



# Newsletter

November - December 2010

## INTERNATIONAL REGULATORY DEVELOPMENTS

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## EUROPE

### Light-duty and Heavy-duty Emissions Technical Regulations Agreed

The European Commission's Technical Committee – Motor Vehicles, meeting on 17 November 2010 agreed the contents of two Technical Regulations.

The first, when published, will provide the first part of the technical requirements to meet the heavy-duty Euro VI emissions Regulation. It includes confirmation of the adaptation of the limit values contained in the co-decision Regulation (EC 595/2009) to the new world-harmonised test cycles (WHTC and WHSC), details of the test methods, specifications of reference fuels, Type Approval procedures, and requirements for OBD, Conformity of Production (CoP), In-Service Conformity (ISC) using Portable Emissions Measurement Systems (PEMS), Off-Cycle Emissions (OCE), Replacement Pollution Control Devices and the correct operation of NOx control devices.

The second Regulation will amend the light-duty Euro 5 and Euro 6 emissions Regulations to include the PMP methodology for particulate mass and particle number measurement, as well as requirements on Repair and Maintenance Information, together with clarification of provisions on On-Board Diagnostics, In-Service Conformity, NOx control monitoring and reference fuels.

### Corrigendum to Euro 5 & 6 Legislation

A corrigendum to Commission Regulation (EC) 692/2008 (the technical part of the light-duty Euro 5 & 6 Regulation) was published in the Official Journal of the European Union on 21 December 2010. The amendment corrects the calculation for the dilution factor for fuels of general composition  $C_xH_yO_z$ .

The corrigendum is available from <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:336:0068:0068:EN:PDF>.

### European Commission Proposal on Flexibility for Tractors

The European Commission has now published its proposal to increase the flexibility scheme allowances for tractors, paralleling that proposed for Non-Road Mobile Machinery (NRMM). The objective is to assist tractor manufacturers during the economic downturn.

The document proposes an increase in the number of engines meeting the previous stage of emissions limits that are allowed to be placed on the market under the flexibility scheme in the period immediately after the introduction of emissions Stage IIIB. The proposed measures would expire on 31 December 2013. In each engine category the increase would be from the current 20% to 50% of the tractor

manufacturer's annual sales of the equipment. There would also be an adaptation of the maximum number of engines that may be placed on the market under the flexibility scheme as an optional alternative. This would allow each manufacturer to place on the market up to 200 engines of 37-56 kW; 175 in the 56-75 kW category, 250 in the 75-130 kW category, and 125 of 130-560 kW to be sold under the flexibility scheme.

The proposal (COM (2010) 607) is at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0607:FIN:EN:PDF>.

### CARS 21 High Level Group relaunched

On 10 November 2010 the European Commission's re-launched CARS 21 (Competitive Automotive Regulatory System for the 21<sup>st</sup> Century) High Level Group met for the first time in its new form.

The European Commission has asked the group to develop a common action plan and a vision for "a competitive EU automotive industry and sustainable mobility and growth in 2020 and beyond." This will contribute to the EU strategy for smart, sustainable and inclusive growth, to the flagship initiatives on resource efficiency and industrial policy and to the EU strategy for clean and energy efficient vehicles. The CARS 21 High Level Group includes 9 State Ministers, 6 Commissioners and representatives of 3 Parliamentary Committees. NGOs and Industry, including AECC, are well represented by Associations' Presidents and CEOs.

### Revised Industrial Emissions Directive published

Directive 2010/75/EU, the recast Directive on industrial emissions (integrated pollution prevention and control, or IPPC) was published in the EU's Official Journal of 17 December 2010. The Directive controls emissions of a wide range of pollutants, including sulfur and nitrogen compounds, dust particles, asbestos and heavy metals.

The revision integrates seven directives into a single legal framework and provides for a more harmonised and rigorous implementation of emissions limits associated with 'Best Available Techniques' (BAT).

The recast also tightens emissions limits for nitrogen oxides, sulfur dioxide and dust from power plants and large combustion installations in oil refineries and the metal industry. New plants must apply the cleanest available technology from 2012, four years earlier than initially proposed. Existing plants have to comply with this standard from 2016, although until 30 June 2020, Member States may define transitional plans with declining annual caps for NOx, SO<sub>2</sub> or dust.

By 31 December 2013, the Commission has to review the need to establish EU-wide emissions limits for

industrial diesel engines and for certain other applications. The Commission must also review the need to amend main emissions limits and must report the results to the European Parliament and Council, accompanied, if appropriate, by a legislative proposal.

The Directive can be downloaded from <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:334:0017:0119:EN:PDF>.

## European Commission publishes Report on 2009 Figures for Car CO<sub>2</sub>

The European Commission has published a report on average CO<sub>2</sub> emissions from new cars sold in the EU, showing a 5.1% drop in 2009 compared to 2008.

Table 1: Average CO<sub>2</sub> emissions from new passenger cars by fuel (EU27)

gCO <sub>2</sub> /km	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
All fuels	172.2	169.7	167.2	165.5	163.4	162.4	161.3	158.7	153.6	145.7
Petrol	177.4	175.3	173.5	171.7	170.0	168.1	164.9	161.6	156.6	147.6
Diesel	160.3	159.7	158.1	157.7	156.2	156.5	157.9	156.3	151.2	145.3
AFV	208.0	207.4	179.2	164.7	147.9	149.4	151.1	140.0	137.0	125.8

In addition, a slight decrease in the power, engine capacity and weight of cars, seen for the first time in 2008, accelerated last year.

Climate Action Commissioner Connie Hedegaard said "Reducing CO<sub>2</sub> emissions from road transport remains a major challenge for the years to come. The latest data shows however that the car industry is on track to achieve the 2015 target [130 g/km CO<sub>2</sub> fleet average] and most likely several major manufacturers will be able to do so well in advance. When the targets were set, industry feared that they would be impossible to reach in time. I am glad that in reality EU legislation on reducing CO<sub>2</sub> emissions is proving an effective driver of innovation, keeping the EU industry at the front-edge of competitiveness."

The report is at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0655:FIN:EN:PDF>.

## European Commission launches Clean Vehicles Lifetime Costs Website

The European Commission has launched a website [www.cleanvehicle.eu](http://www.cleanvehicle.eu) intended to help calculate the lifetime costs of vehicles. The aim is to encourage sales of cleaner and more efficient vehicles.

The lifetime costs of vehicles' energy consumption, CO<sub>2</sub> emissions and air pollutants are calculated according to the methodology defined in the 2009 Directive on Clean Vehicle Procurement. Under this legislation, public authorities must take into account the environmental impacts of the vehicles they buy.

According to the Commission, the lifetime costs of a bus meeting Euro V pollution standards can be about €100 000 cheaper than for an older Euro III bus.

## EU Ministers reach Compromise on Light Commercial Vehicle CO<sub>2</sub> Emissions

On 20 December 2010, the Council of European Environment Ministers discussed the proposed CO<sub>2</sub> emission standards for light commercial vehicles (LCVs). Ministers endorsed the outcome of informal negotiations between the EU Presidency and the European Parliament for an agreement at 1<sup>st</sup> reading.

The agreed text introduces a limit of 175 g/km CO<sub>2</sub> for the average emissions from new LCVs registered in the EU. This target will apply to a small van of average mass while specific targets for individual vehicles would vary according to their weight. The objective will be phased in between 2014 and 2017. A long-term target of 147 g/km CO<sub>2</sub> in 2020 has been included. The modalities for reaching the target are to be established in a revision of the regulation by 2013.

To incentivise investment in new technologies, from 2014 producers have to pay a penalty if their fleet fails to meet the objective. As in the legislation for cars, the premium depends on by how far manufacturers exceeded the target. A maximum penalty of €95 per car for exceeding the target has been agreed.

The text will now be confirmed by the European Parliament at a plenary session and adopted formally by the Council after legal-linguistic revision.

## T&E Report on Car CO<sub>2</sub> Emissions

A report released on 4 November by Brussels-based environmental group T&E, which says that average CO<sub>2</sub> emissions from new cars sold in Europe fell by 5.1% last year, claims that three fifths of this decrease was due to vehicle technology improvements, not simply a shift to smaller cars due to the recession.

As a result of the improving trend, T&E said, carmakers are well on track to achieve an EU cap of 130 g/km years ahead of the 2015 binding target. If last year's pace is maintained the industry will hit the target by 2012 – the target year originally proposed by the European Commission.

T&E added that some manufacturers are virtually at the target – last year Toyota and Fiat had average emissions of 132 and 131 g/km respectively. The report found that companies such as Suzuki, Daimler, Ford and Mazda achieved a 3% CO<sub>2</sub> reduction through the application of new technology, while companies such as Hyundai and Fiat achieved reductions by selling smaller vehicles.

## Consultation on Development of a Low-Carbon Roadmap

The European Commission's Directorate General for Climate Action has sought stakeholder and public input for the development of its roadmap for a low-

carbon economy by 2050. The roadmap is due for publication in the summer of 2011.

The Commission asked what legislation and technologies are anticipated to be the most effective in 2020 and beyond. It also asked for views on the role of emissions trading and how a range of EU policies can be adapted to climate change.

## **Commission Staff Working Document on Clean and Energy Efficient Vehicles**

On 14 December 2010 the European Commission issued a Staff Working Document on its rolling plan for its Strategy for Clean and Energy Efficient Vehicles.

The document notes that, despite significant emissions reductions and several rounds of tightening Euro standards for air pollutants, many Member States continue to have severe difficulties meeting the air quality targets for NO<sub>2</sub> and particulate matter, especially in urban areas "where the contribution of transport emissions stayed unexpectedly high...too many EU citizens are living in areas exceeding air quality limit values or similar targets, many of which were set since the 1990's".

