March 2017

NEWSLETTER

International Regulatory Developments

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EUROPE

Mayors announce Car Identification Scheme based on Real-World Emissions

On 29 March 2017 the Mayor of Paris and C40 Chair Anne Hidalgo and Mayor of London Sadiq Khan announced the development of schemes to score new cars based on their real-world emissions and their impact on air quality.

The new schemes will allocate each car model with a score, based on all of the air pollutants it releases during real-world, on-road conditions. The scores will be made easily available to citizens through dedicated websites. Paris and London have committed to launch their data online by the end of 2017.

To underscore the importance of robust and transparent information on real-world emissions, Ms Hidalgo also announced a commitment from Bloomberg Philanthropies, FIA Foundation and the Joshua and Anita Bekenstein Charitable Fund to enable C40 Cities to work with the International Council on Clean Transportation (ICCT) and Emissions Analytics to measure vehicle emissions with remote sensors and portable emissions monitoring equipment.

The announcement was made following a closed-door meeting between Mayors, senior city officials and representatives of several major car manufacturers, designed to find ways to accelerate the transition to low-emission and electric cars.

Several other C40 cities, including Seoul, Madrid, Mexico City, Milan, Moscow, Oslo and Tokyo have committed to work with C40 to develop a global scoring system.

Parliament Hearing on European Strategy for Low-Emission Mobility

On 22 March 2017 the Transport Committee (TRAN) of the European Parliament held a public hearing on a European Strategy for Low-Emission Mobility.

The hearing was moderated by the Rapporteur of the own-initiative Report MEP Bas Eickhout (Netherlands, Greens). Mr Sánchez-Vicente of the European Environment Agency (EEA) summarized the issues of air pollution and greenhouse gas emissions from transport. Transport is responsible for 25% of GHG emissions in Europe today and is the only sector which is above its 1990 level. Improvement in car fuel efficiency in the EU have been offset by an increase in transport. Since passenger transport is forecasted to increase by 40% between 2015 and 2050 and freight transport by 58% in the same period, fundamental changes are required, he said.

Mr Jonnaert, Secretary General of the European Automobile Manufacturers' Association, ACEA, highlighted the five pillars of the industry when it comes to low emission mobility: emissions testing has to be done in the right way following the new WLTP test procedure; fuel combustion powertrain needs further optimization especially with RDE-compliant diesels; a transition phase is needed with low emission vehicles towards zero-emission vehicles and this includes 2nd generation biofuels, gas, and electrification; the potential of digitalization needs leveraging with Intelligent Transport Systems and autonomous driving; and new business models such as car sharing are to be further developed. When it comes to policy, ACEA calls for an integrated and comprehensive approach that addresses Greenhouse Gas (GHG) and pollutant emissions. More coordination is required to avoid scattered patterns across Europe. Fleet renewal is essential and incentives stimulating clean vehicles in EU Member States should be more harmonized; at least with exchange on best practices.

A great deal of attention was paid to multi-modality and the increased need for cooperation between different modes of transport to enhance efficiency and make the best use of each transport mode, as well as to the importance of changing human behaviour towards favouring low-emission mobility.

In the context of the hearing, the Parliament published on 21 March 2017 a briefing "Towards low-emission EU mobility". The briefing can be downloaded at www.europarl.europa.eu/RegData/etudes/BRIE/2017/599356/EPRS_BRI(2017)599356_EN.pdf.

Consultation on NEDC-WLTP CO_2 Correlation for Vans

On 22 March 2017 the European Commission launched a public consultation on the draft implementing Regulation setting out a methodology for determining the correlation parameters related to the change from the NEDC to WLTP test procedure for CO_2 emissions measurement of light commercial vehicles.

The draft Regulation provides calculation methods for the average specific CO_2 emissions of a manufacturer in the calendar years 2017 to 2020 when WLTP is progressively introduced.

This public consultation is organized ahead of the adoption of the text by EU Member States under the comitology process.

