

N AECC Newsletter

Association for Emissions Control by Catalyst

Av. de Tervueren 100, B-1040 Brussels

Affiliated to CEFIC

May – June 2003

INTERNATIONAL REGULATORY DEVELOPMENTS

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EUROPE

1. Ministers push for faster Sulphur-Free Fuel Timetable

Transport ministers from over 40 European countries have stressed the need for rapid introduction of sulphur-free road fuels at a meeting in Brussels. The road transport industry association, the International Road Transport Union (IRU), went further, urging in addition tax cuts on the cleanest vehicles designed to run on sulphur-free diesel. A resolution on sulphur-free fuels was adopted at the latest meeting of the European Conference of Ministers of Transport (ECMT), held on 23-24 April. Noting that the EU had already agreed a legal timetable for their introduction, ministers underlined the importance of ensuring availability across Europe “as quickly as possible” to prevent east-west barriers to trade.

IRU focused its demands on the EU. New emission standards for diesel-powered vehicles that will effectively demand the use of sulphur-free fuels will take effect four years before member states are bound to make the fuels universally available, it complained. The timetable for introducing sulphur-free fuels should therefore be brought forward with “geographically balanced availability” of the cleaner fuels in 2004, whereas EU law requires that “limited” supplies must be on the market by 2005. It also wants the deadline for universal distribution brought forward from 2009 to 2008, when Euro V heavy-duty diesel vehicle emission norms will take effect.

2. UK challenges Car Makers to Design a Green Family Car

The UK Government is asking carmakers to design and build a new affordable, ultra low carbon family car, Alistair Darling,

Secretary of State for Transport, has announced. Although development work has started on a new generation of fuel-efficient cars – hydrogen-powered for example – these are likely to be 15 to 20 years from production. As a stepping-stone towards that, more urgent improvements are needed according to Darling. So, under a new project called the Ultra Low Carbon Car Challenge, the motor industry is being asked to submit proposals for a new car which is capable of travelling 1,000 miles before needing a refill and of being mass produced within 4 to 8 years.

Successful demonstration vehicles will be:

- A full size family car
- Affordable and capable of being mass produced within a near to medium term
- CO₂ emissions of less than 90 g/km (compared with today’s over 175g/km)
- Fuel-efficient – around 1000 miles between refills, with a 12 gallon tank
- Capable of 80 miles per gallon or more, compared to today’s average of 36 mpg.

The challenge comes at the same time as the UK government launched “Drive Cleaner, Drive Cheaper” to show car drivers how they can benefit from the lower taxation on greener fuels and vehicles and Government grants.

3. Europe's Environmental Progress at Risk

The state of the environment across Europe has improved in several respects over the past decade, but much of the progress is likely to be wiped out by economic growth because governments have yet to make significant strides towards decoupling environmental pressures from economic activity. This is one of the key messages from the European Environment Agency’s new report “Europe’s Environment: the third assessment”.

The report was prepared for the 'Environment for Europe' ministerial conference that took place in Kiev, Ukraine on 21-23 May under the auspices of the United Nations Economic Commission for Europe (UNECE). The report covers a total of 52 countries, including for the first time the whole of the Russian Federation and the 11 other Eastern European, Caucasus and Central Asian (EECCA) states.

It shows that most of the progress towards environmental improvement continues to come from "end-of-pipe" measures to limit pollution or results from economic recession and restructuring in many parts of Europe.

While highlighting wide differences in the environmental situation between and within the different regional groupings, the report confirms that environmental policies, when properly developed and implemented, have in several fields led to significant improvements in the environment and to lower pressures on it.

In the field of transport a marked shift towards road and aviation in place of more environment-friendly modes is under way, increasing energy consumption and greenhouse gas emissions.

Human health continues to face a range of environment-related threats. Exposure to particulate matter is now the biggest threat to human health from air pollution in western European cities.

The report concludes that the formulation and implementation of policies that take full account of environmental concerns need to be accelerated if Europe is to ensure proper protection of its environment and succeed in making the transition to more sustainable development.

4. International Workshop concludes more needs to be done in EU

The German Federal Ministry hosted an International Workshop on the implementation of the EC Air Quality Directives within the framework of the CAFE Program for the Environment, Nature Conservation and Nuclear Safety at the German Federal Environmental Agency (UBA) in Berlin on 1-3 April 2003.