The Commission says that the implementation stage already includes the new type approval framework for 2- and 3-wheelers and quadricycles; implementing measures for the car CO<sub>2</sub> Regulation; the Regulation on light commercial vehicle CO<sub>2</sub>; a study on certification procedures for CO<sub>2</sub>/fuel consumption of heavy-duty vehicles; and biofuel sustainability criteria.

In 2011, the Commission will deliver a Regulation laying down detailed provisions for derogation from the specific CO<sub>2</sub> emission targets for low-volume and niche manufacturers; a Regulation on a procedure for approval and certification of innovative developments; and a proposal to reduce the fuel consumption impacts of mobile air conditioning systems.

By 1 January 2013, the Commission intends to complete the review of the specific emissions targets in the car CO<sub>2</sub> regulation and will propose a target for 2025. Among other options, the Commission will assess the feasibility of the 70 g/km target suggested by the European Parliament. At the latest in 2013, the Commission will propose a revised test cycle to measure emissions and "develop a robust procedure by 2012 to measure real world emissions, considering the use of portable emissions measuring systems."

## **Commission launches Energy Strategy and Low-Carbon Technologies Support**

On 9 November 2010 the European Commission launched its first call for proposals for a programme of investment in low carbon and renewable energy demonstration projects.

The NER300 initiative will provide substantial financial support for at least eight projects involving carbon capture and storage (CCS) technologies and at least 34 projects involving innovative renewable energy technologies. 9 of these are on bio-energy whilst the remainder cover technologies such as photovoltaic, wind, geothermal, ocean and hydro-electric power. The Commission says the aim is to drive low carbon economic development in Europe, creating new 'green' jobs and contributing to the achievement of the EU's climate change goals.

The following day the Commission presented its new Energy Strategy towards 2020. The Commission Communication "Energy 2020" defines the energy priorities for the next ten years and sets the actions to be taken in order to tackle the challenges of saving energy and boosting technological leadership in low-carbon energy. The Commission proposes to focus its initiatives on the two sectors with the biggest energy saving potential: transport and buildings. The Commission says that the public sector should take energy efficiency into consideration when buying works, services or products. The proposals also include research on second-generation biofuels. Ideas on reducing demand for oil in transport are, though, left to a future white paper on transport.

Details of the Energy Strategy 2020 are available at [http://ec.europa.eu/energy/strategies/2010/2020\\_en.htm](http://ec.europa.eu/energy/strategies/2010/2020_en.htm).

## **59% of Black Carbon in Arctic comes from the EU**

The EU is responsible for 59% of black carbon emissions in the Arctic, according to an EU-funded impact assessment discussed by a group of experts in Brussels on 18 November 2010. It was conducted by the Arctic Footprint and Policy Assessment Project.

Europe only contributes to 16% of total GHG emissions. It uses 24% of Arctic oil and gas resources, compared with 37% and 26% for Russia and the US respectively. But 60% of exports from the Arctic's infrastructure-intensive industries go to the EU. A number of proposals to cut Arctic impacts are put forward in the assessment. These include extending the Natura 2000 network and cutting Black Carbon emissions from diesel engines.

"As a major importer of Arctic goods and a significant contributor to Arctic pollution, the EU has a critical contribution to make as Arctic States and neighbouring countries deal with both the costs and potential economic benefits as a result of climate change," said European Commission official Nicholas Hanley. The conference heard that the European Environment Agency wants to help establish a permanent Arctic observation network.

## Commission's DG-JRC outlines Options for cutting Ships' Emissions

The best way of reducing air emissions from shipping is to adopt a mix of regulatory measures, such as sulfur emission control areas and fuel efficiency standards, combined with market-based instruments, according to a report from the European Commission's Joint Research Centre (DG-JRC) issued on 20 December 2010.

The report outlines options for reducing air pollution and emissions of greenhouse gases. Data and methodologies to estimate air emissions from ships are also evaluated. It admits that scarce and limited data available on shipping movements "make the design and assessment of air emission reduction strategies a complex task". But it suggests that combining methodologies could reduce uncertainties.

The measures outlined in the report could lead to an 80% reduction in nitrogen oxide emissions (NOx) by 2020. Emissions of sulfur oxides (SOx) and CO<sub>2</sub> could drop by 90% and 70% respectively. Providing electrical power from the shore while in port could save 20% of CO<sub>2</sub> emissions alone.

A global carbon emission trading scheme for ships is viable, if political objections can be resolved and an equitable method to allocate emissions to countries is established, says the JRC. But administrative challenges would be difficult to overcome.

The JRC report will feed into the Commission's work on cutting ships' carbon footprint. The Commission would prefer a global agreement on emissions trading through the International Maritime Organisation (IMO), but is preparing a "plan B" if this is not reached by the end of next year.

## EU Ports to reduce Fees for Low-emission Ships

A group of European ports will offer reduced fees for ships with lower pollutant emissions from 2011.

The discounts will apply for ships arriving at the Dutch ports of Amsterdam, Moerdijk, Dordrecht and Rotterdam from 1 January 2011. The ports of Antwerp in Belgium, Hamburg and Bremen in Germany and Le Havre in France intend to follow suit later in the year.

The ports will base charges for visiting vessels partly on emissions performance under a new, voluntary assessment scheme, the Environmental Ship Index (ESI). This was launched on 3 November 2010 by the International Association of Ports and Harbours (IAPH), which hopes to see it used across the world.

The ESI offers a simple and easily established score of emissions performance, which can be applied to all kinds of ship. It compares a ship's emissions of

nitrogen oxides (NOx) and sulfur oxides (SOx) to legal standards. The system places the most emphasis on NOx performance. Points are also awarded for reporting energy efficiency. Particulate output is not covered as it is closely associated with sulfur.

A ship that just meets current emissions standards, set by the International Maritime Organisation for open waters and by the EU at berth, would have a rating of 0. Another ship that has no pollutant emissions and which also reports its energy efficiency would be given 100 points.

## UK Ship Emissions Inventory

The UK Air Quality Archive has announced the availability of the UK Ship Emissions Inventory prepared for the environment department (Defra).

The assessment covers NOx, SOx, NMVOC (non-methane volatile organic carbon), primary PM<sub>10</sub> and CO<sub>2</sub>. It provides a detailed analysis of ship emissions resolved to a 5 km x 5 km grid, including emissions from vessels at sea, manoeuvring and at berth. There are projections to 2020 from the 2007 baseline.

The 2020 estimates show increases in NOx, CO<sub>2</sub> and VOC emissions and fuel consumption compared to 2007 due to growth. The assessment incorporates the effects of the Marpol Annex VI regulations on NOx, and notes that the NOx emissions increases are more marginal than CO<sub>2</sub> and VOC. The impact of fuel sulfur content reductions results in significantly lower SO<sub>2</sub> and PM emissions. The report is at [http://www.airquality.co.uk/reports/cat15/1012131459\\_21897\\_Final\\_Report\\_291110.pdf](http://www.airquality.co.uk/reports/cat15/1012131459_21897_Final_Report_291110.pdf).

## Czech Cabinet approves Road Tolls based on Emissions Class

The Czech cabinet has approved a change to the government directive on tolls for the usage of defined roads, which applies to vehicles over 3.5 tonnes.

The new directive classifies vehicles into three groups according to Euro emissions classes. Euro V and higher classes are included. The toll rates for Euro I to IV will be raised by 25%. At the same time, the Friday surcharge rates for vehicles with three or more axles, charged between 3 p.m. and 9 p.m., will be reduced from 50% to 40%.

## Reggio, Italy, introduces Traffic Restrictions to combat Pollution

At the start of November 2010, the Municipality of Reggio, Italy, introduced new traffic restrictions to counter pollution. The restrictions are to remain in place until 5 January 2011, with further measures due to run from 7 January to 31 March 2011.

From 8.30 to 12.30 and 14.30 to 18.30, Monday to Friday, operation of certain older vehicles was

prohibited. The restriction covers petrol vehicles prior to Euro 1; diesel vehicles prior to Euro 2; trucks and diesel vehicles with more than eight passenger seats prior to Euro III that do not have a particulate filter; and mopeds and motorcycles prior to Euro 1.

There are a number of exceptions to the restrictions, including taxis, buses, emergency vehicles, electric and hybrid vehicles and gas-powered (CNG or LPG) vehicles carrying at least 3 people.

## **Helcom seeks NOx Controls on Baltic Shipping**

The Helsinki-based Helcom commission on the protection of the Baltic Sea is seeking to designate the region as a NOx emission control area (NECA) under the IMO's Marpol convention. A proposal will be finalised at a meeting in March 2011.

Helcom's maritime group meeting in Norrköping, Sweden from 9 to 11 November 2010 decided to further study the economic impact of the proposal. The plan is expected to cut NOx emissions from ships in the Baltic by about 80% compared with current levels, and to substantially reduce eutrophication as a result, according to the commission. The proposal, to be submitted to the International Maritime Organization in 2011, would supplement the Baltic's existing controls on sulfur emissions.

## **Report on Spanish Air Quality in 2009**

Spain's air quality improved for the second year running in 2009, thanks more to the economic crisis rather than to action taken by public authorities, environmental group Ecologistas en Acción said in its annual air quality report published on 10 November.

Collating data from regional authorities, Ecologistas found that emissions of PM<sub>10</sub> and NO<sub>2</sub> were down by about 5% on 2008. Despite the improvement, 2.8 million and 5.2 million people were still exposed to excessive levels of PM<sub>10</sub> and NO<sub>2</sub> respectively. Inadequate data collection prevented the compilation of reliable national statistics for other pollutants.