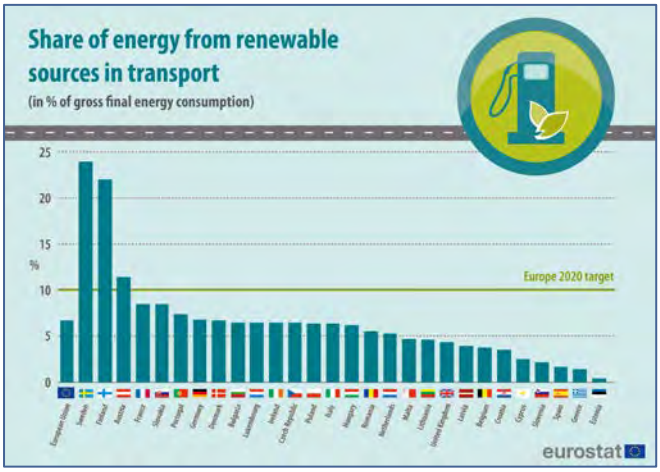
The consultation is open until 19 April 2017 and is at http://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-1543352_en.

6.4% Renewable Energy Share in EU Transport Fuel in 2015

On 14 March 2017 Eurostat released data on transport fuels from renewable energy sources.

Eurostat indicated that in 2015 the share of energy from renewable sources in gross final consumption of energy in the EU reached 16.7%, getting closer to the 2020 target of 20%.

The Europe 2020 strategy however also has a specific sub-indicator on the share of transport fuels that comes from renewable sources. The target for this sub-indicator is 10%. Overall in 2015 the share of energy from renewable sources in transport in the EU stood at 6.7% in 2015, compared with 1.4% in 2004.



Sweden (24% of renewable fuel energy used in transport), Finland (22%) and Austria (11.4%) were the three Member States to have already reached the 10% 2020 transport target. France and Slovakia (both 8.5%) were relatively close to achieving the target. Most of the other EU Member States were around the half-way point to meeting their 2020 objective. Estonia (0.4%), Greece (1.4%), Spain (1.7%), Slovenia (2.2%) and Cyprus (2.5%) were the Member States furthest from the 10% target.

Commission Report on Implementation of End-of-Life Vehicles Directive

On 27 February 2017 the European Commission released its report COM(2017) 98 final on the implementation of the end-of-life vehicles Directive for the periods 2008-2011 and 2011-2014.

Directive 2000/53/EC on End-of-Life Vehicles (ELV) primarily aims to prevent the production of waste from vehicles and their components so as to reduce the final disposal of waste and its overall environmental impact.

According to the Commission report based on mandatory reports from the 28 EU Member States, the implementation of the ELV Directive is mainly positive with the notable exception of the issue of the ELV of unknown whereabouts. Member States have reported good practices working with manufacturers on the composition of materials and the reuse of materials and components, ecodesign is continuously improving, hazardous substances used in cars are almost eliminated, and targets for reuse/recycling/recovery are largely met.

By 2013, almost all Member States had reached the 2006 ELV targets of 80% reuse/recycling and 85% reuse/recovery. 9 Member States had already reached the 2015 targets of 95% for reuse/recovery and 17 Member States had reached those of 85% for reuse/recycling per vehicle.

Nevertheless, the quality of monitoring data for the targets set in the Directive is a continuing challenge. Improved annual reporting on the ELV targets, accompanied by national reporting methodologies, will help improve the monitoring of the implementation of the ELV Directive.

Report COM(2017) 98 final is at http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2017:98:FIN.

Public Consultation on National Clean Air Strategy for Ireland

On 1 March 2017 the Irish Ministry for Communications, Climate Action and Environment launched a public consultation on Ireland's first National Clean Air Strategy, "Cleaning our Air".

The strategy will provide the framework for policies and drive actions to reduce harmful emissions from a range of sources, and clean the air in Ireland. It will address a wide range of national policies that are relevant to air quality including domestic heating from solid fuels, transport, energy and agriculture.

The public consultation is open until 28 April 2017 and is at www.dccae.gov.ie/en-ie/environment/consultations/Pages/National-Clean-Air-Strategy-Consultation.aspx.

