocean-going ships, aircraft and non-road vehicles and engines used in industrial operations.

The lawsuit was filed by Earthjustice and the Western Environmental Law Center on behalf of Oceana, Friends of the Earth, the Center for Biological Diversity, the Center for Food Safety, and the International Center for Technology Assessment. Together, aircraft, ships and non-road vehicles and engines emit approximately 290 000 tons of soot every year. They are responsible for 24% of US mobile source GHG emissions, and emissions from these sources are projected to grow over coming decades, said Earthjustice.

US-EPA delays Issue of Final Air Quality Standard for Ozone

The US Environmental Protection Agency (EPA) has announced that the process of reviewing comments on the proposed National Ambient Air Quality Standard (NAAQS) for ozone and reaching a final decision will take approximately two months longer than anticipated. As a result the final standard is not now expected until late October 2010.

Earlier this year EPA proposed revising the standard from the 0.075 ppm figure set in 2008 to a range between 0.060 and 0.070 ppm. In addition the agency proposed the adoption of a new "biologically relevant" secondary standard to protect environmental resources.

California steps up Gross-Polluter Vehicle Retirement Programme

According to a rule proposed by the California Bureau of Automotive Repair "75% of vehicular pollution is caused by just 25% of the vehicle fleet" in the state.

California has more than 3 million pre-1995 cars registered, some with failing emissions control systems, many owned by low-income drivers. Removing these "gross polluters" from the roads when they fail their biannual smog checks (required for cars six years old or more) is one of the most cost-effective ways available to the state to reduce vehicle emissions. Roughly 22 000 vehicles a year are now scrapped under the programme. California also offers financial assistance to low-income owners, which is restricted to repairs that bring the car into compliance with the emissions limits for its model year.

No smog checks are required in California for cars built before 1976, when the first catalytic converters were installed on new cars. Nor are they required for hybrid cars, motorcycles, diesel cars built in 1997 or earlier, large diesel trucks, or cars with two-stroke engines or engines smaller than 0.8 litres.

Now, under proposed rules, the state is proposing to expand its Fleet Modernization Program, which currently offers financial incentives for owners to 'retire' cars that fail their smog checks. The expanded programme would add trucks, sport-utility vehicles, and vans to those affected. It would also expand eligibility to more than 10 000 vehicles that are in between smog checks. Owners of gross polluters can apply to the Bureau of Automotive Repair (BAR) for a letter of approval to scrap the vehicle. When they turn in the vehicle at a BAR-approved dismantler and receive proof that it has been scrapped, they receive a payment of \$1000 to \$1500.

Testing Project on Heavy-duty Vehicles

California's South Coast Air Quality Management District has issued a request for proposals on a project to conduct chassis dynamometer emissions testing of in-use heavy-duty diesel vehicles.

Measurements will comprise regulated emissions, CO₂, NO₂, ammonia and other unregulated toxic emissions. The intent of the project is to determine whether new and existing engines are within their certification levels. The project will, if needed, evaluate the potential of retrofit technology to allow such engines to meet their original certification limits. The testing is to include on-road vehicles used in goods movement, transit, and refuse collection applications and will cover engines fuelled by natural gas or diesel, including dual fuelling.

US-EPA proposes reducing Pollution from Power Plants

The US Environmental Protection Agency (EPA) is proposing regulations to cut air pollution from power plant pollution that drifts across the borders of 31 eastern states and the District of Columbia. Along with local and state air pollution controls, the new proposal, called the transport rule, is designed to help areas in the eastern United States meet existing national air quality health standards.

EPA is using the "good neighbour" provision of the Clean Air Act to reduce interstate transport of pollutants – i.e. pollution that is created in one state but is then carried downwind into other states, contributing to their air quality problems. The proposal would replace and improve upon the 2005 Clean Air Interstate Rule (CAIR).

The transport rule would reduce power plant emissions of sulfur dioxide (SO₂) and nitrogen oxides (NO_x) to meet state-by-state emissions reductions. By 2014, the rule and other state and EPA actions would reduce SO₂ emissions by 71% and NO_x emissions by 52% over 2005 levels. EPA expects that the emissions reductions will be accomplished by "proven and readily available" pollution control technologies already in place at many power plants across the country.

US-EPA Awards for New Clean Diesel Technologies

The US Environmental Protection Agency (EPA) has awarded \$5.6 million (€4.2 million) for emerging technologies projects as part of a roll out of \$120 million in clean diesel grants. The awards will support environmental innovation to reduce diesel emissions.

Most clean diesel grants involve widely used strategies such as retrofits or replacements. However,

the emerging technologies programme promotes deployment of innovative approaches that have not yet been verified or certified by EPA or the California Air Resources Board (CARB). Instead, the programme enables evaluation of promising technologies in the field.

Recipients of the emerging technologies grants are:

- City of Los Angeles Harbor Department for a hybrid crane with a small diesel generator and battery.
- CARB for a NOx reducing device for locomotives.
- University of Houston for NOx reducing technologies installed on school buses.
- Puget Sound Clean Air Agency for a seawater scrubber for large ship engines.
- South Coast Air Quality Management District for an exhaust capturing mechanism used on a variety of ships while at port.

Californian Study says Climate Change may increase Ozone and Particles

Researchers from the University of California estimate that rising temperatures from climate change will increase ozone levels in California's major air basins. Their report predicts that by 2050 California could experience an additional 6 to 30 days per year with ozone concentrations ≥ 90 ppb, depending on the level of temperature increase. The study, conducted for the California Air Resources Board (CARB) also predicts that peak concentrations of airborne particles will increase in the San Joaquin Valley due to the effects of climate change on wind patterns. The report is at: www.arb.ca.gov/research/apr/past/04-349.pdf.

US-EPA proposes Renewable Fuel Standards for 2011

The US Environmental Protection Agency (EPA) has proposed the standards for the percentage of renewable fuels under the four categories in the agency's Renewable Fuel Standard programme.

To achieve the 2022 target of 36 billion gallons (approx. 136 billion litres) of renewable fuel annually, EPA determines the volume of each type of renewable fuel needed for the following year, and calculates a standard for this as a percentage of total fuel. 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 its transportation fuel.

The 2011 overall volumes and standards are to be:

- Biomass-based diesel: 0.80 billion gallons; 0.68%
- Advanced biofuels: 1.35 billion gallons; 0.77%
- Cellulosic biofuels: 5 - 17.1 million gallons; 0.004-0.015% (to be finalised)
- Total renewable fuels: 13.95 billion gallons; 7.95%.

