



Newsletter

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INTERNATIONAL REGULATORY DEVELOPMENTS

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EUROPE

Commission Proposes Delay to Stages IIIB and IV for Narrow-Track Tractors

The European Commission has now published its proposal to delay by three years the entry into force of Stages IIIB and IV of the emissions legislation for narrow-track tractors. The document, if adopted, will form an amendment to Directive 2000/25/EC.

These tractors (sometimes called vineyard tractors, having maximum width less than 1.15 m) are typically European products developed to meet the requirements of specialized agriculture in southern Europe and the overwhelming majority is sold in the EU. The Commission says that the technical review of Directive 2004/26/EC conducted by DG-JRC confirmed that for agricultural tractors in categories T2, T4.1 and C2 (the so called narrow-track tractors), an amendment of the requirements was deemed necessary. The Impact Assessment indicated that, without a delay, users would not be in a position to buy up-to-date tractors and would continue using (very) old machines ('Stage 0' level).

The proposal is for a co-decision Directive, so will need approval from both the European Parliament and the Council of Ministers. Once adopted and published in the Official Journal, the Commission proposes to allow six months for Member States to transpose the amendment into national legislation.

The proposal (COM(2011) 1) is at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0001:FIN:EN:PDF>.

New European Commission Working Group on Real-life Light-duty Emissions

The European Commission has advised stakeholders of a series of workshops on the real driving emissions of light-duty vehicles (RDE-LDV). The Commission says that the purpose of the RDE-LDV workshops is to accompany the development of a test procedure that should assess the real driving emissions of Euro 6 light-duty vehicles. This work will be co-ordinated by DG-JRC and should be supported by stakeholders and experts from Member States, industry, consumer and environmental organisations.

European Parliament backs new CO₂ Limits for Vans

A compromise agreement on the Regulation setting CO₂ emissions standards for new light commercial vehicles was agreed by the European Parliament on 15 February 2011.

Under the new Regulation, which is similar in concept to that now in place for cars, manufacturers will have to reach a target of 175 g/km CO₂ for 70% of their

vehicles from 2014, rising in annual steps to 100% of their fleet by 2017. By 2020, failure to reach a target of 147 g/km will trigger penalties of up to €95 per vehicle for every g/km over the limit. A tougher target of 135 g/km by 2020 had originally been proposed.

Manufacturers registering fewer than 22 000 new vehicles in a year may apply for an exemption. Light commercial vehicles that emit less than 50 g/km CO₂ will earn "supercredits". Vehicles meeting this emissions limit would count as 3.5 vehicles towards the average to be reached in 2014-2015, 2.5 in 2016 and 1.5 in 2017, the last year of the scheme.

Regulation on Car CO₂ Targets for Small-Volume and Niche Manufacturers

Rules on the information to be provided by small-volume and niche car manufacturers applying for exemptions from the car CO₂ emissions reduction targets have been published in the EU's Official Journal as Commission Regulation (EU) No. 63/2011.

The cars CO₂ Regulation (EC) No. 443/2009 sets specific rules for these small-volume and niche manufacturers. The new Regulation, which entered force on 16 February 2011, sets out the information that they have to supply in an application for a derogation. The details include the CO₂ reduction technologies used and information on the sharing of technologies and outsourcing of activities, together with details of production facilities and financial information including R&D spend.

EU Road Fuels change to E10 and B7 and Off-Road Diesel goes to 10 ppm Sulfur

From 1 January 2011, as a result of the EU Fuel Quality Directive (2009/30/EC), the EU's main grade of unleaded petrol changed to one that contains up to 10% ethanol (or a mixture of oxygenates up to an equivalent limit) and diesel changed to one that contains up to 7% FAME (Fatty Acid Methyl Ester). Previously the limit for both had been 5%.

The new 'B7' diesel can be used in all diesel vehicles but there are concerns regarding the use of E10 (10% ethanol or equivalent) unleaded petrol in older vehicles as they may face some issues of material compatibility when using E10 for a sustained period of time. Petrol containing up to 5% ethanol (E5) or equivalent oxygenates will remain available for vehicles that cannot use E10.

A list compiled by the motor industry association ACEA shows which petrol vehicles can safely use E10 unleaded petrol and which should continue to use E5. The list is available from the national automobile associations and at

http://www.acea.be/images/uploads/files/20110121_list_of_petrol_vehicles_compatible_with_E10_petrol.pdf.

Also from 1 January 2011 the maximum sulfur content of diesel fuel for use in non-road mobile machinery (NRMM), inland waterway vessels, tractors and recreational craft was reduced from 1000 to 10 ppm. To accommodate minor contamination in the supply chain, Member States may permit up to 20 ppm sulfur at the point of final distribution to end users. They may also allow, until 31 December 2011, sales of gasoil containing up to 1000 ppm sulfur for rail vehicles and agricultural and forestry tractors, "provided that they can ensure that the functioning of emissions control systems will not be compromised".

Study on a Diesel Roadworthiness Emissions Test using NO/NO₂

The European Commission's Directorate-General for Mobility and Transport (DG-MOVE) has awarded a contract to Brussels-based CITA (Comité international de l'inspection technique automobile) for a study on a new roadworthiness test for diesel emissions using NO/NO₂. The aim is to define a practical and reliable test procedure for use in periodic inspections.

The study includes conducting NO/NO₂ laboratory measurements on different new vehicles, including passenger cars, light-duty vehicles and heavy-duty vehicles, or on engines with different exhaust after-treatment systems under simulated failure conditions. Measurements have to be done under different conditions as well as with simulated defects and have to be compared with the measurement results at type approval. The study will also evaluate the correlation between the existing opacity meter and new devices.

Report of EU Expert Group on Future Transport Fuels

The European Commission's Expert group on Future Transport Fuels has issued a report saying that in the future road vehicles used for short trips such as urban transport should be powered by electricity while those specifically designed for long distances should use biofuels, synthetic fuels, methane or liquefied petroleum gas (LPG).

The group, which is made up of a wide variety of stakeholders and Commission Directorates, says that railways should be electrified whenever possible and aviation should use kerosene derived from biomass. Regarding waterborne transport, the experts recommend using biofuels. Hydrogen could be used for inland waterways and small boats, they add. Synthetic fuels could be used as an interim alternative to oil as Europe moves towards greater renewable energy production. Methane and LPG could also be used as complimentary sources of energy in the transport sector, say the experts.

Incentives for development and use of these fuels need to be harmonised across the EU to ensure the free circulation of vehicles and to prevent market distortions. There should be tax incentives for using greener fuels, and more low-emission zones.

The report is available from the EC website at http://ec.europa.eu/transport/urban/vehicles/directive/doc/2011_01_25_future_transport_fuels_report.pdf.

European Parliament calls for Limits on Black Carbon from Arctic Shipping

In a resolution adopted on 20 January 2011, the European Parliament called for an international ban on the use and carriage of heavy fuel oil on vessels operating in the Arctic, similar to that which is to apply to the Antarctic from August 2011, and asked the EU to impose a strict regime limiting Black Carbon (soot) emissions and the use of heavy fuel oil by vessels calling at EU ports prior to Arctic voyages.

The resolution "recognises the disproportionately large Arctic warming impact caused by Black Carbon (BC) emissions from the EU and other regions in the northern hemisphere, and stresses the need for inclusion of BC emissions in the relevant UN-ECE and EU regulatory framework, such as the Convention on Long-Range Transboundary Air Pollution and the National Emission Ceilings Directive.

Report on Air Quality Plans in EU Member States

The Austrian Umweltbundesamt has submitted a final report to the European Commission on their assessment for the Commission of plans and programmes reported under Directive 1996/62/EC (Ambient Air Quality Assessment and Management).

18 cities and regions were selected for in-depth analysis of their plans. These included Graz, Vienna, Brussels, Paris, Berlin, Munich, Stuttgart, Milan, Madrid, London and the Netherlands. Assessing the effectiveness of the plans in terms of complying with air quality limit values by the attainment date was one of the main topics of the analysis. In the case of PM₁₀ the limit values had to be attained by 2005. A comparison with observed PM₁₀ levels showed exceedances in all cities and regions covered by the in-depth analysis that had reported exceedances in previous years. Compliance for 2010 – the attainment date for NO₂ – is expected only for a few of the cities previously affected by NO₂ exceedances.

The main reasons given as to why compliance was not achieved included:

- Low acceptance of measures by the public, especially for traffic measures.
- Difficulty of allocating sources in the case of PM₁₀ and inaccurate emission inventories.

- High regional background concentrations of PM₁₀.
- Underestimation of real world emissions from road vehicles compared to legislative limits, as well as an increase in primary NO₂ emissions from diesel vehicles. This, the report says, may lead to a significant overestimation of the emissions reduction potential of current measures.
- Some measures can only be taken at Community level. There was also uncertainty about the timing and ambition level of some EU measures.

EU Analysis shows Benefits of Clean Air far outweigh Costs

The EU's Directorate General for the Environment has made available the most recent cost benefit analysis (CBA) for the revision of the National Emission Ceilings Directive. It concludes that the incremental emissions abatement costs for achieving the Thematic Strategy on Air Pollution (TSAP) targets will be about €1.3 billion/year in 2020 but that the resulting incremental monetised health benefits will be about €15 - 49 billion/year in that same year. The monetised benefits are up to 37 times the estimated costs.