On 3 March 2017 the Directorate General for Environment of the European Commission announced it held its first Clean Air Dialogue with Ireland to promote actions to improve air quality and contribute to Ireland's implementation of EU clean air legislation.

The dialogue focused on the main challenges faced by Ireland, including emissions from agriculture, transport and residential solid fuel combustion – as reflected in the recently started public consultation process to inform development of a National Clean Air Strategy for Ireland.

Traffic related NO_2 emissions are high in Dublin and there is a possible risk of exceedances of the EU limit value in Dublin in the near future, which will need to be kept under review the Commission said. The Irish authorities should be prepared to take short- and medium-term measures to reduce NOx emissions from the current and future road vehicle fleets. Ireland is already considering a broad range of possible measures to promote low carbon transport,

sustainable urban development and congestion reduction objectives that are also relevant for improving air quality.

UK Parliament Inquiry into Air Quality

On 20 March 2017 four influential Committees in the UK Parliament launched a joint inquiry into the scale and impact of the UK's air pollution crisis.

The Environment Food and Rural Affairs Committee, the Environmental Audit Committee, the Health Committee, and the Transport Committee will hold four evidence sessions to consider mounting scientific evidence on the health and environmental impacts of outdoor air pollution.

MPs will examine whether revised UK Government plans will go far enough to cut pollution, not only to meet legal limits but also to deliver maximum health and environmental benefits.

The Committees will be considering the following questions:

- How effectively do Government policies take account of the health and environmental impacts of poor air quality?
- Are the Government's revised plans for tackling NO_2 levels sufficient to meet the High Court and European Commission requirements for urgent action?
- Does the revised plan set out effective and proportionate measures for reducing emissions from transport?
- Is there sufficient cross-government collaboration to ensure the right fiscal and policy incentives are adopted to ensure air quality targets are achieved?

Barcelona Traffic Air Pollution Plans

On 6 March 2017 the Catalan government in Spain and Barcelona metropolitan, provincial and city administrations agreed to cut pollutant emission levels from traffic, particularly those of NO_2, by 10% within five years and by 30% within 15 years.

Access restrictions will be introduced gradually within a low emission zone. From 1 January 2019 pre-Euro 1 vans and passenger cars will be banned from 40 municipalities from Monday to Friday. This affects around 106 000 cars and 22 000 vans. The same restriction will apply from December 2017 during episodes of poor air quality. Each of the 40 municipalities may apply more stringent restrictions according to their needs.

In addition, end-of-life certificates for diesel vehicles built before 2005 and petrol vehicles built before 1996 will entitle owners to three years of free public transport within the metropolitan area; incentives will be given for the purchase of low-emission vehicles.

The authorities will also study the creation of both a congestion charge in the metropolitan area and a surcharge on road fuels in order to finance the reduction in the price of public transport. Conclusions will be published before the end of 2017.

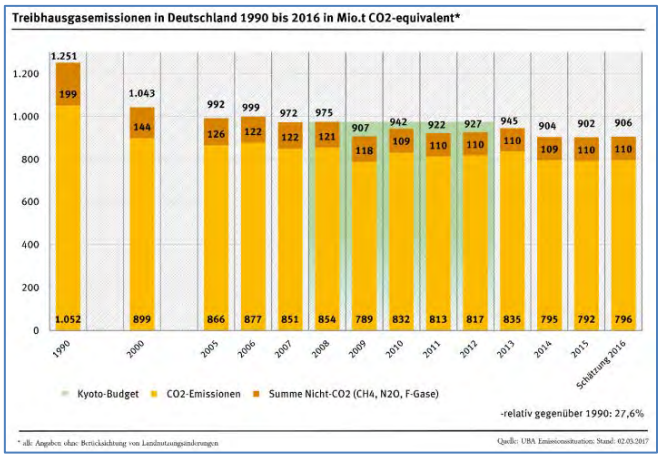
The authorities have also agreed to establish a joint body to analyse the impact of air pollution on health and to monitor the impact of the agreed measures.