Massachusetts suspends Biodiesel Mandate

The Massachusetts Department of Energy Resources has indefinitely suspended the State's biodiesel mandate that was due to start on 1 July 2010. The department found that implementing the requirement for a 2% biodiesel content in transport fuels and heating oil, is not feasible "on the basis of unreasonable cost". Instead of the mandatory programme, the department has proposed a voluntary biodiesel programme.

Revised SAE Standard for Emissions and Fuel Economy of Hybrids

SAE International has issued a revised version of SAE J1711 – "Recommended Practice for Measuring the Exhaust Emissions and Fuel Economy of Hybrid Electric Vehicles, including Plug-in Hybrid". SAE says the revised standard provides procedures to more consistently evaluate these vehicles under a wide range of evaluation cycles. Further details are at http://standards.sae.org/j1711_201006.

SOUTH AMERICA

São Paulo State actions on Greenhouse Gases and Revised Air Quality Standards

By the end of 2010, Brazil's São Paulo state plans to issue more rigorous air quality standards that will be in accordance with the most recent guidelines recommended by the World Health Organization, an official with the state Environmental Secretariat (SMA) told the press on 22 June 2010. A working group of representatives from SMA; the state health secretariat, the state's largest industrial federation; and environmental non-governmental organisations is now drafting the air quality standards for the state.

A 1976 law set state-wide, mandatory air quality standards for a variety of pollutants, including sulfur dioxide, nitrogen oxides, carbon monoxide, particulate matter, and volatile organic compounds. That law said the air quality standards had to be reached gradually, but did not set a deadline. When issued by the end of 2010, the official said, the new standards will include a deadline. SMA will also do a sector-by-sector analysis to determine which industrial sectors most need to gradually reduce their emissions, as well as an analysis of which industrial firms most need to reduce their emissions. Companies with emissions of any of these pollutants that are above the new standards will be required to invest in cleaner technologies to bring their emissions levels into compliance.

A central goal of the new standards is to reduce tropospheric ozone levels in the state. There are 50 to

90 days per year when ozone levels in São Paulo are higher than the 1976 standard of $160 \mu\text{g}/\text{m}^3$.

The governor of São Paulo State has also issued a decree implementing the state's climate change law and its target for the state to reduce its greenhouse gas emissions by 20% from 2005 levels by 2020. The decree (No. 55 947) requires SMA to set down criteria for establishing voluntary emissions reductions targets for various sectors, including the transport sector. Those targets must be established by April 2011.

The co-ordinator of environmental planning for SMA said that SMA's criteria in setting those voluntary targets will be based on the potential of each sector to reduce its greenhouse gas emissions. As the energy and transport sectors are those most responsible for greenhouse gas emissions in the state, SMA will likely set voluntary emissions reductions targets for those sectors at over 20% by 2020, the governor said - "The transport sector alone could reduce emissions by up to 40% by 2020." Under the decree, the State Transportation Secretariat must draft plans to increase sustainable transport. The secretariat plans to do so by creating public/private partnerships to build railways and waterways to reduce the majority of cargo now being transported by truck.

Argentina increases Required Biodiesel Content of Fuel to 7%

On 5 July 2010, Argentina's Ministry of Federal Planning, Public Investment and Utilities issued a resolution requiring diesel fuel for vehicles to contain at least 7% biodiesel (current 5%). One day later, Planning Minister Julio de Vido said the country, already one of the world's top biodiesel producers, would probably raise the amount of vegetable oil it requires in diesel to 10% by the end of the year.

ASIA PACIFIC

Report on Pollution in India

The *Times of India* reports on a written reply from the Minister of State for Environment and Forests to a question raised in the Lok Sabha, the lower house of the Indian Parliament. The Indian Central Pollution Control Board (CPCB) and the State pollution control boards have been monitoring ambient air quality in 175 cities across the country under a national programme using 424 monitoring stations. The Minister's reply lists 91 of the most polluted cities in India for 2009.

Jharia in Jharkhand is shown as the most polluted city in India. Mumbai was placed 37th with a PM_{10} level of $109 \mu\text{g}/\text{m}^3$ and Pune was 69th with average PM_{10} levels of $82 \mu\text{g}/\text{m}^3$. The permissible limit of Respirable Suspended Particulate Matter (RSPM) is $60 \mu\text{g}/\text{m}^3$. The CPCB figures show that northern India is far more

polluted than the south, with Ludhiana, Khanna (both in Punjab) and Ghaziabad, Khurja and Firozabad (all in Uttar Pradesh) having the highest levels of PM_{10} . However, some cities in the south are showing rising PM_{10} trends - Hyderabad, Tuticorin, Bangalore and Coimbatore in particular. While particulate matter comes from a variety of sources, PM_{10} is largely from vehicles.

Other data showed that nitrogen oxide emissions are rising with higher sale of diesel vehicles being the likely cause. In 1998, only five cities exceeded the national standards for NO_2 . In 2008, 15 cities showed violations, most of them in eastern India. Howrah showed the highest levels at $81 \mu\text{g}/\text{m}^3$. Levels in Kolkata reached $56 \mu\text{g}/\text{m}^3$ and Delhi was at $49 \mu\text{g}/\text{m}^3$. Mumbai, which was ranked 7th, had levels of $42 \mu\text{g}/\text{m}^3$. The permissible limit is $40 \mu\text{g}/\text{m}^3$.

Indian Roundtable on Diesel Vehicles and Technologies

The Society of Indian Automobile Manufacturers (SIAM) organised a roundtable on diesel vehicles and technologies in Delhi on 28 June 2010.

Participants gave their viewpoints on world-wide diesel emissions regulations, diesel technologies in the US, current and future clean diesel technology and diesel fuel quality trends in India.

Participants agreed that there is a need for a holistic approach for the image of diesel vehicles, which should also address off-road equipments, tractors, power generation and older vehicles. Emissions reductions beyond Euro V & VI would lead to increased CO_2 emissions and this needs to be addressed, they concluded. There is a need to develop a roadmap for 50 ppm sulfur diesel fuel in India to enable the use of particulate filters and NO_x reduction technology. There is also a need to develop a plan for making older engines cleaner through applying new aftertreatment devices in the Indian context through incentives and strategies.

Australian Design Rule 79 updated

From 1 July 2010, the 02 version of the Australian light-duty emissions regulation ADR 79 is now applicable to all M and N category vehicles with a gross vehicle mass less than or equal to 3.5 tonnes and produced on or after 1 July 2010.