The report provides a 2010 update on the balance of costs and health benefits of possible revisions to the National Emission Ceilings (NEC) Directive with respect to emissions limits to be reached by 2020. The analysis deals only with impacts to human health, using exposure to fine particles and ozone as indicators of risk.

The analysis specifically addresses the position outlined in the Thematic Strategy on Air Pollution (TSAP), the European Parliament (EP) position on the TSAP, and the Maximum Technically Feasible Reduction (MTFR according to the measures contained in the GAINS model) scenario. Estimates of annual health impacts under the scenarios are shown in Table 1 below:

Table 1: Estimated annual health impacts in 2020 due to air pollution in the EU27 for core scenarios.

	Current Legislation (CLE Baseline)	Thematic Strategy on Air Pollution (TSAP)	European Parliament (EP)	Maximum Technically Feasible Reduction (MTFR)
Ozone effects				
Acute Mortality (deaths)	19,900	19,500	19,400	17,800
Hospital Admissions (cases)	18,800	18,500	18,400	16,900
Minor Restricted Activity Days	40,600,000	39,900,000	39,564,100	36,330,500
Days with respiratory medication use	7,800,000	7,600,000	7,588,400	6,967,600
Fine particle (PM_{2.5}) effects				
Chronic Mortality (life years lost*)	2,300,000	2,100,000	2,059,300	1,689,200
Chronic Mortality (deaths*)	250,000	230,000	220,800	181,200
Infant Mortality (deaths)	373	340	326	265
Chronic Bronchitis (cases)	120,000	110,000	104,100	85,400
Hospital Admissions (cases)	63,000	58,000	55,000	45,000
Restricted Activity Days	206,000,000	188,000,000	181,000,000	148,000,000
Days with respiratory medication use	21,000,000	19,000,000	18,000,000	15,000,000
Lower Respiratory Symptom days	273,000,000	250,000,000	240,000,000	197,000,000

* These are alternative metrics, not additive.

Total monetised impacts for the baseline scenario (CLE) are calculated to be between €186 and €583

billion/year in 2020, the range accounting for alternative views on mortality valuation. The results for the TSAP and EP scenarios have large, positive net benefits once costs are subtracted out, despite the omission of all non-health benefits from the analysis.

The report is available at

<http://ec.europa.eu/environment/air/pollutants/cba.htm>.

European Environment Agency Report: Has Policy improved Air Quality?

On 5 January 2011 the European Environment Agency (EEA) published a new report on the Impact of Selected Policy Measures on Europe's Air Quality. It analyses how much policies such as vehicle and industrial plant (IPPC) standards have reduced air pollutant emissions and improved Europe's air quality compared to a 'no-policy scenario'. It also explores how much better air quality could be if the policies were fully applied.

For road transport, the report finds that despite a 26% increase in fuel use over the period 1990–2005, the introduction of the Euro vehicle standards has reduced road transport emissions of CO by around 80%, non-methane volatile organic compounds (NMVOC) by 68%, NO_x by 40% and fine particulate matter (PM_{2.5}) by 60% compared to a no-policy scenario. Due to lower emissions, concentrations of particulate matter over Europe have also been reduced far below the levels that would have been observed had no policies been in place. Due to an overall decrease in the emissions of ozone precursors (CO, NMVOC, NO_x), high daily ozone concentrations have become less frequent over most parts of Europe, especially in the Mediterranean region.

The report says that emissions could be reduced much further if the latest Euro vehicle standards were fully applied in all European countries. This would mostly affect NO_x emissions from gasoline-fuelled vehicles and direct PM_{2.5} emissions from diesel-fuelled vehicles.

Current emissions of NO_x and sulfur oxides (SO_x) from industrial combustion are significantly below the no-policy scenario. The reduction in particulate matter emissions from industrial combustion is more significant than from the road transport sector.

The EEA technical report (8/2010) is available from www.eea.europa.eu/publications/impact-of-selected-policy-measures.

Study says European Company Car Taxation is 'Harming the Environment'

Research for the European Commission has shown that the environmental benefit of fuel taxes is being undermined by tax breaks for company cars, a

Commission official told delegates at a workshop held in Brussels on 28 February 2011.

The workshop was co-organised by the Commission's tax department and environmental groups Green Budget Europe and EEB. The consultancy study finds that, in addition to being a loss of government revenues, tax breaks for company cars are hurting the environment in two ways. Employees tend to choose the most fuel-intensive vehicles when provided for free by their company and they drive more often when their fuel use is covered. The recently launched review of VAT policy might be one way in which it could be addressed. But no proposals are being considered at the moment.

Flanders Bus Operator completes Retrofit Programme

De Lijn, the main bus operator in the Flanders region of Belgium, has completed a €9.4m retrofit programme to reduce emissions from their bus fleet.

De Lijn has retrofitted 1690 buses in total with continuously regenerating DPFs since 2001. Most recently, 247 of these buses have been fitted with a combined De-NOx and continuously-regenerating filter system to reduce emissions of both Particulate Matter (PM) and NOx. City buses in Antwerp, Ghent and Bruges, along with regional and inter-city buses have been fitted with the new technology and are now, De Lijn says, reducing an estimated 80 520 kg of NOx emissions each year.

Freddy Van Steenberghe, Department Head at De Lijn and pioneer of De Lijn's programme to reduce bus emissions, commented that "our bus fleet now has the lowest emissions in Europe".

Investigation into Spanish Cities' Air Pollution Data

Spain's environmental prosecutor Antonio Vercher has launched an investigation into suspected manipulation of air pollution data in the country's largest cities including its capital Madrid.

Last month, the prosecutor notified Madrid's authorities that its practice of "eliminating measuring stations in the areas of highest pollution" significantly altered data without "resolving pollutant levels in the city centre". Mr. Vercher ordered the authorities to identify those responsible for the stations' removal.

The investigation will determine whether such practices have also been used in Barcelona, Seville and Valencia. Environmental group Ecologistas en Acción has claimed that authorities in 13 Spanish cities, mostly in the Castilla-León and Andalusia regions, "have been surreptitiously moving measuring stations since 2001."

Despite the suspected data manipulation, levels of pollutants remain above legal limits in Madrid and elsewhere in Spain. Last November, the European Commission said it was taking Spain to the EU court for not meeting limits on airborne particulates. The Madrid city council has also acknowledged that NO₂ levels in the Spanish capital exceeded the EU air quality standard by 10% last year.

Saying that a "currently impossible" 50% reduction in motor traffic would be required to achieve compliance, the city's environment chief said the council would ask the Spanish government to negotiate extra time for complying with the standard.

German Air Quality in 2010

A first evaluation of air quality in 2010 by the German Federal Environmental Agency (UBA) shows that the limit for the annual average concentration of NO₂ was exceeded at 56% of urban roadside air quality monitoring stations. An EU-wide standard of 40 µg/m³ is in force from the start of 2010.

The analysis is based on provisional data from the monitoring networks of the German Länder and the environment agency UBA. The limit value exceedances for NO₂ occur mainly in cities and metropolitan areas. NO₂ exposure in 2010 was comparable to that of the last decade.

PM₁₀ concentrations also exceeded EU limits. At 13% of all stations there were more than 35 days with PM₁₀ concentrations above 50 µg/m³. At measuring stations in Stuttgart and Reutlingen the annual PM₁₀ average of 40 µg/m³ was also exceeded. Overall, particulate pollution in 2010 was slightly above the level of the previous three years.

The UBA President Jochen Flasbarth looked forward to further action: "The introduction of environmental zones was a positive step to meet particulate matter emissions. The environmental zones should be applied consistently to increase their effectiveness. In addition, other measures are necessary: A stronger focus on public transport and the promotion of pedestrian and cycle traffic in many cities makes a significant contribution to cleaner air."

Preliminary analysis of air quality in 2010, also in comparison to previous years, is at www.uba.de/uba-info-medien/4063.html.

2011 Priorities of the French Health-Environment National Plan

On 27 January 2011, the French Ministry for Ecology, Sustainable Development, Transport and Housing published its priorities for 2011 regarding the health-environment national plan covering 2009-2013.

The press release includes priorities on outdoor air which causes an average reduction of 8 months of life expectancy. Fine particles are considered the most dangerous pollutant in France and the European Commission's CAFE (Clean Air For Europe) programme concluded that more than 40 000 deaths are caused in France each year because of chronic exposure to those fine particles.

Despite significant progress made over the past 20 years with a respective decrease of 34% of emissions of PM₁₀ and 40% of PM_{2.5} since 1990, it is clear that there are still air quality non-compliances in some cities. The "Particles Plan" presented on 28 July 2010 defines a roadmap for all emitting sectors with an objective to reduce fine particles by 30% by 2015.

New actions for 2011 are:

- the creation of 6 Low-Emission Zones (ZAPA or Zones d'Actions Prioritaires pour l'Air) in cities of more than 100 000 inhabitants, where more polluting vehicles will face some traffic restrictions. These zones will be introduced experimentally for 3 years in Paris, Lyon, the Plaine Communes conurbation, Aix-en-Provence, Grenoble and Clermont-Ferrand. Nice and Bordeaux also filed their applications for such zones by 31 December 2010.
- a call for research proposals dedicated to the support of the implementation of ZAPA was launched on 26 January 2011.
- the definition of regional 'Particles plans' integrating the three environmental aspects: climate, air and energy on complex issues such as wood-heating.
- a review of restriction measures taken in case of air pollution peaks in cities of more than 250 000 inhabitants.