The outcome of the workshop was summarised as follows:

Since the 1980/90's, air quality has significantly improved in the EU Member States, Accession Countries and other European countries. European air quality daughter directives, new vehicle emission standards, the improvement of fuel quality, the Directive on National Emission Ceilings (NEC), the Directive concerning Integrated Pollution Prevention and Control (IPPC) and the Large Combustion Plants Directive (LCP) as well as the Gothenburg Protocol are major steps towards the improvement of regional air quality.

However, some recently set European air quality standards are still not met. The main problems in meeting European standards concern PM₁₀, and NO₂, especially in densely populated areas and next to other specific emission sources. Relevant sources causing non-compliance include:

- Road traffic, especially heavy duty vehicles (HDV)
- Off-road machinery
- Other combustion engines (e.g. machinery on construction sites).

During the workshop, several approaches towards implementing air quality directives by establishing air pollution abatement plans and programs were presented. Most of the measures in the plans focus on traffic

management, competitive advantages for environment friendly public transport, charges and financial incentives and technical measures such as diesel exhaust filters as well as low emission vehicles.

5. Council & European Parliament discuss Non-Road Mobile Machinery emissions

At the Environment Council on 13 June, Environment ministers of the European Member States reached agreement on a general approach to amend Directive 97/68/EC dealing with emissions from Non-Road Mobile Machinery (NRMM) i.e engines not intended for the transport of goods or passengers on the road.

The draft Directive, adds to the previous scope inland waterway vessels (e.g. tugs or pusher craft which are built to tow or push vessels of 20m or more).

Following this, the draft report on NRMM emissions from the rapporteur, Bernd Lange, was considered for the first time in the Environment Committee of the European Parliament on 16 June.

The key points in Lange's draft report are:

- Renaming 'Stage IIIB' (around 2010) to 'Euro IV',

- Strengthening the HC+NO_x limit value for engines with Power >75kW down to 1.0 g/kWh and to 3.5 g/kWh for engines with Power <75kW,

- Particulate Matter (PM) limit equal to 0.025g/kWh, confirming the value proposed by the Commission after the discussions with the GEME working group,

- An intention to introduce a 'cold start' at ambient temperature (though the text in the technical annexes is unclear) for both the steady state and transient tests,

- An extension of the scope of the new Directive to all railway applications (railcars

AND locomotives) -also for >560kW- and to inland waterway vessels,

- A further Euro IV step for all these railway applications and inland waterway ships, thus recognising the need for further emissions reductions in the future (mentioning SCR technology to reduce NO_x),

- Not-To-Exceed values for all engine operation modes set at 100% higher than Type-Approval values,

- Specific clauses on defeat devices and irrational control strategies,

- Alignment with on-road standards, technologies and fuels, and with US standards.

There will be further consideration of a derogation for lifeboats. For some MEPs there remain concerns on tractors. These are covered by a separate directive, but it refers to alignment with the NRMM requirements.

6. EU MEPs bid to clean up EU Shipping Fuels

The European Parliament has voted almost unanimously for strict sulphur limits in marine fuels going far beyond proposals tabled by the European Commission. A 1.5% limit on marine fuel sulphur content should initially apply throughout the EU, said MEPs, with an even stricter limit of 0.5% two years later. Current marine fuel sulphur content is around 2.7%.

The Commission proposals were limited to the implementation of a "Marpol" agreement on a 1.5% sulphur cap just in three special zones: the North and Baltic seas and the English channel. The restrictions would come in twelve months after the directive enters force. But the parliament voted for a lower sulphur limit, to take effect six months earlier, and to be extended to all EU waters by 2010. Furthermore, there would be a second stage of cuts, to 0.5% sulphur, applicable from

2008 in the three pollution control zones and on ferries, and from 2012 in all EU waters. The limits would apply to shipping registered anywhere in the world and regardless of their originating port.

Pilot trials of abatement technologies using higher sulphur fuel would be permitted for up to 18 months, following this the Commission would have to consider which technologies might be permitted as an alternative to low sulphur fuel.

7. EU Greenhouse Gas Emissions Increase

Greenhouse gas emissions in the EU have gone up for a second consecutive year, according to a report published by the European Environment Agency on 6 May.

10 of the 15 Member States (Austria, Belgium, Denmark, Finland, Greece, Ireland, Italy, Netherlands, Portugal and Spain) are heading to seriously exceed their agreed share of emissions. The biggest increases between 2000 and 2001 occurred in Austria and Finland.