The key requirement, which was already applicable to new models from mid-2008, is for Euro 4 emissions levels with a durability requirement of 5 years or 100 000 km.

Australian Prime Minister proposes Scrapping Scheme

Australia may soon follow in the footsteps of other international markets with a "cash for clunkers" programme.

As part of her government's climate change policy for the forthcoming Australian elections, Prime Minister Julia Gillard has announced a 'Cleaner Car Rebate', offering a A\$2000 (€1360) subsidy to new car buyers who trade-in pre-1995 cars.

Gillard said the rebate is part of a plan to cut vehicle emissions by one million tons, with mandatory emissions regulations to be introduced for new cars from 2015. If the Labour government is re-elected, the programme will start on 1 January 2011.

Motorbikes over 10 Years Old in Vietnam to undergo Exhaust Inspection

Vietnam's new regulations on vehicle emissions will focus first on motorbikes more than 10 years old, then on new motorbikes and remaining vehicles, the Registration Administration chief has told reporters.

The agency is elaborating a scheme to control exhaust from motorbikes to submit to the government for approval. Its objective is to ensure that 80 to 90% of motorbikes in Hanoi and Ho Chi Minh City meet exhaust standards by 2015. At present, less than half the bikes in circulation in these cities meet the emissions standards. From 2010-2013, the scheme will concentrate on media activities, developing an exhaust testing system, technical facilities and staff. During this stage, only 20% of motorbikes will be checked. In the second phase (2013 to 2015), the scheme will be scaled up to control most motorbikes in Hanoi and HCM City and spread this programme to other big cities. Vehicles that meet exhaust standards will be granted a one-year certificate. Exhaust verification stamps will also be stuck on checked vehicles. Vehicles that fail to meet exhaust standards will have to be repaired to meet the standards.

Singapore consulting on Euro 4

Platts reports that Singapore's National Environment Agency (NEA) has said that the government is in consultation with the oil industry on the adoption of Euro 4-equivalent emissions standards for gasoline-fuelled vehicles.

The agency said that they are consulting the oil industry on the lead time needed to supply 50 ppm sulfur gasoline, possibly by 2012. The current standard in Singapore is 500 ppm. No time frame has been set at this moment on the adoption of a higher emissions standard or the Euro 4 emissions standard for petrol vehicles, the NEA said.

"For diesel vehicles, we have, in the Singapore Sustainable Development Blueprint which was launched in April 2009, indicated that we are targeting to move to Euro V vehicle emissions standards by 2014/5," NEA spokesman said. Since October 2006, all new diesel vehicles have had to meet Euro IV standards. The government "expects all taxis to achieve Euro IV emissions standards by 2014, and the Land Transport Authority will work with public bus operators to attain this standard for all their buses by 2020."

Fuel Cell Bus for Singapore

Singapore's Nanyang Technological University (NTU) has unveiled GreenLite, a hydrogen-electric bus that is the result of a joint research project between NTU and Beijing's Tsinghua University.

The research project was developed in partnership with Singapore's Land Transport Authority (LTA), Singapore bus company SBS Transit and Chinese bus manufacturer Higer. Launched by Mr Teo Ser Luck, who is a Senior Parliamentary Secretary and Mayor of the Youth Olympic Village on NTU's Yunnan Garden campus, the bus will transport athletes and officials within the village during the games Youth Olympic Games.

GreenLite uses a hydrogen fuel cell system that powers the bus and charges the lithium-ion batteries when necessary. NTU says that unlike other hydrogen fuel cell buses which typically have capacities of between 80 and 150kW, the dual design combining a proton exchange membrane (PEM) fuel cell stack with lithium-ion batteries enables the bus to run on a fuel cell power capacity of only 40kW.

Tokyo Buses to test Synthetic Fuel

Buses running on a mixed synthetic fuel comprising 20% biodiesel with Fischer-Tropsch diesel derived from natural gas (GTL) are being tested on routes in Tokyo, Japan between July and December 2010. The government-funded field trials are to be conducted by a team from Toyota, Hino and Showa Shell Sekiyu KK. The partners say the fuel has no sulfur and emits less particulate matter and carbon monoxide when combusted than regular diesel fuel.

Guam to move to Ultra-low Sulfur Diesel

The Governor of Guam has signed into law a bill that will, from January 2011, make ultra-low sulfur (<15 ppm) the legal standard for diesel fuel on Guam. Fuel companies will, however, be given time to deplete their on-island inventories of diesel fuel that does not meet the new standard before tanks are replenished with ultra-low sulfur diesel.

MIDDLE EAST

Israeli Spot-checks found more Polluting Cars in 2009

The Public Council to Prevent Noise and Air Pollution in Israel (Malraz) discovered more polluting cars during its spot-checks in 2009 than in previous years, according to the organisation's annual report.

Malraz checked 7134 cars: 1786 petrol-engined and 5348 diesel. 9% of the cars examined were found to pollute more than the acceptable standard. This is one percent higher than 2008. 367 (21%) of the cars run on petrol were found to be above pollution standards. Most of those were older cars without a catalytic converter but 57 had a converter but were still found to be above the standard. Only 5.2% of the diesel vehicles checked was found to be emitting unacceptable levels of pollution. Commercial diesel vehicles were found to be the most polluting.

Malraz's mobile unit operated in Tel Aviv-Jaffa, Kfar Saba, Holon, Petah Tikva, Ramle and Ashdod, including three days of testing taxis operating out of Ben-Gurion Airport. Malraz has been operating a mobile unit for the last seven years. It is one of only seven in the country to monitor the three million vehicles on the road. Four mobile units are run by the Environmental Protection Ministry, one by the Jerusalem Municipality and one by the Haifa Union of Cities. Only the ministry and Malraz units are able to pull cars off the road and send them for re-check.

AFRICA

South Africa looking at Expanding Automotive Incentive Scheme

Speaking at a meeting of the Port Elizabeth Exporters Club on 7 July 2010, South Africa's Trade and Industry Department director of industrial projects, Francois Truter, said that the department is looking at expanding the Automotive Incentive Scheme (AIS) to include heavier vehicles such as taxis and buses. Truter said the department was looking at three-ton vehicles and would probably increase this to 7.5 tons. Currently the AIS is only applicable to manufacturers of light motor vehicles and components.