New Data show higher Road Traffic NOx Emissions in Norway

A new method for calculating emissions from road traffic has shown that Norway's NOx emissions were a lot higher than previously thought, according to new data released by the country's national statistics office (SSB) on 11 February 2011.

The Handbook of Emission Factors (HBEFA) is now used. The model has updated emission factors for all emission types, and calculated cold start and evaporative emissions, in addition to hot emissions. New data sources have also been adopted, especially Statistics Norway's new mileage statistics. As a result of using the new factors, the emissions are adjusted downwards in the beginning of the time series due to lower emission factors for petrol passenger cars, while the emissions in the last part of the time series are adjusted upwards due to higher emission factors for diesel vehicles. For most other components the emissions are adjusted downwards for the entire time

series. Statistics Norway says the new calculations are more certain and more detailed, especially on road types and driving patterns, and vehicles are split into more weight and engine size classes.

NOx emissions in 2009 were 181 000 tonnes, 16% above Norway's ceiling under the 1999 Gothenburg protocol and the 2001 National Emission Ceilings (NEC) Directive. Previous statistics showed 167 000 t had been emitted that year. Road traffic accounts for 22% of NOx emissions, compared with 29% and 28% for shipping and stationary combustion respectively.

Details are at www.ssb.no/vis/english/subjects/01/04/10/agassn_en/art-2011-02-11-01-en.html.

Preliminary emissions figures for 2010 will be published by Statistics Norway in May 2011.

Danish Order on Environmental Marks for Lorries and Buses

Denmark has notified the Commission of a Draft Executive Order on measures for lorries and buses circulating in municipal environmental areas, etc. The Order imposes requirements for Danish and foreign lorries and buses to bear an environmental area mark before they can enter a Danish environmental area. The draft also lays down the administrative procedure for foreign lorries and buses to obtain an environmental area mark.

Report on Internalisation of External Costs of Transport in Flanders

Transport & Mobility Leuven (TML) has announced the publication of a new report on the internalisation of external costs of transport in Flanders.

TML calculated the private costs, the marginal external costs and the degree of internalisation for different road modes, rail, inland waterways and sea transport. The private costs are the costs for the user. The marginal external costs are the costs for society caused by congestion, direct emissions, accidents, noise, and damage to infrastructure; but for cycling also include the health benefits. The degree of internalisation shows to which extent the user pays via taxes for the external costs.

For road transport the most important marginal external costs are the costs of congestion, with the exception of motorcycles and light-duty vehicles for which the accident cost is more important. For the other modes (rail, sea and inland waterways) the marginal external environmental costs is the most important cost element. For passenger transport the motorcycle has the highest marginal external costs. Within the group of passenger cars the highest marginal external costs are for the diesel car, due to their higher emissions of particular matter. Collective transport modes such as bus and rail have lower

marginal external costs per passenger kilometre than private modes due to their higher occupancy rate. For freight transport, rail and inland waterways have lower external costs than road and sea.

TML found that current taxes and levies only cover part of the marginal external costs. The degree of internalisation is the largest for road transport and more for passenger cars in particular. On average, a gasoline car even pays too much. For road transport, external costs and the degree of internalisation vary strongly with the place and the time of the trip. From an economic point of view it would be better to differentiate the taxes.

The final report is available on the website of the Flemish Environmental Agency (in Dutch): www.milieurapport.be/nl/publicaties/Onderzoeksrapporten.

New UK Air Quality Website

A new UK Air Information Resource website (UK-AIR) is to replace the UK Air Quality Archive. It will be part of the Defra (Department for Environment, Food and Rural Affairs) website and will include links to local air quality management pages.



The site has clearer information on current and forecasted air quality in the UK and interactive monitoring maps showing site locations for all the UK's national monitoring networks. There is a new and improved data selector tool and a new OpenAir data analysis tool, together with an improved library and search function.

The site is available at <http://uk-air.defra.gov.uk> and will replace www.airquality.co.uk.

Report on Sustainable Mobility in Italy

Euromobility has published its 2010 report on sustainable mobility in Italy, with the sponsorship of the Ministry of Environment.

The report on mobility and transport in 50 Italian cities shows that Naples still has many unresolved issues, including failing to meet PM₁₀ standards on over 160 days compared to the 35 allowed by law. Naples is one of the few cities where the number of exceedances has increased steadily from the 2007

level of 40 days. In Naples, 40% of cars in circulation meet Euro 3, 4 or 5, but more than 30% are still at Euro 0. Milan, with more or less the same number of vehicles per hundred inhabitants, reduced its exceedances from almost 140 days to just over 100 in the same period.

La Mobilità Sostenibile In Italia: indagine sulle principali 50 città, Edizione 2010 is available at www.euromobility.org/documenti/atti_di_convegni/2010_50_citta/index.html.

NORTH AMERICA

Canada finalises Regulations for Marine and Off-Road Engine Emissions

Environment Canada has issued an Interim Order to amend Canadian regulations so as to allow sales of non-road engines that bear a model year 2011 US-EPA emission control label. This will allow the import and sales of engines that are manufactured under the EPA programme. The order can be viewed at <http://canadagazette.gc.ca/rp-pr/p1/2010/2010-12-18/html/notice-avis-eng.html#d101>.

Following this, on 16 February 2011 Environment Canada published final regulations to limit emissions from marine engines, vessels, and off-road recreational vehicles. The regulations cover emissions of HC, NO_x, CO, and particulate matter and will take effect starting with the 2012 model year. They are aligned with standards implemented by the US Environmental Protection Agency.

The regulations establish the first emissions standards and test procedures for marine engines, vessels with installed fuel lines or tanks, and off-road recreational vehicles used in Canada. The regulations recognise certificates issued by the US EPA as evidence of conformity, and provide additional compliance flexibility through an optional fleet averaging and emissions credit system.

US Company to pay \$2 Million for Selling Non-Certified NRMM Engines

The US Environmental Protection Agency (EPA) and the US Justice Department have announced that Mississippi-based PowerTrain, Inc. will pay a civil penalty of \$2 million to resolve claims that the company imported and sold nearly 80 000 non-road engines and equipment from China that did not meet standards under the Clean Air Act.

Between 2002 and 2008, PowerTrain imported 79 830 non-road engines or pieces of equipment into the US that were not covered by a certificate of conformity because they were different models, had different power ratings, or were made by a different manufacturer than that listed on the certificate. The

engines also lacked two-year emissions-related warranties, as required by law.

Under the settlement, PowerTrain will implement a plan to ensure that the engines and equipment they import in the future comply with Clean Air Act requirements. They will also offset the excess emissions of HC, NOx, and CO resulting from the sale of the illegal engines and equipment. As one of the offset projects, PowerTrain will spend an estimated \$600,000 (approx. €422 000) to provide subsidies for consumers to replace old wood-burning appliances with efficient, EPA-certified wood stoves.

US EPA awards \$25 Million to Health Effects Institute

Over the course of five years, the US Environmental Protection Agency (EPA) is awarding \$25 million to the Health Effects Institute (HEI) to help address the latest challenges to improving air quality and protecting health. With the funding, HEI will develop the next generation of tools and scientific information to examine the combined effects of air pollution exposures on people's health and the relationship between air quality and climate change.

New Mexico delays LEV/ZEV Standards until 2016

The Environmental Improvement Board of New Mexico has delayed the implementation of California's light-duty LEV and ZEV emissions requirements in the State until the start of 2016. They had been due to begin with the 2011 model year. New Mexico had adopted the Californian regulations in 2007.

California sets Emissions Standards for Replacement School Buses

The California Air Resources Board (CARB) has issued requirements on emissions criteria for replacement school buses to be eligible for funding under the Lower-Emission School Bus Program (LESBP) in 2011.

The standards for school buses funded through the programme will remain the same as in 2010, at 0.50 g/bhp-hr (0.66 g/kWh) for the NOx family emission limit (FEL) and 0.01 g/bhp-hr (0.13 g/kWh) for PM. Details are at

www.arb.ca.gov/msprog/mailouts/msc1102/msc1102.pdf.

Court blocks New York's Diesel Retrofit Regulation

The New York Supreme Court has blocked regulations by the New York Department of Environmental Conservation (NYDEC) that would have required all contractors providing services to the state to retrofit their heavy-duty diesel equipment with

emissions controls. The court found that the act adopted by the New York Legislature only gave the department the authority to require retrofits on state-owned, -leased or -operated heavy-duty vehicles.

US Budget for 2012 does not include Clean Diesel Projects

The proposed US 2012 budget will eliminate funding for diesel retrofits and other clean diesel projects under the Diesel Emissions Reduction Act (DERA). This is despite the fact that in January 2011, President Obama signed into law new legislation that re-authorised DERA for another five year period and authorised up to \$100 million annually for DERA projects. However, the actual DERA funding must be approved as part of the federal budget for each financial year.

US-EPA and California align Timeframe for Next Generation of Standards

The US Department of Transportation (DOT), the Environmental Protection Agency (EPA) and the State of California have announced a single timeframe for proposing fuel economy and greenhouse gas standards for model year 2017-2025 cars and light-duty trucks.