2016 Greenhouse Gas Emissions Inventory in Germany

On 20 March 2017 the Federal Environment Agency of Germany (UBA – Umwelt Bundesamt) released preliminary estimates of greenhouse gas (GHG) emissions for 2016.

The UBA said almost 906 million tonnes of GHG were released in 2016 in Germany, which is 4 million tonnes more than in 2015.

Emissions in the transport sector rose the most, with 5.4 million tonnes more than 2015, an increase of 3.4%. The increase in traffic emissions is due in particular to the fact that more diesel has been fuelled and that road transport has grown by 2.8%. "Climate emissions of traffic are now 2 million tonnes above the 1990 level. If the traffic sector does not move quickly, we will miss our climate protection targets" said UBA President Maria Krautzberger.



The 2020 target for Germany is to cut GHG emissions by 40%. However, the country has only managed a 27.6% reduction so far, UBA noted.

The UBA also said that CO_2 emissions from the energy sector fell again in 2016 despite a slight increase in electricity generation. Electricity generation from renewable energy sources was only slightly higher than in 2015. The generation of wind and photovoltaic electricity even declined due to weather conditions.

NORTH-AMERICA

US to reconsider 2022-2025 Light-duty Vehicles' GHG Standards

On 15 March 2017 the US Environmental Protection Agency (EPA) Administrator Scott Pruitt and Department of Transportation Secretary Elaine Chao announced that EPA intends to reconsider the final determination, issued on 12 January 2017, that recommended no change to the greenhouse gas (GHG) standards for light-duty vehicles for model years 2022- 2025.

In accordance with the schedule of the 2012 final greenhouse gas emissions standards for model years 2017-2025, the EPA intends to make a new Final Determination regarding the appropriateness of the 2022-2025 GHG standards no later than 1 April 2018.

More info is at www.epa.gov/regulations-emissions-vehicles-and-engines/midterm-evaluation-light-duty-vehicle-greenhouse-gas-ghg%23final-determination.

California Clean Air Strategy approved

On 23 March 2017 the California Air Resources Board (CARB) approved the State Strategy for the State Implementation Plan (State SIP Strategy), which describes CARB's commitment for further reducing vehicle emissions needed to meet federal air quality standards over the next 15 years.

The State SIP Strategy maps out a comprehensive suite of actions to deploy the next generation of clean vehicles, equipment and fuels. These include a portfolio of new engine standards for cars and trucks, and the durability and inspection requirements to ensure these vehicles remain clean over their lifetime. The strategy also includes enhanced deployment of zero-emission technologies, cleaner burning fuels, and innovative pilot and incentive programs to accelerate the deployment of this cleaner technology.

In parallel to actions at the State level, CARB will continue to call for strong US federal action to develop more stringent engine standards for cars, trucks, ships, aircraft and locomotives.

Canada proposes Phase 2 GHG Emissions Standards for Heavy-Duty Trucks

On 4 March 2017 a proposal to amend Canadian heavy-duty vehicle and engine greenhouse gas (GHG) emissions regulations with Phase 2 standards was published in the Canada Gazette.

The Phase 2 standards for vehicles and engines would begin in 2021, and new standards for trailers (not regulated at Phase 1) would begin in 2018. These standards would increase in stringency every three model years to the 2027 model year and maintain full stringency thereafter.

Phase 1 standards, finalized in 2013, affected vehicles and engines in model years 2014 through 2017.

The proposal is at http://gazette.gc.ca/rp-pr/p1/2017/2017-03-04/html/reg1-eng.php.

ASIA PACIFIC

ICCT Summary of China 6 Emissions Standard

On 16 March 2017 the International Council on Clean Transportation (ICCT) published a policy update on the China 6 standard released by the Ministry of Environmental Protection (MEP) of the People's Republic of China on 23 December 2016.

The China 6 standard applies to light-duty vehicles (M1, M2, and N1 categories up to 3500 kg of maximum mass per the European regulatory classification) powered primarily by gasoline or diesel.