To qualify for the basic 20% AIS incentive, motor companies must introduce a new or replacement model and convince the department that minimum annual production will reach 50 000 within three years. Components companies must prove they have a contract to supply components, and that their investment will contribute to the company earning at least 25% of total turnover from the light vehicle supply chain.

South Africa to include Light Commercial Vehicles in 'Carbon Tax'

South Africa's National Treasury has confirmed that a national tax on carbon dioxide (CO₂) emissions from new passenger vehicles that takes effect in September 2010 will be expanded to include light commercial vehicles (LCVs).

From 1 September 2010, new passenger vehicles will be subject to a one-time tax at the time of sale, based on their certified level of CO₂ emissions. The tax would add 75 rand (approx €8) to the vehicle price for every gram of CO₂ emitted per kilometre above a 120 g/km threshold. Double-cab commercial vehicles will be treated as passenger cars. The tax will, however, only be applied to double-cab vehicles from 1 March 2011, says the Treasury, to allow manufacturers and importers sufficient time to test and determine the CO₂ emissions. The threshold for such vehicles will be 175 g/km CO₂, and the rate will be 100 rand for every g/km above the threshold.

Other light commercial vehicles, single cabs and light vans, will be subject to the CO₂ tax at a date still to be decided. Minibus taxis are currently excluded from the tax as they are predominantly used for public transport. However, their position will be reviewed when all other LCVs become subject to the tax. About one-third, or 2.4 million, of the nation's estimated 7.4 million vehicles fall into the LCV category, according to the National Association of Automobile Manufacturers of South Africa.

UNITED NATIONS

ECE Regulation 49 updated

Supplement 2 to the 05 series of amendments to UN-ECE Regulation 49 (heavy-duty engine emissions) entered force on 19 August 2010, together with corrigendum 1 to supplement 2. Supplement 1 entered force on 17 March 2010.

Essentially, these amendments cover the latest WHDC procedures (including the compromise agreed with the US on WHTC soak time and cold weighting), but do not yet include the PMP methodology for particle number measurement. OBD requirements are updated (Annexes 9B and 9C) and the new Annex 10 on off-cycle emissions is added.

GENERAL

ETH Nanoparticles Conference

The 14th ETH Conference on Combustion Generated Nanoparticles was held in Zürich on 2-4 August 2010. A new record of some 427 participants registered for the conference, which included a Regulatory update from DG Enterprise on Euro 6/VI and UN-ECE

Regulations relevant to particles, a summary of the outcomes of the heavy-duty PMP inter-laboratory correlation exercise, information on the Beijing off-road particle filter retrofit programme for 2011 and a summary of heavy-duty chassis dynamometer testing at DG-JRC. AECC also presented a summary of particulate emissions data from the AECC NRMM test programme conducted at Ricardo.

Some of the key issues discussed at the conference were nucleation mode particles/particles <23nm; metallic oxide particles; and particles from DI petrol engines. The latter topic included suggestions that DI petrol particles show a shift to smaller particles compared to diesel DI. Other presentations covered the results of tests on scooters, covering PM, particle numbers, and toxicity in exposure tests. Several papers also examined the composition and morphology of soot particles.

Two sessions were devoted to the health effects of particulate. In the following panel discussion it was said that the real correlations with health effects are with particle numbers, black carbon and to some extent PAHs, rather than with PM. It was said that the focus should therefore be on particle numbers, size distribution and particle composition, plus the interaction with gases. It was also suggested that it may be necessary to separate work on older engines from that on newer, emissions-controlled systems which have different particulate compositions, sizes and characteristics.

Other topics included presentations on soot sensors, the development of instruments for in-use compliance measurement of particles, validation of PEMS (Portable Emissions Measurement Systems) for particulate, and comparisons of different methods of determining particle emissions. One talk covered Low Emission Zones and their effect on particles and there were a number of papers on DPF modelling work.

RESEARCH SUMMARY

Health Effects of Emissions

Ultrafine Particles and Allergic Inflammation in Asthma

The authors of this study led by the University of California at Los Angeles (UCLA) say that their results demonstrated that inhalation of pro-oxidative ambient ultrafine particles could effectively boost the secondary immune response to an experimental allergen, indicating that vehicular traffic exposure could exacerbate allergic inflammation in already-sensitized subjects.

Source: Li et al, Ambient Ultrafine Particles Provide a Strong Adjuvant Effect in the Secondary Immune Response: Implication for Traffic-related Asthma Flares; *American Journal of Physiology-Lung Cellular and Molecular Physiology* 18 June 2010, doi: [10.1152/ajplung.00115.2010](https://doi.org/10.1152/ajplung.00115.2010).

Vascular Effects of Diesel Exhaust Exposure

The authors conclude that the adverse vascular effects of diesel exhaust inhalation occur over different running conditions with varying exhaust composition and concentrations as well as physicochemical particle properties.

Source: Barath et al, Impaired vascular function after exposure to diesel exhaust generated at urban transient running conditions; *Particle and Fibre Toxicology* (2010) 7:19, doi: [10.1186/1743-8977-7-19](https://doi.org/10.1186/1743-8977-7-19).

Effect of Ultrafine Particle Exposure on Strokes

Researchers found a significant positive association with exposure to ultrafine particle (UFP), NO_x and CO, and ischaemic strokes, and for UFP and NO_x and mild strokes, 4 days before hospital admission. The strongest associations were with UFP. The authors say their results indicate possible effects of traffic-related air pollution, mainly UFPs, on hospital admissions for ischaemic stroke, especially for mild ischaemic stroke of likely thrombotic origin.

Source: Andersen et al, Association between short-term exposure to ultrafine particles and hospital admissions for stroke in Copenhagen, Denmark; *European Heart Journal*, (2010) 31 (16): pp.2034-40, doi: [10.1093/eurheartj/ehq188](https://doi.org/10.1093/eurheartj/ehq188).

Effect of Particles on Inflammatory Responses

The authors of this paper aimed to analyse the association between short-term exposure to ultrafine and fine particles and systemic inflammation. The researchers concluded that the results support the hypothesis that short-term exposure to traffic-related particles might lead to detrimental cardiovascular health effects via an inflammatory mechanism.

Source: Hertel et al, Influence of short-term exposure to ultrafine and fine particles on systemic inflammation; *European Journal of Epidemiology* (2010) 25 (8):pp.581-92, doi: [10.1007/s10654-010-9477-x](https://doi.org/10.1007/s10654-010-9477-x).

Role of CO and Organic Aerosols in Vascular Effects

Researchers at the Lovelace Respiratory Research Institute in the USA say that emerging evidence suggests that the systemic vasculature may be a target of inhaled pollutants of vehicular origin.