Prior this announcement, the California Air Resources Board (CARB) had announced its intention to propose greenhouse gas emission standards for model years 2017 to 2025 in March of this year, while EPA and NHTSA were working on an end of September 2011 timeline for the proposal. The announcement ensures that both proposals will come out simultaneously after a thorough, joint review of all data available when the proposals are issued.

CARB has also announced that the proposed changes to the Zero Emission Vehicle regulation and LEV III will now be released in September 2011 so as to co-ordinate their motor vehicle standards with the Federal Government.

US EPA grants E15 Fuel Waiver for Model Year 2001 - 2006 Vehicles

The US Environmental Protection Agency (EPA) has now agreed to allow the sale of gasoline containing 10 to 15% ethanol (E15) for light-duty vehicles built in model years 2001 to 2006. It has not, though, agreed to its use in motorcycles, heavy-duty vehicles, or non-road engines.

The decision was made after a review of the Department of Energy's testing and other available data on E15's effect on emissions. EPA has already approved the use of E15 for 2007 and newer cars and light trucks.

The Agency also announced that no waiver is being granted this year for E15 use in any motorcycles, heavy-duty vehicles, or non-road engines because current testing data does not support such a waiver.

Details are at www.epa.gov/otaq/regs/fuels/additive/e15.

Start Date for Canadian Biodiesel Mandate

Environment Canada has proposed 1 July 2011 as the start date for the country's 2% renewable fuel requirement for diesel fuel and heating oil under the Renewable Fuels Regulations adopted in September 2010. The Regulations also included a 5% renewable fuel requirement for gasoline which already took effect on 15 December 2010. Canada will require about 550 million litres of biodiesel per annum to meet the target. Current annual biodiesel production in Canada is about 200 million litres.

Name Change for Association of International Automobile Manufacturers

AIAM - the Association of International Automobile Manufacturers has changed its name. The new Association of Global Automakers, based in Washington DC launched a new website - www.globalautomakers.org in February 2011.

This association's members are Aston Martin, Ferrari, Honda, Hyundai, Isuzu, Kia, Mahindra, Maserati, Mitsubishi, McLaren, Nissan, Peugeot, Subaru, Suzuki, and Toyota.

US-EPA issues Rules on Emissions from Boilers and Incinerators

On 23 February 2011, EPA - the US Environmental Protection Agency - issued final regulations on emissions from heavy industrial boilers (essentially on-site power plants at factories) and incinerators. The rule aims to reduce emissions with so-called "maximum achievable control technology" or MACT, but is somewhat less stringent than that originally proposed last year. The final rules are also more flexible than originally proposed.

EPA estimates that the new rules will affect some 13 800 boilers located at large sources of air pollutants, including refineries, chemical plants, and other industrial facilities and 88 solid waste incinerators at commercial or industrial facilities. About 187 000 boilers located at small sources of air pollutants, including commercial buildings, universities and hospitals will be affected to a lesser extent.

In March this year EPA is expected to also propose MACT rules on toxic emissions from power plants, and plans to issue rules on emissions of greenhouse gases from oil refineries and power plants later this year.

SOUTH AMERICA

Chilean President signs Rules to Limit PM_{2.5}

On 18 January 2011, Chilean President Sebastian Piñera signed regulations setting permissible atmospheric levels of breathable particulates. The regulation will set average limits for levels of fine particulate material measuring 2.5 microns or less in diameter (PM_{2.5}) at 20 µg/m³ annually and 50 µg/m³ daily. The standard will come into force in 2012, 10 years earlier than planned under the draft version of the regulation that was published in late 2009.

Brazil unveils first National Inventory of Vehicular Pollution

On 9 February 2011, Brazil's Environment Ministry unveiled the nation's first national inventory of vehicular pollution. The country's 27 states are expected to use the inventory's guidelines and methodology to draft mandatory plans to control vehicle emissions.

The inventory, which covered the years from 1980 to 2009, measured emissions of CO₂, CO, NO_x, PM, methane, and non-methane hydrocarbons. It recommended that states make massive investments in cargo railways to reduce diesel-fuelled truck transport. It also recommended investments in subways and buses to reduce car emissions, initiation of annual vehicle emissions inspections, and establishment of state tax incentives for companies that replace antiquated small-truck and car fleets. Currently Rio de Janeiro state is the only Brazilian state with mandatory annual vehicle emissions inspections.

A 2009 resolution (No. 418) by the National Environmental Council (CONAMA) requires states to draft preliminary Vehicle Pollution Control Plans (PCPV) to show how they plan to control vehicular emissions and to publish them by June 30, 2011.

ASIA PACIFIC

China delays Diesel Vehicle Standards

China has made some changes in the implementation schedule of China IV standards because the relevant diesel fuel standard has not yet been released. As a result it is not certain that 50 ppm (max.) sulfur fuel is available throughout the country, making it difficult to apply China IV emissions standards to all vehicles.

All heavy-duty vehicles and engines except those using compression Ignition (CI) engines will use China IV emissions standards from 1 January 2011. All gas-fuelled positive ignition engines and vehicles that do not meet the standard cannot be sold and registered.

For compression ignition engines and vehicles, China IV will be delayed by one year, coming into force on 1 January 2012.

All light-duty vehicles except diesels will use China IV emissions standards from 1 July 2011. All light-duty gasoline vehicles, natural gas vehicles and bi-fuel vehicles that do not meet the standards cannot be sold and registered after this date.

For light-duty diesel vehicles, China IV will be delayed two years, coming into force on 1 July 2013.

Beijing to introduce National 5 Emissions Standards

Beijing Municipal Environment Protection Bureau plans to launch the National 5 Emissions Standards in 2012, in an effort to eliminate old vehicles and improve the quality of fuel, the *Beijing News* reports.

Due to the number of motor vehicles on the city's roads growing enormously and fast, the Bureau will still focus on the improvement of air quality and of new vehicle emission standards during the 12th Five-year Plan period (2011-2015), said Du Shaozhong, deputy director of the Bureau. In addition, Du said Beijing has eliminated more than 150 000 more polluting "yellow label cars" and reduced vehicle emissions by approximately 313.5 tons per day in the past year.

Beijing also plans to limit passenger vehicle purchases to 20 000 units per month and says that it will extend measures to limit the number of cars allowed onto the city's roads each day as well as stepping up restrictions on road usage during rush hours based on cars' licence-plate numbers. The government is also researching the feasibility of charging congestion fees in certain districts.

China to set Regional Targets for Air Pollutants, Energy and Carbon Intensity

China will set provincial targets to reduce four pollutants and energy and carbon intensity in its 12th Five-Year Plan (2011-2015), with eastern coastal areas having higher goals than provinces in the central or western part of the country, a Ministry of Environmental Protection official told the *People's Daily* newspaper on 13 January 2011.

Ministry Director Zhou Shenxiang said "nationally binding" targets for the reduction of sulfur dioxide and nitrogen oxides, as well as for reduction of carbon and energy intensity* in certain industries, will be determined according to region. Targets will be lower for the less-developed central and western provinces to "reduce stress" on their overall economic development, according to the newspaper.

* Carbon intensity is a measurement of CO₂ emissions per unit of gross domestic product. Energy intensity is a measurement of use per unit of GDP.

Report on Air Pollution in 6 Indian Cities

The national summary report on air quality monitoring and emissions for six Indian cities of Delhi, Mumbai, Chennai, Bangalore, Pune and Kanpur identifies "significantly high" levels of ambient PM and NO₂ and calls for immediate attention to control emissions.

The Environment Ministry-constituted Central Pollution Control Board that submitted the report has suggested setting up a high-powered inter-ministerial committee to implement its recommendations. It has strongly advocated the strengthening of public transport systems to counter increasing private vehicles on roads; improvement of the quality of road, fuel and vehicle exhaust norms; and actions to minimise the re-suspension of road dust.

The report states that among all air pollutants, particulate matter is the most critical pollutant in almost all urban areas of the country. There are also significant quantities of NO₂ and SO₂ in most cities. Hence, any control strategy for reduction of particulate will have to consider control of SO₂, NO₂ and NH₃. While vehicles contribute significantly at all the locations, their contributions at roadside locations are comparatively higher. Expressing concern over the rising number of vehicles on the roads, the report stressed the need for disposal of old vehicles and recommended a restriction on entry of polluting trucks and heavy-duty goods vehicles in the cities. It also recommends that more tests on in-use vehicles should be carried out.

The report is available from:

<http://moef.nic.in/downloads/public-information/Rpt-air-monitoring-17-01-2011.pdf>.

Singapore may go straight to Euro 4 for Petrol Vehicles

The *'Straits Times'* has reported that Singapore is likely to move directly to Euro 4 emissions standards from early 2014, bypassing the Euro 3 stage.

To meet the Euro 4 standards, the sulfur content of petrol sold in Singapore will have to be cut to 50 ppm compared to the limit of 500 ppm allowed under Euro 2 standards currently in effect. Additionally, it is expected that the National Environment Agency would also raise the diesel standard to Euro 5 in 2014, from Euro 4 currently. That would also require that the allowed sulfur content of diesel be reduced to 10 ppm from 50 ppm.