The NGO said the economic crisis played a big role in improving air quality in 2009, cutting road fuel consumption by 5.1% and fossil fuel-fired electricity production by 13%. Greener fiscal policy may have encouraged a switch by consumers to smaller, less-polluting cars. And unstable climatic conditions contributed by dispersing pollutants. Air quality is improving despite a lack of adequate action by Spanish public authorities, Ecologistas claims. Few air quality plans are in place, as required by the EU Air Quality Directive. Those that exist are ineffective as they lack measures to reduce road traffic, the NGO said. The report is available (in Spanish) at

[www.ecologistasenaccion.org/spip.php?article19068](http://www.ecologistasenaccion.org/spip.php?article19068).

## **London Assembly calls for Action on NO<sub>2</sub> for the Olympic Games**

The London Assembly has warned that there is still significant work to do if the 2012 Olympic and Paralympic Games are to fully live up to the environmental promises the organisers made.

A new report - Going for Green - from the Assembly's Environment Committee praises work to map and reduce the event's carbon emissions, to recycle waste, and to use a low-emission Olympic fleet. But the report also describes failing to secure more electric vehicles for the Olympic fleet as a "missed opportunity" and notes that it is still not clear how carbon emissions from travel to London will be reduced. The report specifically picks out London's problems on NO<sub>2</sub> as a cause for concern, saying that there are forecast to be harmful levels of NO<sub>2</sub> in crucial parts of London in 2012. The report therefore calls for action to ensure NO<sub>2</sub> levels are reduced to bring them closer to EU limits.

## **UK Air Quality Pollutant Inventories**

The UK has published its Air Quality Pollutant Inventories for England, Scotland, Wales and Northern Ireland covering the period 1990-2008.

The report says that UK emissions of NOx (reported as NO<sub>2</sub>) have fallen by 49% since 1990, primarily as a consequence of abatement measures in road transport and at coal-fired power stations, and the increased use of other fuels for power generation. Emissions from road transport and coal combustion together account for 48% of UK emissions in 2008. Between 2007 and 2008, all UK countries show a reduction in road transport NOx emissions of around 10%, which reflects shifts in engine technology across the fleet and the down-turn in UK economic activity.

UK emissions of PM<sub>10</sub> have declined by 53% from 1990 to 2008. The most significant sources are domestic combustion (14% of UK emissions of PM<sub>10</sub> in 2008) and particulate from road transport sources (18% of UK emissions in 2008). Other sources of note include mobile agricultural machinery.

CO emissions, dominated by road transport (54% in 2008) show a 69% reduction on the 1990 figures. The change in emissions between 1990 and 2008 is dominated by the reduction in emissions from the road transport sector, caused by the increased use of three-way catalysts in cars. NMVOC emissions (non-methane volatile organic compounds) have decreased by 63% due to the impact of tighter European vehicle emissions standards and Fuel Quality Directives, as well as the impact of the Solvent Emissions Directive.

The report is available in the UK Air Quality Archive: [www.airquality.co.uk/reports/reports.php?report\\_id=629](http://www.airquality.co.uk/reports/reports.php?report_id=629).

## **State of the Environment Report from the Flemish Environment Agency**

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VMM, the Flemish Environment Agency, has released a report stating that the impact on the environment in Flanders has decreased because of a decrease in energy usage, mainly due to the crisis.

The energy usage and emissions from transport have for the first time decreased in 2009, mainly due to a decrease in transported goods (14% in 2008 and 17% in 2009). Passenger transport showed a decrease in travelled kilometres in 2008, but that increased again in 2009. The CO<sub>2</sub> emissions from personal transport did decrease, but the targets were not met. Regarding emissions, the amount of PAH in the air maintained a status-quo over the last year, but the share of transport was said to have quadrupled since 1990, although emissions of the most hazardous PAH decreased. Furthermore, PM<sub>10</sub> and PM<sub>2.5</sub> decreased in 2009 by 33% and 40%, respectively, but the 2010 NO<sub>x</sub> limit was exceeded by 29%, with a 49% contribution by transport. NO<sub>x</sub> is decreasing more slowly than in other Member States due to the larger share of diesel vehicles. The MIRA 2010 report is available at [www.environmentflanders.be](http://www.environmentflanders.be).

## **Norwegian Firms renew Commitment to cut Nitrogen Oxides**

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A 3-year voluntary commitment by Norway's industrial sector to reduce annual emissions of NO<sub>x</sub> is to be extended by 6 years, the Norwegian Environment Ministry announced on 21 December 2010.

Sectors involved include shipping, oil and construction. The initial agreement between the government and 14 industry organisations specified cuts of 30 000 tonnes during 2008, 2009 and 2010. Participating companies also contribute to a fund for investment in reduction measures, in return for which they are exempt from a tax on NO<sub>x</sub> emissions.

Fifteen bodies have signed up to the new deal, setting a further reduction target of 16 000 tonnes by the end of 2017 for ships, fishing vessels and other sources covered by the agreement. This is in addition to the expected reductions in road traffic due to new emissions requirements and fleet renewal.

Under the 1999 Gothenburg protocol and the 2001 national emission ceilings (NEC) directive, Norway is required to reduce its annual NO<sub>x</sub> emissions to 156 000 tonnes. These emissions have been constantly decreasing since 1999. The country emitted a total of 167 000 tonnes in 2009, according to Statistics Norway.

## **Swiss "Cleantech Masterplan"**

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On 4 November 2010, Doris Leuthard, the new Swiss Environment Minister, unveiled a plan to enable the country to regain "a world-class position" in green technologies by 2020.

The "Cleantech Masterplan" is designed to help Switzerland reduce its resource consumption to naturally sustainable levels by 2020, Ms Leuthard said. Efforts should be focused on research and development of technologies that deal with climate issues, resource management and saving energy. The plan includes 50 recommendations and measures for the Federal Government and Cantons.

The authors of the plan foresee an evaluation of the implementation of the Japanese 'top runner' scheme (under which all manufacturers in a certain product group are required to match best-in-class efficiency performance by a certain deadline), the expansion of green public procurement, more information on the environmental record of products and export promotion for green technologies. The plan calls for a strengthening of research and development by facilitating knowledge transfers between academic institutions and industry. It rates fiscal instruments like the existing CO<sub>2</sub> tax as "prerequisites for innovative behaviour", and calls for an optimisation of the tax system, such as a change of mobility pricing to promote the use of efficient vehicles.

## **NORTH AMERICA**

### **US-EPA again postpones Final Rule on Ozone Air Quality Standard**

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The US Environmental Protection Agency has declared a further delay to its final rule on the National Ambient Air Quality Standard for ground level ozone. It is not now expected until the end of July 2011.

Under the Bush administration, EPA had proposed a standard of 75 ppb, but under the Obama administration EPA proposed tightening the standard to between 60 and 70 ppb. EPA says the agency needs time to complete a scientific review and is asking the agency's independent team of scientists for more guidance on the studies used to make their recommendations.

### **Canada to propose Emissions Regulations for Diesel Locomotives**

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Transport Canada has announced that it intends to align the country's regulations on diesel locomotive engine emissions with US EPA's Tier 3 and 4 locomotive requirements.

The regulations will be developed next year by the Ministry of Transportation under the Railway Safety

Act and so will apply to most rail companies in Canada, although the smaller, provincial railways may not be affected. Transport Canada also proposed that regulations on greenhouse gas emissions will be developed in conjunction with EPA in the future.

A briefing and consultation paper is at [www.tc.gc.ca/eng/policy/acs-consultations-issuebrief-2159.htm](http://www.tc.gc.ca/eng/policy/acs-consultations-issuebrief-2159.htm).

## **California approves Amendments to On- and Off-Road Diesel Fleet Regulations**

On 17 December 2010, the California Air Resources Board (CARB) approved amendments to five fleet regulations affecting on-road diesel truck and bus fleets and diesel drayage trucks plus off-road equipment with diesel or large spark ignition engines.

All on-road trucks must meet 2010 or equivalent emissions standards by 1 January 2023, giving DPF-equipped vehicles an additional 8 years before they have to be replaced. There is also a phase-in option that extends compliance for PM retrofits to the end of 2015. Mandatory PM filter retrofits for 1996-2006 model year trucks/buses > 26 000 lbs gross vehicle weight were added to the original proposal. Smaller vehicles (≤ 26 000 lbs) do not have to be retrofitted with filters but their turnover to 2010-equivalent emissions begins in 2015, for 1995 and older vehicles.

The amendments for drayage trucks (trucks delivering cargo to or from ports or railyards) close loopholes that would have allowed switching from clean trucks to dirty trucks outside the gates of a port, railyard, or distribution centre. The Phase II emissions standards require 2007 or equivalent emissions performance starting in 2014 and 2010 or equivalent emissions performance is required by 2023.

The amendments to the Regulations for off-road diesel equipment delay the start of the regulation for four years, to January 2014, 2017 and 2019 for large, medium and small fleets respectively. In the period until final compliance dates (1 January 2023 for large and medium fleets, 1 January 2028 for small fleets) they must meet a declining combined PM and NOx fleet-average emission level. Alternatively, fleets can comply by meeting a minimum BACT (Best Available Control Technology) rate for each year. For off-road equipment compliance is based primarily on fleet turnover to cleaner engines, with no mandatory retrofit requirements, but retrofits can optionally be used.

The amended requirements for Large Spark-Ignited Engines broaden the compliance extension for non-retrofitable specialty equipment and harmonise the low-use exclusion with the off-road fleet.

The amendments also affect rules on greenhouse gas reductions from on-road tractors and trailers, providing additional phase-in options for large fleets and delayed compliance for certain types of trailers.

## **Vancouver, Canada, extends Vehicle Emissions Testing Programme**

The Board of Directors of Metro Vancouver has decided to extend AirCare, the region's light-duty vehicle emissions testing programme, until 2020.