8. EU Parliament approves Agreement on Recreational Craft

Council and Parliament reached agreement on amendments to Directive 94/25/EC on recreational craft. The proposed new Directive includes design and construction requirements for personal watercraft and regulates noise and exhaust emissions produced by propulsion engines for recreational craft and personal watercraft that were not covered by the previous Directive (94/25/EC). Moreover, it fixes limit values for exhaust emissions of carbon monoxide (CO), hydrocarbons (HC), nitrogen oxides (NOx) and particulate pollutants.

The agreement needed to be endorsed by the Parliament (majority of votes cast) and the Council (qualified majority voting procedure) for the Directive to be adopted.

On 14 May Parliament adopted the agreement reached in conciliation. Most of the amendments tabled by Parliament's delegation to the Conciliation Committee are now incorporated in the joint text, either in full or in a reworked form.

Key elements in the agreement are:

- Replica diesel engines installed in craft built for own use will be exempt from the exhaust and emission requirements
- The Council accepted a minimum 3dB noise allowance for all engine types
- Parliament dropped its demand for a specific provision in favour of a system of non-compliance.

The Parliament and Council delegations have agreed on a final text that includes a list of issues to be dealt with by the executive committee. Furthermore, it was agreed that steam powered craft with regard to design and construction be excluded from the directive.

Finally, the Commission will submit a report on the possibilities of further improving the environmental characteristics of engines and consider the need to revise the boat design categories.

NORTH AMERICA

9. CARB modifies Zero Emission Vehicle Regulation

The California Air Resources Board (CARB) has voted to make significant modifications and upgrades to the state's zero emission vehicles (ZEV) regulations. The most important modification creates a new ZEV pathway, giving manufacturers a choice of two options for meeting their ZEV

requirements.

1. Auto manufacturers can meet their ZEV obligations by meeting standards that are similar to the ZEV rule, as it existed in 2001. This means using a formula allowing a vehicle mix of 2% pure ZEVs, 2% AT-PZEVs (vehicles earning advanced technology partial ZEV credits) and 6% PZEVs (extremely clean conventional vehicles). The ZEV obligation is based on the number of passenger cars and small trucks a manufacturer sells in California.
2. Or, manufacturers may chose a new alternative ZEV compliance strategy, meeting part of their ZEV requirement by producing their sales-weighted market share of approximately 250 fuel cell vehicles by 2008. The remainder of their ZEV requirements could be achieved by producing 4% AT-PZEVs and 6% PZEVs. The required number of fuel cell vehicles will increase to 2 500 from 2009-11, 25 000 from 2012-14 and 50 000 from 2015 through 2017. Automakers can substitute battery electric vehicles for up to 50% of their fuel cell vehicle requirements.

With the ZEV regulations on hold for 2003-04 because of automaker lawsuits, the above requirements will not fully go into effect until 2005. However, automakers can receive credit for any ZEV, PZEV or AT-PZEV vehicles they choose to sell or lease in 2003-04.

10. Non-Road diesel equipment report from NESCAUM

The Northeast States for Coordinated Air Use Management (NESCAUM), with researchers from Keene State College and the University of Massachusetts Lowell have published an interim report on the

Environmental Impact of Non-road Diesel Equipment in the Northeast United States. The objective of this work was to evaluate the potential health risks from non-road sources by monitoring selected hazardous air pollutant and particulate matter exposures in the cabin of operating non-road diesel equipment and at the perimeter of the active work site.

Diesel equipment emissions from the agricultural, construction (building and roadway), and lumber industries were examined. The interim report covers data from three of the five sites assessed. For each location, the researchers used established federal methods to monitor the daily average exposures, and in some cases minute-to-minute exposures, to diesel soot, fine particulate matter (PM_{2.5}), acetaldehyde, benzene, and formaldehyde. In addition to these analyses, measurement techniques were used to provide qualitative and quantitative analyses of the metal content of selected PM_{2.5} samples.

The initial findings were that:

1. In all locations, diesel equipment activity substantially increased fine particulate matter exposures for workers and nearby residents, in some cases by as much as 16 times.
2. Individual workers' estimated 24-hour exposures can exceed current air quality standards by nearly 2 to 3.5 times – substantially increasing workers' health risk.
3. The most potent portion of particulate matter (PM 2.5) – diesel particulate matter – was estimated to exist at levels that pose risk of chronic inflammation and lung damage in exposed individuals.