EURASIA

Azerbaijan to introduce Euro 3 in 2012 and Euro 4 in 2015

The chair of the Azerbaijani State Committee on Standardization has told the press that the Azerbaijani

government has decided to implement Euro 3 emissions standards in 2012 and Euro 4 in 2015.

He also said that Azerbaijan is beginning to build its own emissions control laboratories to better implement the Euro 2 standard which will take effect nationwide in July 2011. "We are planning to open laboratories in the regions as well including Lankaran, Sumgayit and Salyan," he said.

MIDDLE EAST

Lebanon to allow Import of Euro 5 Diesel Cars

A Lebanese parliamentary committee has approved amendments to the country's traffic laws to allow the import of Euro 5 diesel cars.

However, Beirut Member of Parliament Mohammad Qabbani, who chairs the Lebanese Parliament's Public Works and Transport Committee said when European standards move to Euro 6, then only cars in compliance with Euro 6 may be allowed to be imported to the country.

Qabbani also said the country "will ban the import of [regular] diesel except by fuel depots, while the country's fuel stations will only be allowed to import green diesel." Qabbani said under the proposed legislation, gasoline stations that violate the import regulations will face permanent closure on their third violation.

The amendments still require approval by Parliament's General Assembly.

AFRICA

Kenya moves to Low-Sulfur Diesel

Kenya has launched a low-sulfur diesel initiative to reduce vehicle emissions of air pollutants and to improve air quality. At a news conference at the United Nations Environment Programme (UNEP) headquarters in Nairobi on 18 February 2011, Assistant Energy Minister Magerer Langat said the new limit on sulfur in diesel fuel will be 500 parts per million (ppm), substantially lower than the previous 10,000 ppm. "But this is just an interim level as we expect in the near future sulfur levels to be at 50 ppm" once refining capacity is upgraded, Langat said. The cleaner fuel is now available at a limited number of stations but soon will be expanded to pumps nationwide.

According to UNEP Executive Director Achim Steiner, Kenya's new standard is the lowest in East Africa. "However, Kenya's low-sulfur levels will have a significant impact in countries that it exports diesel to, such as Burundi, Democratic Republic of Congo, Rwanda, and Uganda," Steiner said at the news

conference. The transition to low-sulfur diesel in Kenya is the result of collaboration between UNEP; the Partnership for Clean Fuels and Vehicles, which is based at UNEP headquarters; the US Environmental Protection Agency; the Petroleum Institute of East Africa; and the local National Environmental Management Authority.

UNITED NATIONS

UN-ECE Developments

On 13 and 14 January 2011 GRPE, the UN's working party on pollution and energy, held its first meeting of 2011. The committee received reports from each of its task groups, most of which had held meetings in the previous 3 days.

GRPE adopted two documents amending the gtr (global technical regulation) on motorcycle emissions. One amends the gearshift prescriptions and the other introduces limit values into the gtr. For the time being the principal limit values would be those recently introduced by Japan (all signatories will have to accept bikes meeting these limits, but may set one of the alternative limits as the base national requirement). It is intended that in due course the proposed new European limits will replace the Japanese limits as the principal level.

Corrections to gtr no.11 (Tractors and NRMM) were adopted for submission to WP.29, the World Forum for the Harmonisation of Vehicle Regulations. GRPE also adopted a proposal from the Netherlands to introduce requirements on speed-proportional fans into ECE Regulation 83, proposals to update the reference fuel specifications in Reg.120 and to amend Reg.115 so as to permit Euro 5 approvals. These will also be sent to the June 2011 session of WP.29 for approval.

UNEP Study recommends DPFs to control Black Carbon Emissions

A small number of emissions reduction measures targeting black carbon (BC) and tropospheric ozone could immediately begin to protect climate, public health, water and food security, and ecosystems, according to a new study by the United Nations Environment Programme (UNEP).

Such measures include diesel particulate filters for vehicles; the recovery of methane from coal, oil and gas extraction and transport; methane capture in waste management; use of clean-burning stoves for residential cooking; and the banning of field

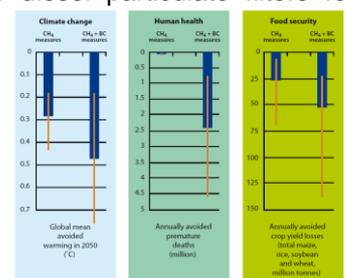


Figure 1. Global benefits from full implementation of the identified measures in 2050 (compared to the reference scenario). The climate change benefit is estimated for a given year (2050) and human health and crop benefits are for 2050 and beyond.

burning of agricultural waste. Widespread implementation is achievable with existing technology but would require significant strategic investment and institutional arrangements, the study found. UNEP says some of the largest BC emission reductions are obtained using diesel particle filters on high emitting vehicles.

The identified measures complement, but do not replace, anticipated CO₂ reduction measures. Major CO₂ reduction strategies mainly target the energy and large industrial sectors and therefore would not necessarily result in significant reductions in emissions of the black carbon or ozone precursors; methane and carbon monoxide. Full implementation of these measures would reduce future global warming by 0.5°C (within a likely range of 0.2-0.7°C), the report says. If the measures are implemented by 2030, this could halve the potential increase in global temperature which is projected for 2050. The rate of regional temperature increase would also be reduced.

The Summary of this assessment for decision makers was presented at the 26th session of the Governing Council/Global Ministerial Environment Forum (GC/GMEF) of UNEP from 21-24 February 2011 in Nairobi, Kenya and is available at www.unep.org/gc/gc26/download.asp?ID=2197.

GENERAL

Thermophoretic Soot Sensor

Norwegian research company Sintef says their new in-vehicle sensor using thermophoresis measures soot particles in the exhaust gas after a DPF. When soot particles collide with high-energy hot particles, they are forced towards colder, less energy-intensive regions. The sensor itself is installed in the middle of the gas flow, so that it is exposed to the high-temperature exhaust gas. If the sensor is kept cold enough, solid particles in the exhaust gas will be attracted to the cold surface of the sensor, where they can be measured. This is achieved by fitting a heat-conducting shield around the sensor.

RESEARCH SUMMARY

Effects of Emissions

Review Article on who is at Risk from Air Pollution

This article reviews the sub-population groups who are at high risk and are the first to be harmed by air pollution coming from anthropogenic combustion. Older people and young infants, people who suffer from allergies, pulmonary and heart diseases, pregnant women and newborn babies, and deprived populations that suffer from low socio-economic status have all been described as populations at risk.

Source: Ronit Peled, Air pollution exposure: Who is at high risk?; *Atmospheric Environment* (2011), [doi: 10.1016/j.atmosenv.2011.01.001](https://doi.org/10.1016/j.atmosenv.2011.01.001).

Healthy Young Adults at Risk from Breathing Ozone

According to this study ozone, the major component of smog, damaged the lung tissues of healthy young adults exposed in a laboratory setting despite being at levels well below what is currently considered safe.

Source: Kim et al., Lung Function and Inflammatory Responses in Healthy Young Adults Exposed to 0.06 ppm Ozone for 6.6 Hours; *American Journal of Respiratory and Critical Care Medicine* (2011), [doi:10.1164/rccm.201011-1813OC](https://doi.org/10.1164/rccm.201011-1813OC).

Effect of Pollution on Cognitive Function in Older Men

A recently-published study aims to assess the association between black carbon (BC), a marker of traffic-related air pollution, and cognition in older men. The authors found a non-linear association between BC and cognition and concluded that ambient traffic-related air pollution was associated with decreased cognitive function in older men.

Source: Power, et al., Traffic-Related Air Pollution and Cognitive Function in a Cohort of Older Men; *Environmental Health Perspectives* (2010), [doi:10.1289/ehp.1002767](https://doi.org/10.1289/ehp.1002767).

Air Pollution and the Socially Disadvantaged Elderly

The objective of this study was to determine the influence of age, education, employment status and income on the risk of mortality associated with ambient air pollution. The authors conclude that the socially disadvantaged, especially if elderly, appear to be especially susceptible to dying on days of higher air pollution. Concentrations deemed acceptable for the general population would not appear to protect this susceptible subgroup.

Source: Cakmak, Dales, Rubio and Vidal, The risk of dying on days of higher air pollution among the socially disadvantaged elderly; *Environmental Research* (2011), [doi:10.1016/j.envres.2011.01.003](https://doi.org/10.1016/j.envres.2011.01.003).

Lung Cancer and Long-Term Air Pollution

Previous studies have shown associations between air pollution and risk for lung cancer. The purpose of this study was to investigate whether traffic and the concentration of nitrogen oxides (NO_x) at the residence are associated with risk for lung cancer. The authors say that the study supports a conclusion that risk for lung cancer is associated with different markers of air pollution from traffic near the residence.

Source: Raaschou-Nielsen et al., Lung Cancer Incidence and Long-Term Exposure to Air Pollution from Traffic; *Environmental Health Perspectives* (2011). [doi:10.1289/ehp.1002353](https://doi.org/10.1289/ehp.1002353).

Traffic Air Pollution linked to Onset of COPD.

Short-term exposure to air pollution has been associated with exacerbation of chronic obstructive respiratory disease (COPD) whereas the role of long-term exposures on the development of COPD is not yet fully understood. In this study COPD incidence was associated with the 35-year mean NO₂ level with

stronger associations in subjects with diabetes and asthma. The authors conclude that long-term exposure to traffic related air pollution may contribute to the development of COPD with possibly enhanced susceptibility in people with diabetes and asthma.