The authors conclude that in a head-to-head comparison of the effects of several pollutants and pollutant mixtures, they found an important contribution to vascular toxicity from readily bioavailable monoxide gases and possibly from volatile hydrocarbons. These data support a role for traffic-related pollutants in driving cardiopulmonary morbidity and mortality.

Source: Campen et al, A comparison of vascular effects from complex and individual air pollutants indicates a role for monoxide gases and volatile hydrocarbons; *Environmental Health Perspectives*. (2010) 118 (7): pp.921-7, <http://www.ncbi.nlm.nih.gov/pubmed/20197249>.

Assessment of Exposure

Short-term Exposure to Particles and Soot

This paper from the Netherlands concerns a study of ultrafine particles (UFP) measured simultaneously with PM₁₀ and soot at 3 inner-city locations in and around Utrecht in autumn 2008. The locations were a moderately busy street (15 000 vehicles/day), a city background location and a suburban background location. The mean particle number count (PNC) at the street location was more than 3 times higher than at the two background locations. The contrast was similar for soot concentrations. Less contrast (1.8 times) was found in PM₁₀ concentrations. Mean PNC concentrations correlated poorly with PM₁₀ and soot.

Source: Boogaard et al, Comparison of short-term exposure to particle number, PM₁₀ and soot concentrations on three (sub) urban locations; *Science of the Total Environment*, doi: [10.1016/j.scitotenv.2010.06.022](https://doi.org/10.1016/j.scitotenv.2010.06.022).

Diesel Exhaust Particulate and Nanoparticle Exposure

A paper from Navistar says that studies of human volunteers exposed to diesel exhaust in research settings report nanoparticle number concentrations that exceed those reported for worst-case exposure conditions for workers manufacturing and handling engineered nanoparticles.

Considerable uncertainty remains both as to which diesel exhaust constituents underlie the observed responses (nanoparticles, particulate mass, exhaust gases), and as to the implications of the observed short-term changes for the development of disease. Even so, these diesel exhaust human clinical data do not give evidence of a unique toxicity for nanoparticles as compared to other small particles, the authors say.

Source: Hesterberg et al, Diesel exhaust particulate (DEP) and nanoparticle exposures: what do DEP human clinical studies tell us about potential human health hazards of nanoparticles?; *Inhalation Toxicology*, (2010) 22 (8); pp.679-94, doi: [10.3109/08958371003758823](https://doi.org/10.3109/08958371003758823).

Impact of Air Pollution on Prague Bus Drivers

DNA integrity was investigated in the lymphocytes of 50 bus drivers, 20 garagemen and 50 control subjects. Exposure to carcinogenic polycyclic aromatic hydrocarbons (cPAHs) and volatile compounds was measured by personal samplers for 48 and 24 h, respectively, before the collection of biological specimens. Both exposed groups exhibited a higher level of DNA instability and oxidative damage to biological macromolecules than the controls.

Source: Bagryantseva et al., Oxidative damage to biological macromolecules in Prague bus drivers and garagemen: Impact of air pollution and genetic polymorphisms; *Toxicology Letters*, doi: [10.1016/j.toxlet.2010.08.007](https://doi.org/10.1016/j.toxlet.2010.08.007).

Air Quality

Global Particle Numbers and Particle Formation

A new paper from researchers in Europe, the US, China and Australia synthesises observations of total particle number (CN) concentration from 36 sites around the world. The authors found that annual mean CN concentrations are typically 300-2000/cc in the marine boundary layer and free troposphere and 1000-10 000/cc in the continental boundary layer. Many sites exhibited pronounced seasonality with summer time concentrations a factor of 2-10 greater than wintertime concentrations.

Source: Spracklen et al, Explaining global surface aerosol number concentrations in terms of primary emissions and particle formation; *Atmospheric Chemistry and Physics*, (2010) 10 (10): pp.4775-4793, doi: [10.5194/acp-10-4775-2010](https://doi.org/10.5194/acp-10-4775-2010).

Analysis of PM_{2.5} at Different Locations in Belgium

Daily and seasonal variation in the total elemental composition, organic carbon (OC) and elemental carbon (EC) content and mass of PM_{2.5} have been studied at industrial, urban, suburban and agricultural/rural areas in Belgium. A high OC/EC ratio (2-9) was generally observed. The total carbon content of PM_{2.5} ranged between 3 and 77% (averages: 12-32%), peaking near industrial/heavy trafficked sites. Principal component analysis identified heavy oil burning, ferrous/non-ferrous industry and vehicular emissions as the main sources of metal pollution. This work also compares various aerosol monitoring methods to characterize PM_{2.5}.

Source: Bencs et al, Appraisal of measurement methods, chemical composition and sources of fine atmospheric particles over six different areas of Northern Belgium; *Environmental Pollution*, doi: [10.1016/j.envpol.2010.07.012](https://doi.org/10.1016/j.envpol.2010.07.012).

Particles, Black Carbon, and PM in Barcelona

Measurements of particle number concentration, black carbon (BC), and PM₁₀, PM_{2.5}, and PM₁ levels and speciation were carried out at an urban background monitoring site in Barcelona. Daily variability of all aerosol monitoring parameters was found to be highly influenced by road traffic emissions and meteorology. The researchers concluded that PM composition was highly influenced by road traffic emissions, with exhaust emissions being an important source of PM₁ and dust re-suspension processes an important source of PM_{2.5-10}.

Source: Perez et al, Variability of Particle Number, Black Carbon, and PM₁₀, PM_{2.5}, and PM₁ Levels and Speciation: Influence of Road Traffic Emissions on Urban Air Quality. *Aerosol Science and Technology*, (2010) 44 (7): pp.487-499, doi: [10.1080/02786821003758286](https://doi.org/10.1080/02786821003758286).

PAHs in Urban Aerosols

Size-segregated atmospheric particles were collected in Rome, Italy and analysed for polycyclic aromatic hydrocarbons (PAHs) and their nitro- and methyl-

derivatives. An evaluation of the potential toxicity of the measured compounds was tentatively assessed based on Potency Equivalency Factors (PEF).

The distribution of the classes of compounds was unimodal and centred at 0.4 μm size fraction for PAHs and bimodal and centred at 0.1 and 0.4 μm for methyl- and nitro- derivatives. 18% of the toxic organic compounds the researchers analysed was distributed into the ultrafine fraction ($\text{PM}_{0.1}$) and 76% in the fine fraction; but substituted PAH distribution in the ultrafine particles shifted toward higher values during warm periods.