Earlier this year a multi-agency review found that the air quality benefits justify continuing the programme, whose \$45 million (€33 million) annual running cost is recovered by fees from motorists. The programme tests vehicles of eight years old and over. In 2007, 13% of those tested failed their emissions test.

The board also decided to identify additional actions for reducing emissions from heavy-duty diesels. The existing 'AirCare On-Road Program' (ACOR) covers on-road heavy-duty diesel vehicles, but the stringency of the opacity limits could be increased.

## **Diesel Emissions Reduction Act of 2010 passes US Congress**

On 21 December 2010, the US Congress gave final approval to the Diesel Emissions Reduction Act (DERA) of 2010. The legislation re-authorises and modernises the Diesel Emissions Reduction Act of 2005, which was set to expire at the end of the fiscal year 2011. The bill not only authorises a five year extension of current operations, but also includes several important modifications to expand the programme and increase eligibility.

The US Environmental Protection Agency has estimated that in California alone, the programme returns an average of more than \$13 in health and economic benefits for every \$1 spent. It is projected that an estimated 2000 lives will be saved by 2017 because of improved air quality attributable to DERA.

In addition to extending the current programme of grants and loans, the legislation includes a rebate programme and will simplify the application process. It also expands the programme by adding eligibility for the District of Columbia and the territories, eliminates the requirement for 50% of funding to go towards public fleets, and reduces the cap for emerging technologies from 10% to 5%.

## **New York Retrofit Regulation delayed**

The Department of Environmental Conservation for New York State has decided that until a pending lawsuit is resolved, it will not enforce its requirement that all heavy-duty diesel vehicles owned by State agencies and by contractors working on behalf of the state be retrofitted or replaced. The requirement was due to come into force at the end of 2010 but the lawsuit is not currently due to be heard until 12 January 2011 and a decision may not be published until the Spring of 2011.



## **United States seeks Controls on Ship Emissions off Caribbean Islands**

The US government has asked the International Maritime Organization (IMO) to designate an Emission Control Area (ECA) in the waters off Puerto Rico and the US Virgin Islands. IMO is due to vote on the proposal in July 2011. If granted, the ECA would introduce requirements that any large ships operating in those waters use much cleaner fuel or install better pollution control technology to cut emissions of nitrogen oxides, sulfur oxides, and particulate matter.

Tankers, container vessels and cruise ships are major sources of air pollution in the two US territories located in the Caribbean, the Environmental Protection Agency (EPA) said. EPA estimated that by 2020, the requirements for the Emission Control Area will have reduced SO<sub>2</sub> from ships by 96%, fine particles by 86% and NO<sub>x</sub> by nearly 30%.

## **US Car CO<sub>2</sub> Emissions fall for Sixth Year**

A boost in US auto fuel economy standards has reduced CO<sub>2</sub> emissions by 14% per mile over the last six years and reduced gasoline use by 16%, the government has announced.

A new report from the US Environmental Protection Agency found that CO<sub>2</sub> emissions have decreased while fuel economy has increased every year since 2005, reversing the trend of the previous eight years. Average CO<sub>2</sub> emissions fell by 64 g/mile to 395 g/mile (approx. 247 g/km) in the last six years.

## **US-EPA seeks delay for New Legislation on Boiler and Incinerator Emissions**

On 7 December 2010, the US Environmental Protection Agency (EPA) filed a motion in a federal court seeking an extension in the current court-ordered schedule for issuing rules to reduce emissions from large and small boilers, process heaters and solid waste incinerators. EPA says the additional time is needed for them to re-propose rules based on a full assessment of information received.

The comments EPA received from Industry groups and the public following the proposal shed new light on a number of key areas, including the scope and coverage of the rules and the way to categorise the various boiler-types. After reviewing the data and public comments, the agency believes it is appropriate to issue a revised proposal that reflects the new data and allows for additional public comment.

EPA has estimated that there are more than 200 000 boilers operating in industrial facilities, commercial buildings, hotels and universities located in highly populated areas and communities across the country. EPA has estimated that for every \$5 spent on

reducing these pollutants, the public will see \$12 in health and other benefits. Further details are at [www.epa.gov/airquality/combustion](http://www.epa.gov/airquality/combustion).

## **EPA launches Website to Increase Transparency of Regulatory Activity**

The US Environmental Protection Agency (EPA) has launched a new website called Reg Stat that is intended to enhance public understanding of its regulatory process and the number, type, and range of regulatory documents developed by it each year.

Reg Stat provides information on EPA documents published in the Federal Register between 2005 and 2009. It also provides in-depth information on rules signed by the EPA administrator that substantively amend the Code of Federal Regulations. Users will be able to determine the number of rules signed by the administrator, how long it took to develop each rule, whether a rule underwent regulatory review by the Office of Management and Budget (OMB), and the length of OMB review. Both summary graphics and searchable data tables are available.

More information is at [www.epa.gov/regstat](http://www.epa.gov/regstat).

## **CARB issues Manufacturers Advisory on Alternate NO<sub>x</sub> Family Emission Level**

On 22 December 2010 the California Air Resources Board (CARB) issued a Manufacturers Advisory Correspondence (MAC) on alternate NO<sub>x</sub> Family Emission Level for 2011-2014 model year non-road compression ignition engines.

CARB says that several engine manufacturers have requested clarification on whether it will allow them to certify certain engines to the 3.8 g/kW-hr alternate oxides of nitrogen (NO<sub>x</sub>) family emission level (FEL) from the 2011 through the 2014 model years. The MAC clarifies that CARB will allow engine manufacturers to certify non-road compression ignition engines in the 130 to 560 kW power category to a 3.8 g/kW-hr alternate NO<sub>x</sub> FEL cap from the 2011 through the 2014 model years.

For details see [www.arb.ca.gov/msprog/mac/mac.htm](http://www.arb.ca.gov/msprog/mac/mac.htm).

## **US-EPA finalises 2011 Renewable Fuel Standards**

The US Environmental Protection Agency (EPA) has announced that it has finalised the 2011 figures for the four categories of fuel under 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 figures for biomass diesel, advanced biofuels and renewable fuels are similar to those proposed in mid-2010, but the volume for cellulosic biofuels has been defined within the range originally quoted. The final 2011 overall volume and standards are thus:

Cellulosic biofuel: 6.6 million gallons; 0.003% of fuel

Biomass-based diesel: 800 million gallons; 0.69%

Advanced biofuel: 1.35 billion gallons; 0.78%

Renewable fuel: 13.95 billion gallons; 8.01%.

## **US-EPA to further delay Decision on Ethanol-Blended Gasoline**

The Environmental Protection Agency has announced that it will delay until January 2011 a decision on whether gasoline blended with up to 15% ethanol (E15) is safe for use in 2001-2006 model year cars and light trucks. In October 2010 EPA approved E15 for vehicles made since 2006. If the blend is approved for vehicles built since 2001, it would cover 60% of cars and trucks.

A decision initially was expected in December but the Energy Department said it needed more time to test older vehicles due to mechanical failures in test vehicles unrelated to fuel. It said it expected to complete the additional testing by the end of December 2010. "EPA will make its decision shortly after receiving that data," the agency said.

## **ASIA PACIFIC**

### **Japan to continue Limits on Particulates and NO<sub>2</sub> but toughen Emissions Rules**

Japan's Ministry of the Environment has said that when the current eight-year regulatory period under the Special Law on Gross Reduction of Nitrogen Oxides and Particulate Matter in Designated Areas expires in March 2011, the new compliance period will retain the same standards but extend to 10 years.

The hourly national ambient air quality standard for NO<sub>2</sub> is 0.04-0.06 parts per million. The hourly limit for suspended particulate matter is 0.10 mg/m<sup>3</sup>. The ministry said that, with other ministries, it is preparing tougher tailpipe emission regulations on NO<sub>2</sub>, sulfur oxides, CO<sub>2</sub>, and particulates that makers and importers of new heavy-duty, diesel-powered vehicles as well as ethanol-powered vehicles must meet by the end of 2016. A senior official of the Japan Automobile Manufacturers Association (JAMA) told the press the industry expects the next regulations to be introduced in close coordination with the European Union and the United States, probably in 2011.

## **Hong Kong, China's 2010 Pollution Level is worst on Record**

Hong Kong will record the worst year for roadside pollution since the city started collecting readings in 1999, based on government data. Roadside smog reached "very high" or "severe" levels on the city's air pollution index, triggering government health warnings, at least 12.6% of the time at monitoring stations this year, even without including data collected in December 2010. That compares with very high or severe roadside pollution recorded 10.62% of the time during the whole of 2009.

The pollution index reached over 100 at all three of the city's roadside monitoring stations recently. The higher incidence of roadside pollution is due to an increase in levels of nitrogen dioxide, created by older vehicles' exhaust emissions and higher levels of ozone in the atmosphere, a statement from the government's Environmental Protection Department said. Measures to tackle the problem announced by the Chief Executive Donald Tsang in October included fitting equipment to clean exhaust emissions from older buses and a pilot project to set up low-emission zones in parts of the city, the department said.

## **China issues First Motor Vehicle Pollution Control Annual Report**

Air pollution from motor vehicles in China's urban areas remained "basically stable" in 2009 compared with the prior year, according to annual data on 113 cities released by the Ministry of Environmental Protection. However, 14 cities were singled out as needing to improve their environmental oversight, policies, and mitigation actions.

According to the China Motor Vehicle Pollution Control Annual Report, urban air quality rated "good" or better 66.7% of the time in 2009. Still, one-third of China's cities failed to meet overall national air quality standards, largely due to motor vehicle emissions, the ministry said. Motor vehicle pollution in the 113 cities "is serious" and has "become a major source of urban air pollution" due to the rapid increase in the number of automobiles on China's roads, the ministry said in its annual report, released on 5 November 2010.