Source: Andersen et al., Chronic obstructive pulmonary disease and long-term exposure to traffic-related air pollution: a cohort study; *American Journal Respiratory and Critical Care Medicine* (2010) doi: [10.1164/rccm.201006-0937OC](https://doi.org/10.1164/rccm.201006-0937OC).

Air Pollution and Atherosclerosis

In this paper, researchers tested the hypothesis that individual exposure to particulate matter (PM) derived from fossil fuel would correlate with plasma concentrations of oxidized low-density lipoprotein (LDL), taken as a marker of atherosclerosis. They tested this hypothesis in patients with diabetes, who are at high risk for atherosclerosis.

The observed positive association, in a susceptible group of the general population, between plasma oxidized LDL levels and either the carbon load of airway macrophages or the proximity of the subject's residence to busy roads suggests a proatherogenic effect of traffic air pollution.

Source: Jacobs et al., Traffic Air Pollution and Oxidized LDL; *PLoS ONE* (2011) 6 (1): e16200, doi:[10.1371/journal.pone.0016200](https://doi.org/10.1371/journal.pone.0016200).

Diabetes Medication and Air Pollution

Type 2 Diabetes and particulate air pollution are associated with inflammatory dysregulation. In this paper the authors assessed the modifying effects of diabetes medications on the association of C-reactive protein (CRP), a marker of inflammation, and traffic exposure in adults with Type 2 Diabetes.

The authors conclude that among people with diabetes, individuals on insulin appear to be most vulnerable to the effects of traffic exposure. Disease severity among insulin users may promote the pro-inflammatory response to traffic exposure, though diabetes medications may also modify the response. Possible anti-inflammatory effects of OHAs with traffic exposure merit further evaluation.

Source: Rioux, Tucker, Brugge, Gute and Mwamburi, Traffic exposure in a population with high prevalence type 2 diabetes – Do medications influence concentrations of C-reactive protein?; *Environmental Pollution* (2011), doi:[10.1016/j.envpol.2010.12.025](https://doi.org/10.1016/j.envpol.2010.12.025).

Effect of Diesel Exhaust on Influenza Infection

This study sought to determine if diesel exhaust exposure could affect the severity of an ongoing influenza infection in mice, and examine if this could be modulated with antioxidants. The authors conclude that exposure to diesel exhaust during an influenza infection polarizes the local immune responses to an IL-4 dominated profile in association with increased viral disease, and some aspects of this effect can be reversed with antioxidants.

Source: Gowdy et al., Role of oxidative stress on diesel-enhanced influenza infection in mice; *Particle and Fibre Toxicology* (2010), 7:34, doi: [10.1186/1743-8977-7-34](https://doi.org/10.1186/1743-8977-7-34).

Air Pollution is an important Trigger of Heart Attacks

This paper compares triggers of myocardial infarction at an individual and population level. Taking into account the Odds Ratio and the prevalences of exposure, the highest population attributable fraction were estimated to be for traffic exposure (7.4%), followed by physical exertion (6.2%), alcohol (5.0%), coffee (5.0%), and a difference of 30 µg/m³ in PM₁₀ (4.8%). The authors conclude that air pollution is an important trigger of myocardial infarction and is of similar magnitude to other well accepted triggers such as physical exertion, alcohol, and coffee.

Source: Nawrot, Perez, Künzli, Munters and Nemery, Public health importance of triggers of myocardial infarction: a comparative risk assessment; *The Lancet* (2011) 377 (9767) pp. 732-740, doi: [10.1016/S0140-6736\(10\)62296-9](https://doi.org/10.1016/S0140-6736(10)62296-9).

Assessment of Exposure

Mn and Pb in Children's Blood and Particulate Matter

This study investigates the environmental exposures of Mn and Pb in Durban, South Africa, a region that has utilised both metals in gasoline. Airborne metals were sampled as PM_{2.5} and PM₁₀ at three sites, and blood samples were obtained from a population-based sample of school children attending seven schools.

The study's findings suggest that while vehicle exhaust may contribute to exposures of both metals, other sources currently dominate lead exposures.

Source: Battermana et al., Manganese and lead in children's blood and airborne particulate matter in Durban, South Africa; *Science of the Total Environment*, doi:[10.1016/j.scitotenv.2010.12.017](https://doi.org/10.1016/j.scitotenv.2010.12.017).

Air Pollution Exposure during Pregnancy

Air pollution exposure during pregnancy has been linked to a wide range of negative health effects. NO₂, a traffic pollution marker, and benzene, an industrial pollution indicator, stand out among the types of air pollution linked to these effects. The aim of this work was to show the methodology used to assign exposure levels for both of these pollutants and preliminary reports in the INMA (Environment and Childhood) Asturias cohort in Spain. The authors conclude that air pollution exposure for the INMA Asturias cohort clearly depends on the place of residence.

Source: Fernández-Somoano, Estarlich, Ballester and Tardón, Outdoor NO₂ and benzene exposure in the INMA (Environment and Childhood) Asturias cohort (Spain); *Atmospheric Environment* (2011), doi:[10.1016/j.atmosenv.2011.02.010](https://doi.org/10.1016/j.atmosenv.2011.02.010).

Air Pollution Exposure Indicator for Greece

The European Environment Agency (EEA) calculates the air pollution exposure indicator for Greece using data from only one monitoring station, which is located in Athens. This paper presents an alternative

approach for calculating such an indicator. The assessment focuses on particulate matter (PM₁₀), NO₂ and ozone for the period from 2001-2008. Comparisons between exposures estimated by the current procedure and by the EEA methodology indicate that the latter procedure can produce large over-estimates of exposure, the authors state.

Source: Dimitroulopoulou, Plemmenos, Kyrios, and Ziomas, Air Pollution Exposure Indicator for Greece; *Atmospheric Environment* (2011), [doi:10.1016/j.atmosenv.2011.01](https://doi.org/10.1016/j.atmosenv.2011.01).

Air Quality

Distribution of Pollutants near a Major Road

This study characterised the distribution of vehicle related air pollution in proximity to a major arterial road. The findings suggest, the authors say, that for protection of public health in the near road environment, vertical distance is an important determinant of exposure to pollutants that are key indicators of traffic related air pollution. This has implications for sensitive land use development in proximity to high volume traffic corridors.

Source: McAdam, Steer and Perrotta, Using Continuous Sampling to Examine the Distribution of Traffic Related Air Pollution in Proximity to a Major Road; *Atmospheric Environment* (2011), [doi:10.1016/j.atmosenv.2011.01.050](https://doi.org/10.1016/j.atmosenv.2011.01.050).

Do Strict Speed Limits reduce Traffic Emissions?

Researchers have investigated the impact of reducing speed limits on traffic emissions using two different models, but the models produced some contradictory results. The researchers therefore warn policy makers to interpret model results very carefully and to avoid relying on simple "macroscopic" models. Despite the variations in model results, the researchers conclude that, unlike the situation on inter-urban roads, strict speed limits are unlikely to reduce emissions significantly in urban areas.

Source: Int Panis et al., PM, NO_x and CO₂ emission reductions from speed management policies in Europe; *Transport Policy* (2011) 18 (1) pp.32-37, [doi: 10.1016/j.tranpol.2010.05.005](https://doi.org/10.1016/j.tranpol.2010.05.005).

Contribution of Traffic to Particulate in Street Canyons

In this study, the researchers used continuous mobile monitoring of traffic-related particulate air pollutants to assess the contribution to concentrations, above background, of traffic in the street canyons. On average, an approximate 11% increase in concentrations of ultrafine particles (UFP) and 8% increase in concentrations of PM_{2.5} over urban background was estimated during high traffic periods in street canyons as opposed to low traffic periods.

Source: Zwack, Paciorek, Spengler and Levy, Characterizing Local Traffic Contributions to Particulate Air Pollution in Street Canyons Using Mobile Monitoring Techniques; *Atmospheric Environment* (2011), [doi:10.1016/j.atmosenv.2011.02.035](https://doi.org/10.1016/j.atmosenv.2011.02.035).

Assessment of Pearl River Delta Emissions Policies

By taking 2015 as a target year, this paper assessed the impacts of five possible motor vehicle emissions control measures and a combined policy scenario on air quality in China's Pearl River Delta (PRD) region.

Upgrading to National IV emission standards was the most effective individual measure and it was shown that it can reduce daily average NO₂ and PM₁₀ concentrations by 11.7 ppb(v) and 21.3 µg/m³, respectively; but involves an increase (at maximum) of 10.3 ppb(v) in O₃ concentration. Evaluation of the combined scenario indicates that solely controlling motor vehicle emissions is not sufficient to improve PRD regional air quality significantly.

Source: Wenwei Che et al, Assessment of Motor Vehicle Emission Control Policies Using Model-3/CMAQ Model for the Pearl River Delta Region, China; *Atmospheric Environment*, [doi:10.1016/j.atmosenv.2010.12.050](https://doi.org/10.1016/j.atmosenv.2010.12.050).

Impact of Cruise Ship Emissions

The objective of this study was to investigate community level concentrations of PM_{2.5}, NO₂ and SO₂ associated with cruise ships in James Bay, Victoria, British Columbia, Canada. Concentrations of PM_{2.5} and NO were elevated on weekends with ships present with winds from the direction of the terminal to a monitoring station.