Source: Di Filippo, Riccardi, Pomata and Buiarelli Concentrations of PAHs, and nitro- and methyl- derivatives associated with a size-segregated urban aerosol; *Atmospheric Environment*, (2010) 44 (23): pp.2742-2749, doi: [10.1016/j.atmosenv.2010.04.035](https://doi.org/10.1016/j.atmosenv.2010.04.035).

Characterisation of Particulate

Reactive Oxygen Species in Particulate

Three light-duty passenger vehicles were tested in five configurations in a chassis dynamometer study to determine the chemical and oxidative potential of the particulate exhaust emissions. Particulate matter was collected on filters and subsequently analysed using various chemical and toxicological assays.

Source: Cheung et al, Emissions of Particulate Trace Elements, Metals and Organic Species from Gasoline, Diesel, and Biodiesel Passenger Vehicles and Their Relation to Oxidative Potential; *Aerosol Science and Technology*, (2010) 44 (7): pp.500-513, doi: [10.1080/02786821003758294](https://doi.org/10.1080/02786821003758294).

Engine Development and Emissions Measurement

Emissions from partially pre-mixed ethanol/diesel

In newly-published work from Lund University, EGR sweeps were performed on ethanol partially premixed combustion (PPC) to show different emission and efficiency trends as compared with diesel partially premixed combustion. The sweeps showed that when the EGR rate is increased, efficiency does not diminish, the HC trace is flat, and CO is low even with 45% EGR. NO_x exponentially decreases by increasing EGR while soot levels are nearly zero throughout the sweep.

Source: Manente et al, Characterization of Partially Premixed Combustion With Ethanol: EGR Sweeps, Low and Maximum Loads; *Journal of Engineering for Gas Turbines and Power - Transactions of the ASME*, (2010) 132 (8): pp.82802, doi: [10.1115/1.4000291](https://doi.org/10.1115/1.4000291).

Particle Emissions during Regeneration

A new paper reports on the collaborative emissions testing by the EU's Joint Research Centre and the California Air Resources Board (CARB) of a Euro 4 light-duty diesel vehicle with a DPF. From the description, the vehicle appears to be the 'golden vehicle' from the UN-ECE's PMP programme. The California testing included an investigation of the

regeneration of the DPF over cruise conditions and the European regulatory cycle, the NEDC.

Regulated exhaust emissions increased substantially during the regeneration events; however, PM emissions levels were below California LEVII emissions standards. There was a very large increase of volatile particles between 5 and 10 nm, and these volatile particles were generated during all of the observed regeneration events. The authors say that it appears that the particle number instruments that use the PMP methodology do not capture the PM mass increase during DPF regeneration; however, for one regeneration event there was an apparent large increase in solid particles below the PMP size limit. The PM mass increase associated with regeneration appears to be due to semi-volatile particles collected on filters. During the testing, the regeneration events exhibited considerable variations in the time for regeneration as well as the amount of PM emissions.

The researchers concluded: "From this investigation, several questions have been posed concerning the emission of very small (<20 nm) volatile and solid particles during DPF regeneration that need further investigation."

Source: Dwyer et al; Emissions from a diesel car during regeneration of an active diesel particulate filter; *Journal of Aerosol Science*, (2010) 41 (6): pp.541-552, doi: [10.1016/j.jaerosci.2010.04.001](https://doi.org/10.1016/j.jaerosci.2010.04.001).

Particle Numbers from a Gas-powered DI Engine

The results of this study indicate that the combustion versus the injection timing was primarily dependent on the mixing quality of the air-fuel mixture. The particulate number concentration increased as the fuel injection was advanced but the particle size distribution was not affected significantly with different injection timings. The authors say that this is probably related to the in-cylinder combustion.

The initial combustion duration increased as the spark timing advanced and the fastest rapid combustion duration was obtained at the maximum brake torque spark timing. As the fuel injection timing and spark timing advanced, particle number levels increased but the particle size distribution showed few variations.

Source: Liu et al, Combustion characteristics and particulate emission in a natural-gas direct-injection engine: effects of the injection timing and the spark timing. *Proceedings of the Institution of Mechanical Engineers Part D - Journal of Automobile Engineering*, (2010) 224 (D8): pp.1071-1080, doi: [10.1243/09544070JAUTO1532](https://doi.org/10.1243/09544070JAUTO1532).

Measurement of High NO₂/NO_x Ratios

In this work, scenarios are explored in which the NO₂/NO_x ratio for lean-burn natural gas engines can be large. Additionally, three NO_x measurement approaches - chemiluminescence, chemical cell, and Fourier-transform infrared spectroscopy - are compared for exhaust with various NO₂/NO_x ratios. A

portable analyzer with chemical cell technology was found to be the most accurate for measuring exhaust NO_x with large NO₂/NO_x ratios.

Source: Olsen, Kohis and Arney, Impact of oxidation catalysts on exhaust NO₂/NO_x ratio from lean-burn natural gas engines; *Journal of the Air and Waste Management Association*, (2010) 60 (7): pp.867-74, www.ncbi.nlm.nih.gov/pubmed/20681434.

Aldehydes and Methanol from a Gasohol Engine

Formaldehyde (HCHO), acetaldehyde (CH₃CHO) and methanol (CH₃OH) emissions from a spark ignition engine fuelled with M10 (10% methanol-gasoline blend) were directly detected by gas chromatography (GC) with a pulsed discharge helium ionization detector.

Experimental results showed that compared with gasoline, formaldehyde emissions from M10 were substantially larger while acetaldehyde was smaller. HCHO emissions increased while CH₃OH emissions decreased with engine speed and tailpipe temperature. The three-way catalytic converter could remove over 85% of CH₃OH and CH₃CHO emissions once light-off was reached. However, an unfamiliar phenomenon of negative HCHO conversion efficiency occurred when the engine speed was over 3500 rpm, which infers that the catalyst may enhance HCHO emission rather than weaken it at high engine speeds.

Source: Wei et al, Direct measurement of formaldehyde and methanol emissions from gasohol engine via pulsed discharge helium ionization detector; *Fuel* (September 2010) 89 (9): pp.2179-2184, [doi: 10.1016/j.fuel.2010.04.015](https://doi.org/10.1016/j.fuel.2010.04.015).