4. As many as 200 000 workers may be exposed to these harmful concentration levels of non-road equipment emissions in the Northeast region.
5. Measured concentrations of acetaldehyde, benzene, and formaldehyde around the tested non-road equipment operations were as much as 140 times the federally established screening threshold for cancer risk.
6. Concentrations of metals such as iron, nickel and vanadium, are elevated in samples collected around non-road equipment. These metals are known to cause inflammatory responses and damage in pulmonary cells.

The report is available at <http://64.2.134.196/mobile/rpt030609nonroad.pdf>

11. Whitman resigns as Administrator of US EPA

EPA Administrator Christie Whitman has resigned as Administrator of the US Environmental Protection Agency, effective 27 June 2003. In a letter to President Bush, Mrs. Whitman said the reason for leaving was her desire to return to her home life in New Jersey.

12. Health & Environmental Groups compel EPA to schedule Air Quality Standards Update

A court settlement has been announced between the US Environmental Protection Agency and a coalition of environmental and public health groups that offer the prospect of improved air quality standards across the country. In the settlement, EPA agreed to a schedule for reviewing national standards for soot (particles) and smog (ozone) and strengthening them if appropriate in light of recent scientific evidence.

The air quality standards to be reviewed were set in 1997, in response to data showing that the previous standards were inadequate to protect public health and welfare. The Clean Air Act requires that these health-based standards be reviewed and as appropriate, revised every five years to ensure that they reflect the latest scientific research.

13. EPA and EMA agree on In-use Truck Test Programme

The US Environmental Protection Agency (EPA) and the Engine Manufacturers Association (EMA) have reached a settlement agreement that will result in a manufacturer-run, in-use emissions testing programme for heavy-duty diesel trucks. The in-use testing programme will measure exhaust emissions from diesel engines using portable onboard emission measurement systems. EPA will propose the detailed regulatory provisions for this programme within approximately one year. As part of the agreement EPA will issue guidance documents that will provide engine manufacturers additional certainties and details of the requirements they must meet in testing and certifying their engines.

The new testing programme will assess in-use exhaust emissions from heavy-duty diesel trucks using portable emission measurement systems for the first time.

ASIA-PACIFIC

14. Australia MVEC issues Vehicle Emissions and Fuel Standards Review

The Australian Motor Vehicle Environment Committee (MVEC) is undertaking a review of vehicle emissions and fuel standards for Australia post 2006. The Commonwealth Department of Transport and Regional Services (DOTARS) and Environment

Australia (EA) on behalf of the MVEC are jointly managing the review.

The review is comprised of the following main elements:

- Consideration of the vehicle emissions standards post 2006
- Consideration of the fuel standards required to support any new emissions standards
- Examination of complementary measures, including non-regulatory policy options.

A discussion paper has been developed that provides a stimulus for public comment to assist the setting of appropriate fuel quality and emissions standards for Australia. These standards will also provide the legal framework for initiatives to support cleaner vehicles and fuels, including the Commonwealth Government's Budget announcement on incentives to promote cleaner fuels.

15. South Korean Parliament urges New Air Quality Legislation this year

South Korea's National Assembly has adopted a resolution calling for government action to reduce air pollution in Seoul and areas surrounding the capital city. Citing "serious" pollution levels in the region, lawmakers urged the government to act on its proposed legislation to introduce special measures aimed at increasing central-government control over air quality in the region. The resolution was issued on 29 April.

The level of atmospheric particulate matter in Seoul is 3.5 times and 1.7 times as high as in London and Tokyo, respectively, contributing to serious health problems, they said.

The proposed special law calls for increased involvement by the central government in setting emissions limits specific to a province, a city, a county, a factory, and even an automobile. As a market-oriented enforcement mechanism, businesses in the affected region would be allowed to buy and sell emissions rights.

Public opinion is overwhelmingly in favour of the special law, according to a survey released by the environment ministry. About 80% percent of 1 000 residents in the capital region surveyed said they support the legislation. In addition, 60% rated air pollution in their region as "serious" or "very serious".