Unlike the previous standard phases, which closely follow the European emission standards, the China 6 standard combines best practices from both European and US regulatory requirements in addition to creating its own. Specifically, the standard features:

- Two sets of fuel-neutral emission limits – China 6a (from 1 July 2020) and 6b (from 1 July 2023) – for air and climate pollutants, including carbon monoxide (CO), total hydrocarbons (THC), nitrogen oxides (NOx), particulate matter (PM), particle number (PN), and nitrous oxide (N_2O);
- A shift from the New European Driving Cycle (NEDC) to the World Harmonized Light Vehicle Test Procedures (WLTP);
- Real-Driving Emissions (RDE) testing and requirements for China 6b, based on European RDE provisions but with some differences such as exclusion of cold start emissions, Conformity Factors set to 2.1, and 'further extended conditions' covering altitudes up to 2400m;
- On-Board Diagnostics (OBD) provisions based on the US OBD II program;
- Evaporative and refuelling emissions control requirements equivalent to the US Tier 2 requirement with a streamlined test procedure;
- Introduction of a low temperature (-7°C) testing requirement and emission limits for CO, THC, and NOx for both gasoline and diesel vehicles; and
- A multi-component compliance program involving agency- and manufacturer-run emission tests during pre-production, production, and in-use stages, and China's first emissions warranty and defect reporting programme.

Table 1. Emission Limits for Type I Test Under China 6a and 6b

Vehicle Category[1]/Test Mass (kg)		CO (g/km)	THC (g/km)	NMHC (g/km)	NO_x (g/km)	N_2O (g/km)	PM (g/km)	PN[2] (#/km)
China 6a								
I	All	0.7	0.1	0.068	0.06	0.02	0.0045	6.0×10^{11}
II	TM≤1305	0.7	0.1	0.068	0.06	0.02	0.0045	6.0×10^{11}
	1305<TM≤1760	0.88	0.13	0.09	0.075	0.025	0.0045	6.0×10^{11}
	TM>1760	1	0.16	0.108	0.082	0.03	0.0045	6.0×10^{11}
China 6b								
I	All	0.5	0.05	0.035	0.035	0.02	0.003	6.0×10^{11}
II	TM≤1305	0.5	0.05	0.035	0.035	0.02	0.003	6.0×10^{11}
	1305<TM≤1760	0.63	0.065	0.045	0.045	0.025	0.003	6.0×10^{11}
	TM>1760	0.74	0.08	0.055	0.05	0.03	0.003	6.0×10^{11}

[1] Category I refers to passenger vehicles not exceeding 2,500 kg of maximum mass and not exceeding six seats, and Category II refers to all other light-duty vehicles
[2] Before July 1, 2020, a transitioning PN limit of 6.0×10^{12} #/km applies on gasoline cars.

The ICCT report is at http://theicct.org/sites/default/files/publications/China-LDV-Stage-6_Policy-Update_ICCT_16032017_vF.pdf.

Draft Action Plan for Air Pollution Control in New Delhi

On 2 March 2017 the Environment Pollution (Prevention & Control) Authority (EPCA) for the National Capital Region (NCR) of New Delhi released their draft comprehensive action plan for air pollution control.

The comprehensive action plan outlines over 85 short-term and long-term measures to be taken in 12 different areas such as air quality monitoring, vehicular emissions, non-motorised transport network, traffic management, power plants and industries, open burning of solid waste and agricultural by-products, and road and construction dust to achieve this goal.

Some of the more innovative measures include using satellite imagery to identify pollution hotspots, and track agriculture waste burning, which will be monitored and enforced by state governments.