Emissions from Marine Fuel Biodiesel Blends

This paper investigates diesel engine performance and emissions with marine gas oil-alternative fuel blends. The experiments were conducted with a six-cylinder, four-stroke, turbocharged, direct-injection Scania DC 1102 (DI) diesel engine.

Source: Nabi and Hustad, Experimental investigation of engine emissions with marine gas oil-oxygenate blends; *Science of the Total Environment* (2010) 408 (16):pp.3231-9 www.ncbi.nlm.nih.gov/pubmed/20452651.

Review of NO_x Abatement Trends

A paper from the Technical University of Lodz, Poland summarises the current state of NO_x abatement strategies. Firstly, the influence of NO_x on the environment and human health is described. The main focus is put on NO_x control methods applied in combustion of fossil fuels in power stations and vehicles, as well as methods used in the chemical industry. The influence of ozone and other oxidising agents in NO_x oxidation is emphasised.

Source: Skalska, Miller and Ledakowicz, Trends in NO_x abatement: A review; *Science of the Total Environment*, [doi:10.1016/j.scitotenv.2010.06.001](https://doi.org/10.1016/j.scitotenv.2010.06.001).

Climate Change and Emissions

Controlling Soot may be Fastest Method to reduce Global Warming

Controlling soot from fossil fuels and solid biofuels may be a faster method of reducing Arctic ice loss and global warming than other options, including controlling CH₄ or CO₂, although all controls are needed, according to a new study by Dr. Mark Z. Jacobson at Stanford University.

Results of the study suggest that soot is second only to carbon dioxide in contributing to global warming. However, climate models to date have mischaracterised the effects of soot in the atmosphere, according to Jacobson. Because of that, soot's contribution to global warming has been ignored completely in national and international global warming policy legislation, he said.

Jacobson used a computer model of global climate, air pollution and weather that he developed over the last 20 years and updated to include additional atmospheric processes to analyse how soot can heat clouds, snow and ice. He found that soot from fuel and biomass combustion is the second-leading cause of global warming after carbon dioxide.

Jacobson found that eliminating soot produced by the burning of fossil fuel and solid biofuel could reduce warming above parts of the Arctic Circle in the next fifteen years by up to 1.7°C.

Source: Mark Z. Jacobson. Short-term effects of Controlling Fossil-Fuel Soot, Biofuel Soot and Gases, and Methane on Climate, Arctic Ice, and Air Pollution Health; *Journal of Geophysical Research* (2010) 115, D14209; pp.24, [doi:10.1029/2009JD013795](https://doi.org/10.1029/2009JD013795).

Climate Change effects of Cars versus Planes

According to the results of an EU-funded study, car travel increases global temperatures more than an air travel for the same journey but only in the long term. Travelling by plane, on the other hand, adversely affects short-lived warming processes at high altitudes. The work focused on the impact of air, sea and land traffic on the Earth's climate, with particular reference to the effects of greenhouse gases, emissions of ozone precursors and particles, contrails and ship tracks. The ultimate goal was to provide forecasts and other policy-relevant advice to governments and international bodies.

The authors say that an unambiguous ranking of the specific climate impact can be established for freight transportation, with shipping and rail having the lowest and light trucks and air transport having the highest specific impact for all cases calculated. Passenger travel with rail, coach or two- and three-wheelers has on average the lowest specific climate impact also on short time horizons. Air travel has the highest specific impact on short-term warming, while on long-term

warming car travel has an equal or higher impact per passenger-kilometer.

Source: Borken-Kleefeld, Berntsen and Fuglestvedt, Specific Climate Impact of Passenger and Freight Transport; *Environmental Science & Technology* (2010) 44 (15): pp.5700–5706, doi: [10.1021/es9039693](https://doi.org/10.1021/es9039693).

Cost and CO₂ Aspects of Future Vehicle Options

A new paper from the EU's Joint research Centre (DG-JRC) says that the expected gains in environmental performance for new electrified vehicle types are associated with higher technology costs, but in parallel the fuel efficiency of internal combustion engine vehicles and hybrids is continuously improving. This improvement in turn advances their environmental performance but also leads to additional technology costs.

The study compares the well-to-wheel CO₂ emissions, costs and CO₂ abatement costs of generic European cars, including a gasoline vehicle, a diesel vehicle, gasoline, diesel and plug-in hybrids, and a battery electric vehicle. The comparison is done for snapshots of 2010, 2020 and 2030 under a new energy policy scenario for Europe.

Source: Thiel, Perujo and Mercier, Cost and CO₂ aspects of future vehicle options in Europe under new energy policy scenarios; *Energy Policy*, doi: [10.1016/j.enpol.2010.07.034](https://doi.org/10.1016/j.enpol.2010.07.034).

FORTHCOMING CONFERENCES

Diesel Emissions Conference India 2010

8-9 September 2010, New Delhi, India

Details at

www.integer-research.com/conferences/dec-india.

Sessions include global emission control technology trends and application in the Indian market; vehicular emission reduction policy and the Government's plans for air quality improvement in India; innovative SCR technologies to meet tighter future emissions target; and further emissions reduction for diesel commercial vehicles and passenger cars.

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 CO₂ Reduction?"

Joint Strategy and Networking Event 2010, 'Thinking ahead to the European Green Cars Initiative'

10 September 2010, Berlin, Germany

Details at <http://www.vdivde-it.de/green-cars>.

The major focus of the European Green Cars Initiative is on electric and hybrid vehicles, but research for

heavy-duty vehicles based on internal combustion engines is also included. The event is intended to encourage participation of interested stakeholders in the initiative. Sessions will include 'European projects and programmes for the Green Car' and 'Proposals and consortia for the 2011/12 Calls'.

Heavy Duty Diesel Emissions Control Symposium

21-22 September 2010, Gothenburg, Sweden

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

This event will discuss pathways to emissions compliance and the solutions that are under investigation. Discussions will include new Diesel hybrid and clean Diesel technologies, the CARB HD OBD 2013 regulation, aftertreatment, emerging technologies, emission control strategies, and global harmonisation of emissions standards.

Keramik in der motorischen Abgas-nachbehandlung

23 September 2010, Dresden, Germany

Details at www.ikts.fraunhofer.de/veranstaltungen/abgas_nachbehandlung.jsp.

This Industry Day will cover the current status and trends from the perspective of ceramic design and manufacturing process. There will be the opportunity to see operation of a hot gas test rig allowing analysis of the structural behaviour of ceramic components in the hot gas and thermal cyclic loading programmes.