16. Japanese Proposal would cut Emissions from Motorcycles by 2007

The Ministry of the Environment released on 22 April for public comment a proposal for what it expects to be the world's toughest motorcycle emissions regulations, part of the ministry's drive to reduce emissions causing respiratory ailments and photochemical smog. The proposals call for reducing:

- nitrogen oxide emissions from motorcycles (with four-stroke, reciprocal engines) of all engine sizes to 0.15 g/km by 2007, compared with 0.51 g/km under a 1999 regulation
- hydrocarbons to 0.3-0.5 g/km from the present regulation of 2.93 g/km by 2007
- carbon monoxide from 20 g/km to 2.0 g/km by 2007.

The proposed regulations do not cover particulate matter.

Hydrocarbons released from motorcycles driven in Japan account for up to 20% of total hydrocarbon emissions from all motor vehicles, according to an official of the ministry's Environmental Administration Bureau.

Motorcycles used on Japanese roads must be able to meet the new targets after 24 000 km (15 000 miles) of use, instead of the present requirement of 12 000 km (7500 miles), the statement said. Motorcycles must be able to meet the targets under Japan's 15-mode test procedure, which includes idling, acceleration, and deceleration modes.

17. Thai Agencies to step up Action against Diesel Vehicles

The Ministry of Natural Resources and Environment's Pollution Control Department (PCD) is considering tough new measures to remove polluting buses and trucks from Bangkok's streets but is likely to stop short of declaring a total ban on offending vehicles. Speaking after a 26 April meeting with Bangkok police and Land Transport Department (LTD) officials, PCD Deputy Director General Supat Wangwongwatana said the three agencies would propose new regulations to the Thai government that would empower LTD officers to ban large vehicles with diesel engines from inner city Bangkok. Current legislation allows the LTD to take action against polluting vehicles only in Bangkok's suburbs.

The new regulations could come into effect as early as June after approval by the Thai Cabinet.

18. Australia to Boost Fuel Excise Duties to stimulate Low Sulphur Fuel sales

The Australian government will boost excise levels on gasoline and diesel fuels in order to speed the use of low-sulphur gasoline and diesel, Treasurer Peter Costello announced in his 13 May budget speech for the 2003-2004 fiscal year. From 1 January 2006, the government will increase the excise duty on gasoline for two years so as to fund grant payments for the production or import of low-sulphur gasoline (less than 50 ppm). Similar arrangements will come into force on 1 January 2007, to fund grants for importing or producing ultra low-sulphur diesel (less than 10 ppm).

19. Australian Ministers approve National Standard for reporting Fine Particulate Matter Levels

Australia's federal, state, and territory environment ministers approved on 23 May a national reporting standard for fine particles with a diameter of 2.5 micrometers or less (PM-2.5). The standard obliges states and territories to report any identified occurrences of PM-2.5 levels in ambient air exceeding a one-day average of 25 micrograms per cubic meter or an annual average of 8 micrograms per cubic meter. Reports on any such occurrences must be submitted annually to the ministerial council that approved the standard, the Environment Protection and Heritage Council (EPHC). States and territories must also report any action they take to deal with high levels of PM-2.5.

The EPHC meeting also released a draft national environment protection measure on air toxics. This specifies investigation standards for formaldehyde (one-day average of 0.015ppm), benzene (annual average of 0.003 ppm), and polycyclic aromatic hydrocarbons (annual average of 0.3 nanograms per cubic meter).

GENERAL

20. Air Regulators call Sulphur the “Lead of the New Century”

Leading pollution regulators and technology experts from around the world issued a statement calling sulphur in fuel “the lead of the new century” – warning governments that sulphur threatens to become the next major obstacle to clean air. The International Council on Clean Transportation (ICCT) called on countries to implement cost-effective measures quickly to dramatically reduce sulphur levels in fuel.

Members of the ICCT, supported by the Hewlett Foundation and the Energy Foundation, collaborate as expert individuals to develop strategies for deploying clean vehicle technologies. The Council includes leading air regulators such as Dr. Alan Lloyd of the California Air Resources Board, Margo Oge of the US Environmental Protection Agency, scientists such as Nobel Prize-winning chemist Dr. Mario Molina of the Massachusetts Institute of Technology, and vehicle experts such as Professor Yasuhiro Daisho of Waseda University. The largest auto markets and auto-producing nations in the world are represented on the Council, including the United States, the European Union, Germany, Great Britain, Japan, China, India, Brazil, Mexico, and Thailand.