The report singled out 14 cities needing improvement in managing vehicle traffic and pollution. Urban air quality in five cities - Taiyuan in Shanxi province, Zigong in Sichuan province, Yuxi in Yunnan province, Jiaying in Zhejiang province, and Bozhou in Anhui province - was designated "low" and in need of improvement. Nine other cities need to reduce traffic noise or to improve their environmental management systems, the ministry said.

Overall, about 25% of vehicles on the road in China meet China III emissions standards. Another one-third of vehicles meet China II standards, 26% meet China I standards, and about 17% are older vehicles that fall below the country's emissions control standards. While the overall level of vehicle emissions is growing because of increased car ownership, the rate of growth had slowed since 2000 because of the adoption of more stringent emissions standards and the phasing out of older, higher-emission vehicles, the ministry said.

## China updates Pollution Prevention Rules for Ships

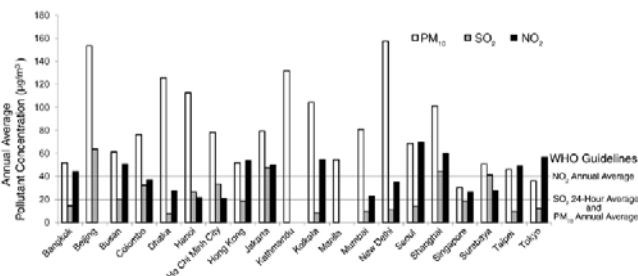
China's Ministry of Transport has released updated regulations on the prevention and control of maritime pollution related to shipping to meet obligations under its Marine Environment Protection Law and international treaties. The regulations, posted on the ministry's website on 2 December 2010, include fuel quality and the reduction of airborne shipping emissions.

China, which is a signatory to the International Maritime Organization's (IMO) International Convention for the Prevention of Pollution from Ships (MARPOL), expects to officially adopt the regulations on 1 February 2011.

In a related development, 15 shipping lines operating in the Hong Kong Special Administrative Region have signed a two-year voluntary agreement, known as the Fair Winds Charter, to use fuels with lower sulfur content in some of their ships while in the region's jurisdictional waters.

## Air Pollution in Large Asian Cities

Air pollution in major cities in Asia exceeds the World Health Organisation's air quality guidelines and results in over 530 000 premature deaths a year, according to a new report issued by the Health Effects Institute.



The study took into account PM<sub>10</sub>, NO<sub>2</sub> and SO<sub>2</sub>. No single city in Asia had all three pollutants within limits considered acceptable by the WHO. For instance, although SO<sub>2</sub> and NO<sub>2</sub> in Dhaka were within safety limits, particulates in the capital of Bangladesh were more than five times over WHO guidelines. The same

was true in Singapore, where particulates exceeded WHO guidelines by 50%.

The study says elderly people with cardiopulmonary and other chronic illnesses were especially vulnerable and tended to die prematurely when their conditions were exacerbated by poor air quality. Recognising solid progress in improving air quality in many Asian cities, the report emphasises that urbanisation and aging will continue to increase the number of people most susceptible to the health effects of air pollution.

**Source:** HEI Special Report 18, *Outdoor Air Pollution and Health in the Developing Countries of Asia: A Comprehensive Review*, <http://pubs.healtheffects.org/view.php?id=349>.

## UNITED NATIONS

### Transboundary Convention to link Air Pollution and Climate Change

The meeting of the executive body of the UN Convention on Long-range Transboundary Air Pollution on 13-17 December 2010, was expected to adopt a long-term strategy to create international governance controlling pollutants that affect both air quality and climate change. The report on the outcomes of the meeting has yet to be released.

The Convention is organised under the UN Economic Commission for Europe and has 51 parties, including the countries of the EU, the US, Russia, the Caucasus region, and Central Asia. The Convention now seeks to play a key role in setting a new policy agenda based on scientific evidence that four traditional air quality pollutants - particulate matter, ozone, methane, and carbon monoxide - play important roles in climate change as so-called short-lived climate forcers.

The meeting agenda included revisions to its protocols to allow the new direction, such as adding particulate matter as a pollutant controlled under the treaty, with the possible inclusion of black carbon. The Convention's Expert Group on Black Carbon reported that there are clear environmental benefits to reducing emissions of Black Carbon and recommended its inclusion in the Gothenburg Protocol on ground-level ozone, the adoption of monitoring and reporting requirements specific to Black Carbon, and consideration of a "non-binding statement outlining even more ambitious" actions to quickly reduce the pollutant that could include "potential actions outside the [Convention's] region".

### WHO suggests Indoor Air Quality Targets

The World Health Organisation's office for Europe has released guidance setting targets on indoor air quality. These targets on specific indoor chemicals could provide the scientific basis for legally binding limits across the world.

The UN organisation has recommended targets for nine substances: benzene, carbon monoxide, formaldehyde, naphthalene, nitrogen dioxide (NO<sub>2</sub>), polycyclic aromatic hydrocarbons, radon, trichloroethylene and tetrachloroethylene.

An annual average indoor NO<sub>2</sub> guideline of 40 µg/m<sup>3</sup> is recommended. This guideline intends to reduce the risk of a broad range of respiratory symptoms associated with the exposure. A series of guidelines is recommended to prevent the effects of short peaks of CO exposure. In addition a new guideline value of 7 mg/m<sup>3</sup> is defined for a 24-hour mean CO concentration to prevent the effects of chronic exposure.

More is available at [www.euro.who.int/en/what-we-publish/abstracts/who-guidelines-for-indoor-air-quality-selected-pollutants](http://www.euro.who.int/en/what-we-publish/abstracts/who-guidelines-for-indoor-air-quality-selected-pollutants).

## **Greenhouse Gases at Record Levels**

Concentrations of the main greenhouse gases in the atmosphere have reached their highest level since pre-industrial times, the World Meteorological Organisation (WMO) has announced.

Total radiative forcing of all long-lived greenhouse gases increased by 1.0% in 2009 and rose by 27.5% from 1990 to 2009, the WMO said. The growth rates for CO<sub>2</sub> and nitrous oxide (N<sub>2</sub>O) were smaller than in 2008, but this had only a marginal impact on the long-lasting concentrations. It would take about 100 years for carbon dioxide to disappear from the atmosphere if emissions stopped completely.

The average concentration for CO<sub>2</sub> was measured at 386.8 ppm, the average for methane at 1803 ppb, and the average for nitrous oxide at 322.5 ppb. "These values are greater than those in pre-industrial times (before 1750) by 38%, 158%, and 19% respectively," the WMO said.

Natural emissions of methane due for example to the melting of the Arctic icecap or increased rainfall on wetlands - themselves caused by global warming - are becoming more significant, the report said. This could create a "feedback loop" in which global warming releases large quantities of methane into the atmosphere which then contributes to further global warming. These natural emissions could be the reason why methane has increased in the atmosphere over the past three years after nearly a decade of no growth, the WMO said. Human activities such as cattle-rearing, rice planting, fossil-fuel exploitation and landfills account for 60% of methane emissions, with natural sources accounting for the rest.

## **GENERAL**

### **ICCT Report on Variations in the Carbon Intensity of Fuels**

According to an ICCT report issued on 20 December 2010, there are significant differences in the carbon intensity of EU road fuels. The report - by Energy-Redefined LLC for the ICCT - comes as the European Commission decides on how it will assess emissions under the EU Fuel Quality Directive.

Emissions from extraction, gas flaring, fugitive emissions, transportation and refining imported crude oils vary from 4 to 50g of CO<sub>2</sub> per MJ. The average is 12g CO<sub>2</sub>/MJ. Emissions from petrol or diesel combustion add about 73g CO<sub>2</sub>/MJ.

Relatively little high-carbon fuel enters the EU market: about half of the 13.1 million barrels of oil imported each day is below 9g CO<sub>2</sub>/MJ, and almost all is below 19g CO<sub>2</sub>/MJ. The remaining 300 000 barrels per day is "an attractive target for greenhouse gas reductions," says the report.

Global emissions from extraction-to-refinery account for 2.8 billion tonnes of CO<sub>2</sub> per year, or around five times Germany's total emissions. The report recommends optimising flare combustion, re-injecting gas into wells or developing pipelines to market it. Tar sand exploitation should be limited or carbon storage deployed. The ICCT report is available from [www.theicct.org/pubs/ICCT\\_crudeoil\\_Europe\\_Dec2010.pdf](http://www.theicct.org/pubs/ICCT_crudeoil_Europe_Dec2010.pdf).

### **Combustion Powertrains predicted to dominate the Decade**

By 2020, 93% of the new cars sold in Europe will have a traditional powertrain. That is the conclusion made in a report by analysts J.D. Power and Associates, who also predict that just 3% of Europe's total car registrations will be battery-powered electric vehicles (BEVs) and 4% will be gasoline- and diesel-electric hybrids by 2020.

Even with government incentives, BEVs and hybrids are – and will remain – very expensive for at least the next decade, the report says. Therefore, they will have only a small effect on reducing overall automotive emissions during the next 10 years. Meanwhile, improvements to the internal combustion engine have led to the launch of many models that emit less than 100 grams of CO<sub>2</sub> per kilometre. Most of these cars cost about 15 000 euros, roughly half the promised starting price of a battery-powered hatchback.

## RESEARCH SUMMARY

### Effects of Emissions

#### Effect of Air Pollution on Cardiovascular Mortality

The purpose of this study was to estimate the effects of air pollutants on cardiovascular mortality (CVM) in Tianjin, China, and compare time-stratified case-crossover and time series analyses. Both case-crossover and time series analyses show that air pollutants (PM<sub>10</sub>, SO<sub>2</sub> and NO<sub>2</sub>) were positively associated with CVM.