Source: Poplawski, Setton, McEwen, Hrebenyk, Graham and Keller, Impact of cruise ship emissions in Victoria, BC, Canada; *Atmospheric Environment*, (Feb. 2011) 45 (4) pp.824-833, [doi:10.1016/j.atmosenv.2010.11.029](https://doi.org/10.1016/j.atmosenv.2010.11.029).

Ambient Particle Size Distribution in Milan

In this report, aerosol number concentration and size distributions in the 10 to 20 000 nm size range were measured at an urban background site. Daily patterns of the Total Particle (TP), ultrafine (UFP, diameter<100 nm) and submicron (SMP, 100-1000 nm) fine particle concentration were analysed both on a seasonal (cold and warm season) and weekly (weekdays and weekends) basis.

Total particulate number concentrations were in the order of 10⁴/cc, with UFPs and SMPs accounting for 80% and 20%, respectively. Aitken mode particles were found to increase simultaneously with primary traffic emissions, peaking in the morning rush hour and dominating the number size distribution still during the afternoon and in the evening rush hour.

Source: Lonati, Crippa, Gianelle and Van Dingenen, Daily patterns of the multi-modal structure of the particle number size distribution in Milan, Italy; *Atmospheric Environment* (2011), [doi:10.1016/j.atmosenv.2011.02.003](https://doi.org/10.1016/j.atmosenv.2011.02.003).

Engine Development and Emissions Measurement

PM from GDI Vehicles fuelled with Ethanol Blends

This new study from the University of Oxford (UK) suggests that increased enthalpies of vaporisation in ethanol/gasoline mixtures could account for increased PM emissions from GDI engines fuelled with ethanol blends, a result the authors attributed to the air-fuel mixture being less homogeneous.

Source: Chen and Stone, Measurement of Enthalpies of Vaporization of Isooctane and Ethanol Blends and Their Effects on PM Emissions from a GDI Engine; *Energy & Fuels* (2011), [doi: 10.1021/ef1015796](https://doi.org/10.1021/ef1015796).

Emissions from Alternative Diesel Fuels (1)

In this study the authors evaluate the emissions of several types of diesel fuel and the effectiveness of catalysts to eliminate pollutant species. Compared to the baseline Texas Low Emission Diesel (TxLED) fuel, NO_x was found to decrease for Fischer-Tropsch diesel and biodiesel made from canola and tallow feedstocks, while an increase was found for biodiesel made from soy feedstocks. The authors also presented the speciation of hydrocarbon emissions in the raw exhaust.

Source: Bugosh, Muncrief and Harold, Characterization and Catalytic Abatement of Emissions from Alternative Diesel Fuels Using a Benchtop Engine System; 2010 American Institute of Chemical Engineers (AIChE) Annual Meeting, Conference Proceedings.

Emissions from Alternative Diesel Fuels (2)

In this study, regulated and unregulated gaseous emissions and fuel consumption with five different fuels were tested in a typical Euro 4 4-cylinder, light-duty diesel. Three different biodiesel fuels obtained from soybean oil, rapeseed oil and palm oil, a Fischer-Tropsch fuel and an ultra-low sulfur diesel were studied on a hot-start New European Driving Cycle.

When biodiesel was used, increases in regulated and unregulated emissions were observed and also a significant increase in fuel consumption. The use of Fischer-Tropsch fuel, however, caused lower regulated and unregulated emissions and fuel consumption than diesel.

Source: Bermúdez, Lujan, Pla and G. Linares, Comparative study of regulated and unregulated gaseous emissions during NEDC in a light-duty diesel engine fuelled with Fischer Tropsch and biodiesel fuels; *Biomass and Bioenergy* (2011) 35 (2) pp.789-798, [doi:10.1016/j.biombioe.2010.10.034](https://doi.org/10.1016/j.biombioe.2010.10.034).

Study of Emissions from Auto-Rickshaws

Chassis dynamometer emissions testing was conducted on 30 in-use Indian auto-rickshaws including two-stroke and four-stroke CNG-fuelled (CNG-2S and CNG-4S) and four-stroke petrol-fuelled (PET-4S) vehicles. The study found that global warming commitment (GWC) associated with

emissions from the 2-stroke CNG-fuelled vehicles was more than twice that from CNG or petrol-fuelled 4-strokes, due mostly to CH₄ emissions. In addition the mean fuel-based PM_{2.5} emission factor for CNG-2S was almost 30 times higher than for CNG 4-strokes and 12 times higher than for petrol 4-strokes.

The authors say that their findings suggest that CNG fuel should be limited to use in four-stroke engines to realise potential health and climate benefits. They note that the average CNG-2S vehicle emitted nearly 3 orders of magnitude more PM than the new CNG-4S test vehicle.

Source: Reynolds, Grieshop and Kandlikar, Climate and Health Relevant Emissions from in-Use Indian Three-Wheelers Fueled by Natural Gas and Gasoline; *Environmental Science & Technology* (2011), [doi: 10.1021/es102430p](https://doi.org/10.1021/es102430p).

Neural Network Model for SCR Dosing

In this paper, a mathematical model of the SCR catalytic converter was replaced with a neural network model to accelerate the optimization process. Steady state calibration test data was used to simulate the inlet properties of the SCR catalytic converter. For each chosen condition, a separate neural network was developed. In order to generate sufficient data to form a neural network for each condition, the original mathematical model was run several times at the temperature and inlet NO_x concentration of each condition with a range of different ammonia concentrations. Subsequently the neural network model was trained and tested for each condition. Ammonia dosing optimisation was performed using a multi objective genetic algorithm module of MATLAB[®]. The optimisation objectives were NO_x reduction percentage and SCR outlet ammonia concentration.

Source: Faghihnia and Shamekhi, Development of a neural network model for selective catalytic reduction (SCR) catalytic converter and ammonia dosing optimization using multi objective genetic algorithm; *Chemical Engineering Journal* (2010) 165 (2) pp. 508-516, [doi:10.1016/j.cej.2010.09.055](https://doi.org/10.1016/j.cej.2010.09.055).

Study of NO_x Storage-Reduction Processes

The focus of this study is on the NO_x Storage-Reduction (NSR) process and in particular on the reaction between NO, CO, and H₂O via an NCO-Pt or HNCO intermediate. Experiments were also conducted to study the effects of various factors like reaction temperature, reactant concentration and space velocity on the production of ammonia. The kinetic data obtained are interpreted through the expansion of existing literature models.

Source: Dasari, Harold and Muncrief, Kinetics of the CO+NO, CO+NO+H₂ and CO+NO+H₂+H₂O reactions over Pt/BaO/Al₂O₃ monolith; 2010 American Institute of Chemical Engineers (AIChE) Annual Meeting, Conference Proceedings.

The role of CO₂ in NO_x Traps

In this paper, the authors try to elucidate the role of CO₂ in desulfation steps over Pt-BaO/Al₂O₃. In

addition, the role of CO₂ during NO_x desorption on BaO/Al₂O₃ catalysts was investigated.

Source: Kim, Kwak, Szanyi, Peden, Wang and Li, Various effects of CO₂ in Pt-BaO/Al₂O₃ lean NO_x trap catalysts; 2010 American Institute of Chemical Engineers (AIChE) Annual Meeting, Conference Proceedings.

Study on SCR Mechanisms

In this study a comprehensive steady-state and transient SCR on zeolitic monolith catalysts was carried out in bench-flow and Temporal Analysis of Products (TAP) reactors with the goal to develop mechanistically-based kinetic models for SCR reactor design and optimisation. A proposed reaction mechanism and corresponding kinetic model was developed consistent with experimental observations.

Source: Metkar, Harold, Balakotaiah and Muncrief, Kinetics and mechanistic studies of selective catalytic reduction of NO_x on Fe based zeolite monolith catalysts; 2010 American Institute of Chemical Engineers (AIChE) Annual Meeting, Conference Proceedings.

Electrically Heated catalysts for Plug-in Hybrids

The design aspects and heating strategies of an electrically heated catalytic converter system have been analysed in this study using a transient monolith converter model which accounts for the electrical heating of an inert metal-substrate monolith placed ahead of a conventional three-way catalytic converter. The results of model calculations quantify the effects of various heating strategies on the emission performance of PHEVs during the first 250 seconds of a Federal Test Procedure (FTP) drive cycle.

Source: Ramanathan, Oh and Bissett, Electrically heated catalysts for hybrid applications: Mathematical modeling and analysis; 2010 American Institute of Chemical Engineers (AIChE) Annual Meeting, Conference Proceedings.

Characterisation of Particulate

Study on PAH Associated with PM₁₀

A study was carried out at four urban and rural Spanish areas during the warm and cold seasons in 2008–2009 to quantify 19 PAH associated with atmospheric PM₁₀. The particle-bound composition of the analysed PAH was 5 and 10 times greater in industrial and urban areas, respectively when compared to those measured in rural areas. The use of molecular diagnostic ratios indicated that the possible major PAH pollution sources in the most polluted areas were pyrogenic sources, mainly attributed to petroleum combustion sources (motor vehicle emissions and crude oil combustion).

Source: Callén, López and Mastral, Characterization of PM₁₀-bound polycyclic aromatic hydrocarbons in the ambient air of Spanish urban and rural areas; *Journal of Environmental Monitoring* (2011), 13, pp. 319-327, [doi: 10.1039/C0EM00425A](https://doi.org/10.1039/C0EM00425A).