The ICCT statement was issued in conjunction with release of “Low-Sulfur

Gasoline & Diesel: The Key to Lower Vehicle Emissions.” The report outlines advances in emission control technologies for gasoline and diesel vehicles, identifies high sulphur fuel as a serious obstacle to introducing these technologies, and analyses the costs of removing sulphur from fuels. The report notes that many countries are still burdened by very high sulphur levels; for example, sulphur limits in some Asian countries can be as high as 10 000 ppm, 1 000 times higher than the sulphur content of the cleanest fuels available today in some European countries. Citing studies in Asia, the US and Europe, the report concludes that moving directly to near-zero sulphur fuels provides significant and cost-effective public health benefits. The report is available at:

<http://www.cleantransportcouncil.org/>.

Fuels with high sulphur content significantly impair or, in some cases, can entirely prevent the use of advanced pollution control technologies such as oxidation catalysts, particulate traps, nitrogen oxide catalysts and exhaust gas recirculation. These technologies, used with near-zero sulphur fuels (about 10 ppm), greatly reduce not only fine particulate (PM-2.5) - the most dangerous airborne pollutant - and sulphur dioxide, but also carbon monoxide (CO), hydrocarbons (HC) and nitrogen oxides (NO_x).

The United States, the European Union and Japan have led the way in sulphur reduction and will reach near-zero sulphur levels for fuels used in on-road vehicles later this decade. But even in these leading countries non-road diesel fuel, used to power trains, ships, tractors, construction equipment and other heavy use engines, continues to contain high levels of sulphur and produce excessive pollution.

21. New Studies indicate Child Respiratory Disease is apparently induced by Traffic Pollution

Child respiratory disease is apparently induced, not just exacerbated, by traffic pollution according to two new studies to be published in the June issue of the European Respiratory Journal (ERJ). Asthma, allergic rhinitis, a dry cough and wheezing in children can all be caused by traffic pollution, according to these two independent studies, conducted in Taiwan and Germany, which monitored over 315 000 children in total.

FORTHCOMING CONFERENCES

Engine Emissions Measurement

23-27 June 2003, University of Leeds, UK

Details from:

www.leeds.ac.uk/fuel/shortc/sc.htm

A short course to explain the function of on-line gas analysis and emission measurements from gas turbine, diesel and spark ignition engines.

Clean Air 2003 – Seventh International Conference on Energy for a Clean Environment

7-10 July 2003, Lisbon, Portugal

Details from: <http://navier.ist.utl.pt/cleanair>

The conference will deal with the reduction of local and global environment degrading emissions and aims at a better integration of supply and demanding side, while covering all the end users sectors with emphasis on industry and transport.

European Congress on Advanced Materials and Processes - Euromat 2003

1-5 September 2003, Lausanne, Switzerland

Organised by Deutsche Gesellschaft für Materialkunde e.V. The full call for papers is available on the conference website: <http://www.euromat2003.fems.org>

SAE Toptec

Heavy Duty Diesel Emissions Control

23-25 September 2003, Gothenburg, Sweden

Details from:

http://www.sae.org/contedu/tt_hddiesel.htm

Sessions on policy and regulation, engine development, market development, emission control technologies, future standards and system integration; visit to Volvo Emissions Testing Laboratory.

6th International Congress on Catalysis and Automotive Pollution Control (CAPoC6)

22-24 October 2003, Brussels

Details from CAPoC6 web site:

<http://www.ulb.ac.be/sciences/cpmct/capoc6/index.html>

Covers applications and requirements of catalysis in automotive (including cars, light and heavy duty vehicles) emission control, including catalyst technologies, fuel cell catalysis, materials for catalysts, washcoat and fuel-borne catalysts, particulate emission control, lean NOx emission control, unregulated pollutants, integrated emission control systems and alternative fuel technologies.

World Automotive Congress FISITA 2004

23-27 May 2004, Barcelona, Spain

Call for papers, deadline for abstracts is 31 May 2003, more on www.fisita2004.com

FISITA is a global conference on automotive technology with a session on “vehicles and the environment” dealing with, amongst other topics, emissions.

15th International AVL Conference Engine & Environment

3-4 November 2003, Graz, Austria

Details from: www.avl.com

Automotive industry leaders and specialists will address the following issues: market requirements, efficient powertrains, drivetrain application and calibration and engine/vehicle/drivetrain integration.

2004 SAE World Congress

8-11 March 2004, Detroit, USA

Details from:

<http://www.sae.org/congress/index.htm>

Call for Papers, abstracts should be submitted (on-line) before 1 June 2003.