**Source:** Gou et al., The short-term effect of air pollution on cardiovascular mortality in Tianjin, China: Comparison of time series and case-crossover analyses; *Science of the Total Environment* (2010), [doi: 10.1016/j.scitotenv.2010.10.013](https://doi.org/10.1016/j.scitotenv.2010.10.013).

#### Study finds No Adverse Effect on Birth Weight

Maternal exposure to air pollution has been associated with adverse pregnancy outcomes. The authors of this paper from the Netherlands say that few studies took into account the spatial *and* temporal variation of air pollution levels. Their work evaluated the impact of maternal exposure to traffic-related air pollution during pregnancy on preterm birth and term birth weight using a spatio-temporal exposure model.

The authors found positive, statistically non-significant associations between exposure to soot during entire pregnancy and during the last month of pregnancy and preterm birth. There was no indication of an adverse effect of air pollution exposure on term birth weight.

**Source:** Gehring et al., Traffic-related air pollution, preterm birth and term birth weight in the PIAMA birth cohort study; *Environmental Research*, [doi:10.1016/j.envres.2010.10.004](https://doi.org/10.1016/j.envres.2010.10.004).

#### Air Pollution and Birth Outcomes

Several mechanisms are suspected to underlie adverse birth outcomes among mothers exposed to air pollutants, including inflammation, direct toxic effects on foetuses and the placenta, displacement of the oxygen-haemoglobin dissociation curve, and formation of DNA adducts. A new paper aims to systematically review the association between air pollutants and birth outcomes of low birth weight (LBW), preterm (PTB) and small for gestational age (SGA) births using published data from 41 studies.

Exposure to sulfur dioxide was associated with PTB, exposure to fine particulate matter PM<sub>2.5</sub> was associated with LBW, PTB and SGA births, and exposure to coarse PM (PM<sub>10</sub>) was associated with SGA births. The evidence for nitrous oxide, NO<sub>2</sub>, ozone and CO was inconclusive.

The authors say that the reported associations, and lack thereof, between individual air pollutants and birth outcomes have differed across published studies. This may be due to difficulty in quantifying exposure, method of ascertainment, time of measurement and

collinearity between pollutants. Important future research directions include developing improved methods to detect the duration and intensity of exposure, including entire populations.

**Source:** Shah and Balkhair, Air pollution and birth outcomes: A systematic review; *Environment International*, (2010) [doi:10.1016/j.envint.2010.10.009](https://doi.org/10.1016/j.envint.2010.10.009).

#### Pro-Inflammatory Response Mechanisms

In this study researchers investigated the potential of a characterised sample of diesel exhaust particulate (DEP) to induce cytotoxicity, to influence the expression of CYP1A1 and inflammation-related genes, and to activate intracellular signalling pathways, in human bronchial epithelial cells.

The study indicates that particulates induce both CYP1A1 and pro-inflammatory responses in vitro, but via differential intracellular pathways. DEP-induced pro-inflammatory responses seem to occur via activation of NF-kappaB and p38 and are facilitated by CYP1A1. However, the DEP-induced CYP1A1 response does not seem to involve NF-kappaB and p38 activation. The study also indicates that expression of CYP1A1 may represent a particular sensitive biomarker of DEP-exposure.

**Source:** Totlandsdal, Cassee, Schwarze, Refsnes and Lag, Diesel exhaust particles induce CYP1A1 and pro-inflammatory responses via differential pathways in human bronchial epithelial cells; *Particle and Fibre Toxicology* (2010) 7 (41), [doi:10.1186/1743-8977-7-41](https://doi.org/10.1186/1743-8977-7-41) or at [www.particleandfibretoxicology.com/content/7/1/41/abstract](http://www.particleandfibretoxicology.com/content/7/1/41/abstract).

#### Air Pollution associated with Eye Vessel Changes

A new publication shows that older people living in areas with long-term air pollution or even exposed to short-term pollution, are more likely to have narrowing of their retinal arterioles - microvascular changes associated with higher risk of cardiovascular disease.

Retinal arteriolar diameters were narrowed among those who lived in regions with increased levels of long- and short-term fine particle pollution. In addition, increased retinal venular diameters were weakly associated with long-term (but not short-term) high concentrations of fine particle pollution. The authors conclude that residing in regions with higher air pollution concentrations and experiencing daily increases in air pollution were each associated with narrower retinal arteriolar diameters in older individuals. They continue: "These findings support the hypothesis that important vascular phenomena are associated with small increases in short-term or long-term air pollution exposures, even at current exposure levels".

**Source:** Adar et al, Air Pollution and the Microvasculature: A Cross-Sectional Assessment of In Vivo Retinal Images in the Population-Based Multi-Ethnic Study of Atherosclerosis (MESA); *PLoS Medicine* (2010) 7 (11): e1000372, [doi:10.1371/journal.pmed.1000372](https://doi.org/10.1371/journal.pmed.1000372).

## Research links rise in Autism to Living near Freeways

Living near a freeway may be associated with increased risk of autism, according to a study published by US researchers.

Data from children with autism and typically developing children, who served as controls, were drawn from the Childhood Autism Risks from Genetics and the Environment (CHARGE) study, a population-based case-control study of preschool children. The study examined the locations where the children's families lived during the first, second and third trimesters of their mothers' pregnancies, and at the time of the baby's birth and looked at the proximity of these homes to a major road or freeway.

The authors found that living within 309 metres of a freeway in the third trimester was associated with a two-fold increase in autism risk. The researchers found no consistent pattern of association of autism with proximity to a major road. Traffic-related air pollutants have been observed to induce inflammation and oxidative stress in toxicological and human studies. The authors say that the emerging evidence that oxidative stress and inflammation are involved in the pathogenesis of autism may suggest a biologically plausible rationale for the observations.

**Source:** Volk, Hertz-Picciotto, Delwiche, Lurmann and McConnell, Residential Proximity to Freeways and Autism in the CHARGE study; *Environmental Health Perspectives*, (2010) [doi:10.1289/ehp.1002835](https://doi.org/10.1289/ehp.1002835).

## Economic Valuation of Air Pollution Mortality

This paper provides a key element for the calculation of the damage costs of air pollution, namely the valuation of mortality, important because premature mortality makes by far the largest contribution.

Whereas several studies have tried to quantify the cost of air pollution mortality by multiplying a number of deaths by the 'value of prevented fatality' (also known as 'value of statistical life'), the authors of this study say that one needs to evaluate the change in life expectancy due to air pollution. Based on the results from a 9-country survey they recommend a 'Value of a Life Year' (VOLY) estimate of €40 000 for cost-benefit analysis of air pollution policies for the European Union. The range is from at least €25 000 to at the most €100 000.

**Source:** Economic valuation of air pollution mortality: A 9-country contingent valuation survey of value of a life year (VOLY); *Ecological Indicators*, [doi:10.1016/j.ecolind.2010.12.006](https://doi.org/10.1016/j.ecolind.2010.12.006).

## Assessment of Exposure

### Study on the Effects of Emissions Control in Paris

A new paper presents a modelling study of the effect of the future evolution of traffic emissions on air quality at the urban scale.

The modelling results suggest that the reduction of NO<sub>x</sub> emissions must be coupled with more stringent measures on NMVOC emissions than those currently planned in the transportation sector to avoid an increase of ozone concentrations in some densely populated areas. The modelled NO<sub>2</sub> concentrations in Paris reach a maximum in 2010 due to an increase of the NO<sub>2</sub> emissions related to the evolution of the NO<sub>2</sub>/NO<sub>x</sub> ratio of the Diesel vehicle emissions. The reduction of PM emissions leads to a non-proportional decrease in PM concentrations, which results mostly from the decrease in Diesel particulate emissions.

**Source:** Roustan, Pausader and Seigneur, Estimating the effect of on-road vehicle emission controls on future air quality in Paris, France; *Atmospheric Environment* (2010), [doi:10.1016/j.atmosenv.2010.10.010](https://doi.org/10.1016/j.atmosenv.2010.10.010).

## Air Quality

### NO<sub>2</sub>/NO<sub>x</sub> Ratios in Athens

This paper examines the contribution of primary and secondary NO<sub>2</sub> production in NO<sub>x</sub> concentrations and offers a comprehensive analysis of the long-term trends of NO<sub>x</sub>, NO<sub>2</sub> and O<sub>3</sub> concentrations, as well as of the NO<sub>2</sub>/NO<sub>x</sub> ratio, in the Athens conurbation.

Long-term pollutant concentration time series show that NO<sub>2</sub> concentrations in Athens have decreased since 1987 but at a slower rate than those of NO<sub>x</sub>, resulting in an increasing NO<sub>2</sub>/NO<sub>x</sub> concentration ratio. However, this increasing trend is much smaller than those observed in urban areas of other European countries. The possible causes of this trend are examined and especially the interaction with ozone and the amount of direct NO<sub>2</sub> traffic emissions. The results indicate that the increasing NO<sub>2</sub>/NO<sub>x</sub> ratio in the Athens area is mainly attributable to an increased secondary formation of NO<sub>2</sub> through photochemical reactions in the atmosphere.

**Source:** Mavroidis and Chaloulakou, Long-Term Trends of Primary and Secondary NO<sub>2</sub> Production in the Athens Area. Variation of the NO<sub>2</sub>/NO<sub>x</sub> Ratio; *Atmospheric Environment*, [doi:10.1016/j.atmosenv.2010.11.006](https://doi.org/10.1016/j.atmosenv.2010.11.006).