Toxicological Evaluation of Emissions with Biofuels

This study was designed to determine the toxicity (oxidative stress, cytotoxicity, genotoxicity) in extracts

of combustion aerosols. A typical Euro III heavy truck engine was tested over the European Transient Cycle with different fuels: conventional diesel meeting EN590, biodiesel meeting EN14214 as B100 and as blends with conventional diesel (B5, B10, and B20) and pure plant oil to DIN51605 (PPO). In addition application of a wall flow diesel particulate filter (DPF) with conventional diesel EN590 was tested.

In summary, the authors say that B100 and PPO have good potential for the use as a second generation biofuel resulting in lower PM mass, similar to application of a DPF, but caution should be made due to potential increased toxicity.

Source: Kooter et al, Toxicological characterization of diesel engine emissions using biodiesel and a closed soot filter; *Atmospheric Environment* (2011) 45 (8), pp.1574-1580, [doi:10.1016/j.atmosenv.2010.12.040](https://doi.org/10.1016/j.atmosenv.2010.12.040).

Climate Change and Emissions

Reduction of CO₂ and Pollutants from Land Transport

Existing technologies could reduce emissions of CO₂ and air pollutants from land transport by almost a third. But reductions will not be delivered through markets alone, according to a recent assessment, particularly for CO₂. The researchers argue that strong policy interventions will be needed.

Source: Uherek et al., Transport impacts on atmosphere and climate: Land transport. *Atmospheric Environment*, (2010) 44, pp.4772-4816, [doi: 10.1016/j.atmosenv.2010.01.002](https://doi.org/10.1016/j.atmosenv.2010.01.002).

Health Impacts of Air pollution and Climate Change

A recent study focused on shipping as a source of emissions to explore whether reducing air pollution to improve human health could increase the risk of health problems caused by climate change.

Despite a number of uncertainties about calculating the health effects caused by air pollution and climate change, the researchers suggest there are some short-term benefits from emissions that cause climate cooling. Therefore, it would be preferable to focus mitigation efforts initially on reducing pollutants that cause climate warming, such as black carbon.

Source: Löndahl, Swietlicki, Lindgren and Loft, Aerosol exposure versus aerosol cooling of climate: what is the optimal emission reduction strategy for human health? *Atmospheric Chemistry and Physics* (2010) 10, pp.9441–9449, www.atmos-chem-phys.net/10/9441/2010/acp-10-9441-2010.html, [doi: 10.5194/acp-10-9441-2010](https://doi.org/10.5194/acp-10-9441-2010).

Impact of Pollution Laws on Radiative Forcing

In this work, researchers examine the temporal and spatial trends in the concentrations of black carbon (BC) recorded for the past 20 years in California.

The authors attribute the observed negative trends to the reduction in vehicular emissions due to stringent statewide regulations. The absorption efficiency of aerosols at visible wavelengths decreased by about

50% leading to a negative direct radiative forcing (i.e. a cooling effect) of -1.4 W/m^2 ($\pm 60\%$) over California.

Source: Bahadur, Feng, Russell and Ramanathan, Impact of California's air pollution laws on black carbon and their implications for direct radiative forcing; *Atmospheric Environment* (2011) 45 (5), pp.1162-1167, [doi:10.1016/j.atmosenv.2010.10.054](https://doi.org/10.1016/j.atmosenv.2010.10.054).

Study links Cold Winters to Local Pollution

A group of researchers from the University of Gothenburg has investigated how the concentrations of NO and NO₂ in the air can be linked to the weather. The winter weather in large parts of North-West Europe is partly due to the North Atlantic Oscillation (NAO), in other words the differences in air pressure over the North Atlantic. The NAO swings between positive and negative phases depending on the differences in air pressure between Iceland and the Azores. The study has shown that the air quality standard has been exceeded more and more frequently during periods of negative NAO even though emissions have fallen in the city.

The conclusion of this study is that a climate shift towards higher or lower NAO Index has the potential to significantly influence urban air pollution in North-West Europe, and thus the possibility to reach air quality standards, even if emissions remain constant.

Source: Grundström, Linderholm, Klingberg and Pleijel, Urban NO₂ and NO pollution in relation to the North Atlantic Oscillation NAO; *Atmospheric Environment* (2011) 45 (4), pp. 883-888, [doi:10.1016/j.atmosenv.2010.11.023](https://doi.org/10.1016/j.atmosenv.2010.11.023).

FORTHCOMING CONFERENCES

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.

Luftqualität an Straßen 2011

30-31 March 2011, Bergisch Gladbach, Germany

The purpose of the colloquium is to present current research activities and measures in the field of clean air to join the existing experience and to create a basis for coordinated cooperation between transport and environmental protection.

Diesel Emissions Conference 2011 Brazil

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

Details at www.integer-research.com/conferences/dec-brazil/

Participants will discover the latest diesel emissions legislation and technology developments in Brazil, and

be part of 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

15th Conference of the International Motor Vehicle Inspection Committee (CITA)

4-6 May 2011, Berlin, Germany

Details at 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 Technical and Test Result Database Initiative.

32nd Vienna Motor Symposium

5-6 May 2011, Vienna, Austria

Details at www.oevk.at

2011 Cambridge Particle Meeting

13 May 2011, Cambridge, UK

Details at www.cambustion.com/cambridgeparticle

First held in 1998 at the Department of Engineering, University of Cambridge, the Cambridge Particle Meeting has grown to attract researchers in a range of aerosol and particle disciplines from around the world. The conference is open to all, and is free to attend.

Diesel Particulates and NOx Emissions Short Course

16-20 May 2011, Leeds, UK

Details at www.engineering.leeds.ac.uk/short-courses/automotive/

This course concentrates on the engine technology for low emissions, their fuel requirements and after-treatment techniques. Although it does not cover the details of the particulate measurement and analysis techniques it does, however, cover particle size analysis and problems with the US heavy-duty transient test with very low emissions diesel engines.

Engine Expo 2011

17-19 May 2011, Stuttgart, Germany

Details at www.engine-expo.com

Session categories include future engine and transmission developments and emissions and certificated standards.

Vehicle Emissions Reduction Conference – Criteria Pollutants and CO₂

17-20 May 2011, Detroit, Michigan, USA

Details at 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_x control. A third day will be devoted to technologies to reduce CO₂.

2011 JSAE Annual Spring Congress & Exposition

18-20 May 2011, Yokohama, Japan

Details at www.jsae.or.jp/2011haru/index_e.html

Challenge Bibendum

18-22 May 2011, Berlin, Germany

Details at www.challengebibendum.com

6th AVL International Commercial Powertrain Conference

25-26 May 2011, Graz, Austria

Details at 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.

The European Electric Vehicles Conference 2011 – will electric vehicles become a reality in Europe?

26 May 2011, Brussels, Belgium

Details at www.eu-ems.com/summary.asp?event_id=72&page_id=518

The conference will address fundamental questions::

- Has a sufficient case been made for electric vehicles and what challenges lie ahead?
- Will Europe deliver an infrastructure capable of facilitating the roll-out of electric vehicles?
- How will the consumer experience be guaranteed and what options are available to incentivise EVs?
- Will Europe be left behind or could electric vehicles spell a technological step-change?

2nd International Exhaust Emissions Symposium

26-27 May 2011, Bielsko-Biala, Poland

The conference will cover gaseous and particulate matter emissions; emissions legislation trends; emissions testing methods and equipment; the latest development trends in vehicular technology concerning improvements in emissions and fuel consumption; powertrain system development and powertrain test methods; and the composition of transport fuels and their influence on emissions.

Diesel Emissions Conference & AdBlue Forum Europe

15-17 June 2011, Dusseldorf, Germany

Details at 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 the best emissions technologies available to meet diesel emissions standards.

15th ETH Conference on Combustion Generated Nanoparticles

26-29 June 2011, Zürich, Switzerland

Deadline for abstracts 18 April 2011

The conference addresses characterization methods of nanoparticles for research, type-approval, in-use compliance testing, manufacturing control, and development of internal and external emissions control of internal combustion engines and other combustion technologies.

SAE Powertrains, Fuels and Lubricants

30 August – 2 September 2011, Kyoto, Japan

Details at www.jsae.or.jp/2011pf1

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/

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.

10th International Conference on Engines & Vehicles (ICE 2011)

11-15 September 2011, Capri, Italy

Details at 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.

10th Aachen Colloquium on Automobile and Engine technology

10-12 October 2011, Aachen, Germany

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

XIX International Symposium on Alcohol Fuels

10-14 October 2011, Verona, Italy

Much of the conference will concentrate on biofuel production, but there is a session on alcohols and biofuels end use in transport.

Details at <http://www.isaf2011.it>

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

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.

The Spark Ignition Engine of the Future

30 November-1 December 2011, Strasbourg, France

Details at

www.sia.fr/evenement_detail_the_spark_ignition_engine_caj_for_1085.htm

Abstracts due by 15 April 2011

This conference is intended to provide the opportunity for both technical experts and executives from the automotive industry, the oil industry, external analysts, research laboratories and universities to exchange their points of view and information on the potential of the future spark ignition engine to respond to the main challenges of mobility, CO₂ emissions and hybridization.