Table 1: Reduction needed in annual average concentration in selected NCR cities to meet the clean air standards

City	PM10 levels (in micro-gramme per cubic metre, or cu m)	Percentage reduction in PM10 required to meet the annual average standard (i.e. 60 microgramme per cu m)	NO2 levels (in micro-gramme per cu m)	Percentage reduction in NO2 required to meet the annual average standard (i.e. 40 microgramme per cum)	PM2.5 levels (in micro-gramme per cu m)	Percentage reduction in PM2.5 required to meet the annual average standard (i.e. 40 microgramme per cu m)
Delhi	232	74%	64	37.5%	132	69.7%
Faridabad	166	63.9%	41	2.5%	NA	NA
Ghaziabad	247	75.7%	35	Within standard	NA	NA
Noida	138	56.5%	31	Within standard	NA	NA
Meerut	149	59.7%	47	14.9%	NA	NA

Note: Annual data for consecutive years for Gurugram is not available
NA: Not available
Source: Based on data reported on CPCB website

Short-term priority actions include ensuring on-schedule implementation of Bharat Stage (BS) VI fuel and emissions standards, including early delivery of BS VI fuel; ensuring registration of only BS IV vehicles from 1 April 2017 and only BS VI-compliant vehicles from April 2020. Tax measures are considered needed to nullify incentives for diesel cars over petrol cars. Also CNG bus and auto fleets should be expanded.

In the medium-term, battery-operated vehicles in targeted segments of two-wheelers, three-wheelers and buses need to be introduced; and vapour recovery systems in fuel refuelling outlets should be installed to reduce benzene emissions in the NCR.

Short-term priority action for existing vehicles include auditing Pollution under Control (PUC) certifications centres; tightening PUC norms for post-2000 vehicles with an upgrade of in-use emissions testing for diesel vehicles; implementing an On-Board Diagnostic (OBD) system fitted in new vehicles for vehicle inspection; linking PUC certificates with annual vehicle insurance to ensure 100% compliance; and enforcing law against visibly polluting vehicles with penalty and extensive awareness against polluting vehicles.

The draft plan was submitted to the Supreme Court of India and the governments of Haryana, Uttar Pradesh and Rajasthan. A meeting will reconvene at the end of March 2017 to finalize the plan.

The draft action plan is at www.epca.org.in/EPCA-Reports1999-1917/Report-draft-no.66.pdf.

Indian Court bans Sales of Bharat Stage 3 Vehicles

On 29 March 2017 the Supreme Court of India barred sale of vehicles compliant with Bharat Stage 3 (BS 3) emission norms beyond 31 March 2017.

The 2015 notification of the Indian Ministry for road transport and highways made it mandatory for automakers to switch to BS 4 norms from 1 April 2017, but did not say whether the sale of BS 3 vehicles inventory would be allowed. According to data submitted by the Society of Indian Automobile Manufacturers (SIAM) to the Court, the inventory of two-wheelers stands at 671 000 units. Inventory of trucks stands at 96 000 and cars at 16 000.

The Court nevertheless said that manufacturers were aware of the deadline and health of public is more important than sales.

Vietnam Roadmap for Euro 4 Implementation

On 28 March 2017 the Vietnam Prime Minister issued a decision on the implementation of the roadmap for the application of Euro 4 emission standards for cars.

New diesel vehicles are required to follow Euro 4 emission standards before 31 December 2017. Automakers and importers of diesel vehicles will have to ensure completion of procedures related to customs, registration and rolling out of vehicles for the domestic market by that date.

The Vietnamese government also assigned the Ministry of Industry and Trade to request petroleum enterprises to provide the Vietnamese market with Euro 4 and 5 fuel. In the fourth quarter of 2017, petroleum firms should complete their infrastructure to ensure timely supply of Euro 4 diesel fuel on the market. The deadline for the start of supplying is 1 January 2018.

Vietnam has applied Euro 2 standards since 2007. However, it is lagging behind neighbouring countries such as China and Singapore, which have applied Euro 5 standards, and Thailand, the Philippines and Malaysia, which have applied Euro 4 standards.

UNITED NATIONS

Two- and Three-Wheeled Motor Vehicles' GTRs No 17 & 18 published

Two new Global Technical Regulations (GTRs) respectively related to evaporative emissions and OBD of L-category vehicles (motorcycles and mopeds) have been published.