### Distributed Power Generation vs Power Stations

A recent study has compared the impact on air quality in California of future power generated from large, central stations with power generated from smaller distributed generators. It concluded that although distributed generation produces more emissions, its impact on air quality is likely to be smaller than central power stations due to complex interactions between air chemistry and transport.

**Source:** Carreras-Sospedra, Vutukuru, Brouwer and Dabdub, Central power generation versus distributed generation - An air quality assessment in the South Coast Air Basin of California; *Atmospheric Environment* (2010) 44 pp.3215-3223. [doi:10.1016/j.atmosenv.2010.05.017](https://doi.org/10.1016/j.atmosenv.2010.05.017).

## Analysis of Policy and Research Decisions on PM

The paper describes the results of a 'back-casting' process which evaluates policy decisions that were made in the past to achieve the PM<sub>10</sub> standard in Flanders. That standard is still not achieved and a new PM<sub>2.5</sub> standard will be in place in 2015.

The goals of the paper are to promote the interaction and extend the relations between researchers and policy makers and to synthesize the lessons learnt from the PM<sub>10</sub> standard. Actions that were taken in the past and that can be taken in the future are scored by a small group of stakeholders for importance on achieving the PM standard and on development of knowledge. The paper presents the results of the analysis, which were first discussed between the stakeholders during a closed workshop.

The paper concludes that a pro-active policy is needed to achieve the future PM<sub>2.5</sub> standard and it defines three crucial actions: knowledge improvement on sources of PM, use of low emission zones and quantification of measures to reduce PM concentration.

**Source:** Buekers, Stassen, Panis, Hendrickx and Torfs, Ten years of research and policy on particulate matter air pollution in hot spot Flanders; *Environmental Science & Policy*, [doi:10.1016/j.envsci.2010.10.012](https://doi.org/10.1016/j.envsci.2010.10.012).

## **Engine Development and Emissions Measurement**

### Concawe Reports on Advanced Combustion

Concawe, the oil industry's European association for environment, health and safety in refining and distribution, has issued two news reports on advanced combustion for low emissions and high efficiency.

Part 1 (Report 9/10) covers the impact of engine hardware on HCCI combustion. Two single-cylinder diesel engines were optimised for advanced combustion performance by means of practical and cumulative hardware enhancements that Concawe says are likely to be used to meet Euro 6 emissions limits and beyond. These included high fuel injection pressures, high exhaust gas recirculation levels and charge cooling, increased in-cylinder swirl, and a fixed combustion phasing. These enhancements achieved low engine-out emissions of NO<sub>x</sub> and particulate matter emissions with engine efficiencies equivalent to today's diesel engines. Concawe says these combustion conditions approach those of Homogeneous Charge Compression Ignition (HCCI), especially at the lower part-load operating points. Four fuels exhibiting a range of ignition quality, volatility, and aromatics contents were used to evaluate the performance of these hardware enhancements on engine-out emissions, performance, and noise levels.

In Part 2 (Report 10/10) the impact of fuel properties on HCCI combustion was examined, with a broad range of diesel, kerosene, and gasoline-like fuels being tested in a single-cylinder diesel engine optimized for advanced combustion performance. The fuels were selected in order to better understand the effects of ignition quality, volatility, and molecular composition on engine-out emissions, performance, and noise. Low-level biofuel blends, both biodiesel and ethanol, were included in the fuel set in order to test for short-term advantages or disadvantages.

The warmed-up engine could be run successfully on a wide range of fuels, including part-load and full-load operation, with diesel-like efficiency. NO<sub>x</sub> emissions at or below Euro 6 limits were achieved without the use of NO<sub>x</sub> aftertreatment. PM emissions were also low but a diesel particulate filter would be needed to reach Euro 6 limits and below, Concawe says. HC and CO emissions increased but were within the range that could be treated with a diesel oxidation catalyst.

Fuel properties had a substantial effect on PM emissions, consistent with the wide range of fuels investigated. In general, PM emissions decreased with increasing ignition delay, higher volatility, and lower aromatics levels of the fuel but the relative effects varied depending upon the engine operating conditions. This study investigated engine performance and emissions for a warmed-up single-cylinder bench engine only. Additional work would be needed to investigate engine performance under transient and cold start conditions.

Both Concawe reports are available from [www.concawe.org/content/default.asp?PageID=569](http://www.concawe.org/content/default.asp?PageID=569).

### NO<sub>x</sub> formation from Use of Biodiesel

This review article focuses on the higher emissions of NO<sub>x</sub> from use of biodiesel. It concludes that combined effects lead to several complex and interacting mechanisms that make it difficult to fundamentally identify how biodiesel affects NO<sub>x</sub> emissions. Instead, it is perhaps better to say that several parameters seem to most strongly influence observed differences in NO<sub>x</sub> emissions with biodiesel. These parameters are injection timing, adiabatic flame temperature, radiation heat transfer, and ignition delay.

**Source:** Sun et al., Oxides of nitrogen emissions from biodiesel-fuelled diesel engines. *Progress in Energy and Combustion Science* (2010) 36 (6), pp.677-695, [doi: 10.1016/j.pecs.2010.02.004](https://doi.org/10.1016/j.pecs.2010.02.004).

### Emissions Reduction using 'Fumigation' Ethanol DOC

In this research paper, experiments were conducted on a four-cylinder direct-injection diesel engine with part of the engine load taken up by 'fumigation ethanol', injected into the air intake of each cylinder, to investigate the combustion and emissions of the engine under five engine loads at 1800 rpm. The

ethanol was injected to top up 5, 10, 15, and 20% of the engine loads under different operating conditions.

The authors say that in comparison to Euro V diesel fuel, fumigation ethanol gives a higher peak in-cylinder pressure and heat release rate. Increasing the fumigation ethanol would increase the ignition delay. More fuel is burned in the premixed mode, and less fuel is burned in the diffusion mode. The brake thermal efficiency decreases with an increase in fumigation ethanol at low and medium engine loads but is not changed significantly at high engine loads.

The application of this fumigation ethanol resulted in a significant increase in HC, CO, and NO<sub>2</sub> emissions. However, there was a decrease in NO<sub>x</sub>, smoke, and particulate mass and number concentrations. The diesel oxidation catalyst was able to reduce the CO and HC arising from fumigation ethanol and, in addition, further reduce the particulate emissions.

**Source:** Tsang, Cheung, Chan and Zhang, Reducing emissions of a diesel engine using fumigation ethanol and a diesel oxidation catalyst; *Energy & Fuels* (2010),24 (11) pp. 6156-6165, [doi: 10.1021/ef100899z](https://doi.org/10.1021/ef100899z).

#### Impact of Altitude on Emissions of Ozone Precursors

The aim of this study was to investigate the impact of altitude on emission rates of ozone precursors from gasoline-driven light commercial vehicles (LCVs) in three Indian cities (Delhi, Dehradun, and Mussoorie).

Basic equations of the International Vehicle Emission (IVE) model were applied to estimate emission rates from the LCVs. Topography (altitude) and meteorology (temperature) specific parameters of the IVE model were modified to Indian conditions for estimating emission rates.

Unlike NO<sub>x</sub>, emission rates of CO and VOCs increased with altitude. For example, the CO emission rate increased considerably from 36.5 g/km in Delhi to 51.3 g/km in Mussoorie, whereas VOCs marginally increased from 3.2 g/km to 3.6 g/km.

**Source:** Nagpure, Gurjar, and Kumar, Impact of altitude on emission rates of ozone precursors from gasoline-driven light-duty commercial vehicles; *Atmospheric Environment*, [doi:10.1016/j.atmosenv.2010.12.026](https://doi.org/10.1016/j.atmosenv.2010.12.026).

### Characterisation of Particulate

#### Nanoparticles in the Wake of a Moving Vehicle

This article provides an overview of significant research work relevant to modelling the dispersion of pollutants, especially nanoparticles, in the wake of vehicles. Literature on vehicle wakes and nanoparticle dispersion is reviewed, taking into account field measurements, wind tunnel experiments and mathematical approaches.

**Source:** Carpentieri, Kumar and Robins, An overview of experimental results and dispersion modelling of nanoparticles in the wake of moving vehicles; *Environmental Pollution*, [doi:10.1016/j.envpol.2010.11.041](https://doi.org/10.1016/j.envpol.2010.11.041).

### Climate Change and Emissions

#### Effect of Climate Change on Air Quality

According to a recent European study, climate change alone is likely to significantly increase ozone pollution in Europe by the year 2100, compared to 1990 levels.

Using combined chemistry-transport and global atmospheric circulation models, the study simulated the impact of climate change on ground-level ozone and particulate matter (PM) at the regional level in the year 2100 (compared with a reference year of 1990).

Modelling results suggest monthly average levels of ozone could reach around 110 µg/m<sup>3</sup> over central France in July 2100, an increase of 50 µg/m<sup>3</sup> from the year 1990. Large areas of south-western Europe will experience average ozone levels of around 110-125 µg/m<sup>3</sup> in July 2100, up from 95-105 µg/m<sup>3</sup> in July 1990. Projected increases (and decreases) in PM levels depended on the region and month. The highest levels are likely to occur over land in October, while over water, the concentration of PM will decrease. The increase in PM<sub>10</sub> concentrations during specific months could be explained by the average reduction of boundary layer height and wind speed.

**Source:** Carvalho et al., Climate-driven changes in air quality over Europe by the end of the 21st century, with special reference to Portugal. *Environmental Science & Policy* (2010) 13 (6) pp. 445-458, [doi: 10.1016/j.envsci.2010.05.001](https://doi.org/10.1016/j.envsci.2010.05.001).