The Future of Biodiesel in Europe

27-28 September 2010, Brussels, Belgium

Details at www.hartenergyconferences.com/index.php?area=details&confID=148.

This event will discuss critical issues affecting the European biodiesel market, including policy and market developments, quality and sustainability concerns, and technology developments that will impact the production and use of biodiesel in Europe.

16th DEER (Directions in Engine-Efficiency and Emissions Research) Conference

27-30 September 2010, Detroit, Michigan, USA

Details at www.orau.gov/deer2010.

The conference will showcase the US Department of Energy's cooperatively funded R&D with its partners, national laboratories, the passenger and commercial transportation industry, universities and other national and international organisations.

SAE 2010 Small Engine Technology Conference

28-30 September 2010, Linz, Austria

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

The 2010 technical programme will address all small engine topics related to specialty equipment, motorcycles, ATVs, lawn & garden equipment,

recreational marine use, and much more. Solutions to the recently finalised EPA regulations regarding small spark-ignition engines will also be addressed.

23rd World LP Gas Forum

28 September - 1 October 2010, Madrid, Spain

Details at www.wlpgasforum-aeqpl2010.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.

European Transport Forum 2010

5 October 2010, Brussels, Belgium

Details at www.europeantransportforum.eu/component/content/article/24/51.html.

SAE 2010 Commercial Vehicle Engineering Congress and Exhibition

5-6 October 2010, Rosemont, Illinois, USA

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

13th Annual Central and Eastern European Refining and Petrochemicals Roundtable

12-14 October 2010, Budapest, Hungary

Details at www.wraconferences.com/2/4/articles/110.php.

It is planned to include case studies on meeting EU fuel specifications, blending first and second generation biofuels, biofuels production from municipal solid waste, and market trends.

SAE 2010 Powertrains, Fuels and Lubricants Meeting

25-27 October 2010, San Diego, California, USA

The conference covers the latest developments in fuels, combustion optimisation, emissions reduction, advanced powertrains, engine downsizing, advanced fuel delivery and engine control.

Engine Downsizing

2 November 2010, London, UK

Details at

<http://events.imeche.org/EventView.aspx?EventID=1000>.

This seminar will provide an essential guide to the technology solutions available to achieve medium and high level downsizing.

8th FAD Conference: The Challenge – Exhaust Aftertreatment for Diesel Engines

3-4 November 2010, Dresden, Germany

Details at www.fad-diesel.de.

The focuses of this year's conference will display the current problems and future challenges for the development of exhaust aftertreatment technologies. The four sessions of the conference will be on Euro 6/Euro VI; future emissions concepts; retrofit; and fuel diversity and exhaust aftertreatment.

ICAT'10 – International Conference on Energy and Automotive Technologies

5 November 2010, Istanbul, Turkey

Details at www.icatconf.com.

The main theme of this conference will be “Fossil Fuels: Today and Tomorrow”. In addition to specific fuel issues, topics include vehicles of the future; diesel and gasoline engine development, durability and emissions; alternative drivetrains; and scenarios for the green future.

SAE 2010 On-Board Diagnostics Symposium Europe: Update on Light and Heavy-Duty Vehicles

9-10 November 2010, Amsterdam, Netherlands

Details at

www.sae.org/events/training/symposia/obdeurope.

The Europe OBD event addresses technical advancements and legislative information for the automotive engineer working in the field of OBD who is specifically engaged in ICE and hybrid systems with a primary focus on light-duty vehicles and a secondary focus on heavy-duty vehicles. Discussions will also centre on current and anticipated legislative requirements from CARB and the EC, as well as Euro 6/VI and 2005/55/EC updates.

MTZ-Konferenz – Heavy-Duty, On- und Off-Highway-Motoren, Euro 6 / Tier IV – und was kommt danach?

23-24 November 2010, Mannheim, Germany

Details at www.atzlive.de/pdf/cfp_heavy_duty_2010.pdf.

The conference will cover new engines, emissions, aftertreatment, fuel injection, supercharging and cooling, combustion process, fuels, lubricants and friction and alternative propulsion.

Emissions Control Concepts

29 Nov. – 1 Dec. 2010, Wiesbaden, Germany

Details at www.emission-control-concept.com/PM.

IQPC is providing a forum to discuss international emissions legislation and evaluate its impacts on the automotive industry. Key speakers will share their knowledge on advanced aftertreatment systems and present their experiences in customised product development.

Monitoring Ambient Air 2010: New Air Quality Measurement Technologies

14-15 December 2010, London, UK

Details at www.aamq-rsc.org.

This meeting will focus on new measurement challenges, including new technologies for air pollution measurement, small sensors for dense urban networks or measurement of personal exposure, real-time measurement of PM components or physical properties, improved measurement of organic particles and gases, measurements for source apportionment and the quality assurance of new measurement methodologies.

International Advanced Mobility Forum

8-9 March 2011, Geneva, Switzerland

Details at www.iamf.ch/en/presentation/index.php?idContent=160&navigId=30.

12th European Fuels Conference

8-11 March 2010, Paris, France

Details at www.wraconferences.com/2/4/articles/205.php.

17th Annual Fuels & Lubes Asia Conference

9-11 March 2011, Singapore

Details at www.fuelsandlubes.com/callForPapers.

8th Green Ship Technology Conference and Exhibition

21-22 March 2011, Oslo, Norway

Details at www.greenshiptechnology.com.

The technical programme will feature high quality papers which will draw on the experiences of leading projects to showcase new innovations in technology as well as address some of the hottest issues currently impacting the maritime industry.

2011 SAE World Congress

12-14 April 2011, Detroit, Michigan, USA

Details at www.sae.org/congress.

32nd Vienna Motor Symposium

5-6 May 2011, Vienna, Austria

15th ETH Conference on Combustion Generated Nanoparticles

26-29 June 2011, Zürich, Switzerland

SAE Powertrains, Fuels and Lubricants

30 August – 2 September 2011, Kyoto, Japan

Details at www.jsae.or.jp/2011pfl.

Abstracts due by 10 October 2010.

Emissions topics include aftertreatment for CI and SI engines, future automotive catalysts and converter technologies, and the effects of fuels and lubricants for automotive devices.

SAE 2011 Small Engine Technology Conference

8-10 November 2011, Sapporo, Japan

Details at www.setc-jsae.com.

Abstracts due 28 January 2011.

The conference will cover products such as ATVs, motorcycles, generators and agricultural/gardening equipment, focussing on combustion engines but also covering hybrids and electric drive.