#### Air Pollution Impacts in Pursuing Climate Policies

Climate change policies in the Netherlands could help to reduce the level of air pollutants as well, although technologies such as carbon sequestration and combined heat and power, or cogeneration facilities could result in increases in some pollutants, according to a study by the Netherlands Environmental Assessment Agency. Measures that boost energy saving and efficiency or the use of nuclear, wind, solar, and geothermal power also benefit air quality, because they reduce the need to burn fossil fuels, the agency said. Depending on the policies that are implemented, emissions of sulfur dioxide could fall from 48 kilotons per year to 32 kilotons by 2020, while emissions of nitrogen oxides could drop from 199 kilotons to 184 kilotons as a result of climate policies.

**Source:** Hammingh, Smekens, Plomp and Koelemeijer, Co-impacts of Climate Policies on Air Polluting Emissions in the Netherlands, PBL Report No. 500146003, Nov 2010.

#### Well-to-Wheels CO<sub>2</sub> Comparison for US, UK, France

A new report analyses the indirect well-to-wheels CO<sub>2</sub> emissions from electric vehicles (EVs) when run in the US, the UK, and France and compares these to well-to-wheels emission data for a selection of internal combustion engine vehicles (ICEVs) and hybrid electric vehicles (HEVs). The study also compares the well-to-wheels emissions of the existing passenger



car fleet in each country to a hypothetical EV fleet with the average electricity generation requirements of the three EVs considered in this analysis.

**Source:** Holdway, Williams, Inderwildi and King, Indirect emissions from electric vehicles: emissions from electricity generation; *Energy & Environmental Science* (2010), doi: [10.1039/C0EE00031K](https://doi.org/10.1039/C0EE00031K).

#### Effects of moving to Electric Two-Wheelers in India

This study from India considers the possible annual petroleum saving and greenhouse gas emission reductions in India from the two-wheeler segment in the next decade.

A survey was conducted in Coimbatore, India to estimate the average daily kilometres travelled and the distribution of travel ranges by two-wheelers. Forecasting suggest that a 37% reduction in CO<sub>2</sub> could be made by replacing all internal combustion engined two-wheelers with plug-in hybrid electric technology with an all-electric range of 25 km, and a 48% reduction with hybrid electric two-wheelers. Since around 76% of kilometres covered by two-wheelers is less than 25 km per day, electric vehicles could displace a large portion of gasoline.

**Source:** Amjad, Rudramoorthy and Neelakrishnan, Assessment of petroleum saving and greenhouse gas emission reduction from two-wheeler segment: 2011–2021, *Transportation Research Part D: Transport and Environment*; doi:[10.1016/j.trd.2010.10.003](https://doi.org/10.1016/j.trd.2010.10.003).

#### **FORTHCOMING CONFERENCES**

##### **Symposium on International Automotive Technology 2011**

19-21 January 2011, Pune, India

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

*The theme of SIAT 2011 is Sustainable Mobility - A Creative Challenge. The symposium will focus on a number of areas including alternate fuels, future engine technologies, emissions, and ELV regulations.*

##### **Scania Transport Conference 2011**

26 January 2011, Brussels, Belgium

Details at <http://www.scania.com/media/calendar/2011/scania-transport-conference-2011.aspx>

*The 5th Scania Transport Conference will discuss what needs to be done from a regulatory and industry standpoint to realise the CO<sub>2</sub> saving potential in road transport.*

##### **4<sup>th</sup> Natural Gas Vehicle Conference**

9-10 February 2011, Prague, Czech Republic

Details at [www.cng.cz/en/sd/news/11.html](http://www.cng.cz/en/sd/news/11.html)

##### **Diesel Emissions Conference and AdBlue Forum Asia 2011**

22-24 February 2011, Beijing, China

Details at [www.integer-research.com/conferences/dec-asia/](http://www.integer-research.com/conferences/dec-asia/)

*The event will provide legislative updates, case studies, technology assessments, market insights and forecasts from industry experts.*

##### **International Advanced Mobility Forum**

8-9 March 2011, Geneva, Switzerland

Details at [www.iamf.ch/en/presentation/index.php?idContent=160&navid=30](http://www.iamf.ch/en/presentation/index.php?idContent=160&navid=30)

##### **12<sup>th</sup> European Fuels Conference**

8-11 March 2011, Paris, France

Details at [www.wraconferences.com/2/4/articles/205.php](http://www.wraconferences.com/2/4/articles/205.php)

*The conference will focus on reviewing refiners' and manufacturers' strategy for each renewable energy foreseen to be used in transport between 2010-2020, as well as the contributions from the transport sectors to the 10% CO<sub>2</sub> reduction target and how biofuels and road transport will contribute to that overall target.*

##### **17<sup>th</sup> Annual Fuels & Lubes Asia Conference**

9-11 March 2011, Singapore

Details at <http://fuelsandlubes.com/conferences/register/>

*Topics include assessment of challenges faced by regional OEMs to meet future requirements on improved emissions, fuel economy and durability, views on fuel quality issues and challenges, and a study of internal diesel injector deposit phenomena.*

##### **8<sup>th</sup> Green Ship Technology Conference and Exhibition**

21-22 March 2011, Oslo, Norway

Details at [www.greenshiptechnology.com](http://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.*

##### **Diesel Emissions Conference & ARLA-32 Forum 2011**

5-7 April 2011 (revised dates), Sao Paulo, Brazil

Details: [www.integer-research.com/conferences/dec-brazil/](http://www.integer-research.com/conferences/dec-brazil/)

*Participants will discover the latest diesel emissions legislation and technology developments in Brazil, and be part of profitable discussion on the Brazilian on- and non-road diesel emissions markets.*

##### **2011 SAE World Congress**

12-14 April 2011, Detroit, Michigan, USA

Details at [www.sae.org/congress](http://www.sae.org/congress)

##### **15<sup>th</sup> Conference of the International Motor Vehicle Inspection Committee (CITA)**

4-6 May 2011, Berlin, Germany

Details at [www.cita-vehicleinspection.org](http://www.cita-vehicleinspection.org)

There will be three simultaneous workshops, covering the contribution of EU legislation to the achievement of mutual recognition; ensuring that PTI Inspections are of a consistent quality; and CITA Projects on the Low Diesel Emission Initiative, Electronically Controlled Systems, and the Technical and Test Result Database Initiative.

### **32<sup>nd</sup> Vienna Motor Symposium**

5-6 May 2011, Vienna, Austria

### **Vehicle Emissions Reduction Conference – Criteria Pollutants and CO<sub>2</sub>**

17-19 May 2011, Detroit, Michigan, USA

Details at [www.emission-control-systems.com/index.asp?page=veranstaltung&lang=deutsch&sid](http://www.emission-control-systems.com/index.asp?page=veranstaltung&lang=deutsch&sid)

One day of the conference will be dedicated to provide an update on cutting edge technologies. A second day will be dedicated to update participants on the evolving technologies on heavy-duty diesel PM and NO<sub>x</sub> control. A third day will be devoted to technologies to reduce CO<sub>2</sub>.

### **2011 JSAE Annual Spring Congress & Exposition**

18-20 May 2011, Yokohama, Japan

Details at [www.jsae.or.jp/2011haru/index\\_e.html](http://www.jsae.or.jp/2011haru/index_e.html)

### **6<sup>th</sup> AVL International Commercial Powertrain Conference**

25-26 May 2011, Graz, Austria

Details at [www.avl.com/icpc](http://www.avl.com/icpc)

The conference will cover powertrains for commercial, agricultural and non-road vehicles and machinery. Topics will include emissions legislation strategies, Euro VI emissions compliance and Tier 4 final (Stage IV) emissions compliance for engines of 50 to 500 hp. Electrification and hybrids will also be addressed.

### **Diesel Emissions Conference & AdBlue Forum Europe**

7-9 June 2011 (revised dates), Dusseldorf, Germany

Details at [www.integer-research.com/conferences/dec-europe/](http://www.integer-research.com/conferences/dec-europe/)

The conference will discuss the industries' preparations for Euro VI (on-road) and Stage IV (non-road) legislation due in 2014, led by a range of expert speakers from around the globe. The conference will also discuss and showcase the best emissions technologies available to meet diesel emissions standards.

### **15<sup>th</sup> 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/2011pf](http://www.jsae.or.jp/2011pf)

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.

### **Diesel Emissions Conference India 2011**

7-8 September 2011, New Delhi, India

Details at [www.integer-research.com/conferences/dec-india/](http://www.integer-research.com/conferences/dec-india/)

The conference will bring together over 200 leading stakeholders from India and beyond to discuss the industries' progress in meeting Bharat Stage III & IV legislation. The conference will also showcase the latest emissions reduction technologies being used in India and across the world.

### **10<sup>th</sup> International Conference on Engines & Vehicles (ICE 2011)**

11-15 September 2011, Capri, Italy

Details at [www.sae-na.it](http://www.sae-na.it)

Topics of the conference include powertrain technology; exhaust aftertreatment and emissions; fuel injection and combustion processes; alternative and advanced power systems; and fuels and lubricants.

### **10<sup>th</sup> Aachen Colloquium on Automobile and Engine technology**

10-12 October 2011, Aachen, Germany

Abstracts due 15 February 2011

Papers are solicited on innovative vehicle concepts, electric vehicles and hybrids, commercial vehicles, energy and thermal management, and automotive strategy concepts.

### **Diesel Emissions Conference USA**

11-13 October 2011, Atlanta, Georgia, USA

Details at <https://www.integer-research.com/conferences/dec-usa/>

The conference will bring together leading stakeholders from around the globe to discuss the latest emissions technologies available to meet current and future legislation.

### **SAE 2011 Small Engine Technology Conference**

8-10 November 2011, Sapporo, Japan

Details at [www.setc-jsae.com](http://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.