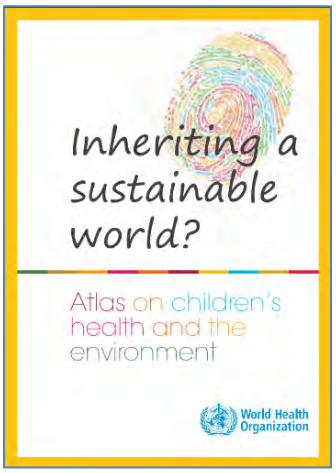
GTR No 17 establishes the measurement procedure for two- or three-wheeled motor vehicles equipped with a combustion engine with regard to the crankcase and evaporative emissions while GTR No 18 defines the measurement procedure for two- or three-wheeled motor vehicles with regard to On-Board Diagnostics (OBD).

GTR No 17 is at www.unece.org/fileadmin/DAM/trans/main/wp29/wp29wgs/wp29gen/wp29registry/ECE-TRANS-180a17e.pdf.

GTR No 18 is at www.unece.org/fileadmin/DAM/trans/main/wp29/wp29wgs/wp29gen/wp29registry/ECE-TRANS-180a18e.pdf.

WHO Report on Polluted Environment Effects on Children

On 6 March 2017 the World Health Organization (WHO) released two reports on the impact of polluted environment on children.



The first report 'Inheriting a Sustainable World: Atlas on Children's Health and the Environment' reveals that a large portion of the most common causes of death among children aged 1 month to 5 years – diarrhoea, malaria and pneumonia – are preventable by interventions known to reduce environmental risks, such as access to safe water and clean cooking fuels.

It is not simply an update of the first edition published in 2004 but a more detailed review. Changes in the major environmental hazards to children's health over the last 13 years due to increasing urbanization, industrialization, globalization and climate change were taken into account as well as efforts in the health sector to reduce children's environmental exposures. The report seeks to promote the importance of creating sustainable environments and reducing the exposure of children to modifiable environmental hazards.

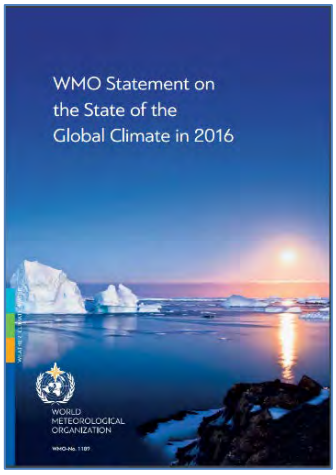
The companion report 'Don't pollute my future! The impact of the environment on children's health' provides a comprehensive overview of the environment's impact on children's health, illustrating the scale of the challenge.

It notes in particular that every year, 570 000 children under 5 years die from respiratory infections, such as pneumonia, attributable to indoor and outdoor air pollution, and second-hand smoke. Also, 270 000 children die during their first month of life from conditions, including prematurity, which could be prevented through access to clean water, sanitation, and hygiene in health facilities as well as reducing air pollution.

The two WHO reports are at http://apps.who.int/iris/bitstream/10665/254677/1/9789241511773-eng.pdf?ua=1 and http://apps.who.int/iris/bitstream/10665/254678/1/WHO-FWC-IHE-17.01-eng.pdf?ua=1 respectively.

2016 WMO State of the Global Climate

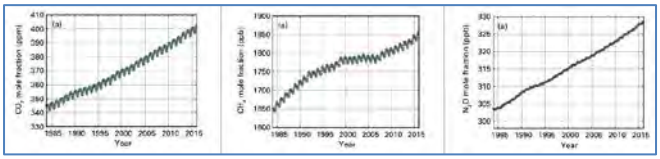
On 21 March 2017 the World Meteorological Organization (WMO) published its annual report on the State of the Global Climate for 2016.



The report confirms that the year 2016 was the warmest on record, 1.1°C above the pre-industrial period (i.e. before 1750). This increase in global temperature is consistent with other changes occurring in the climate system. Globally averaged sea-surface temperatures were also the warmest on record, global sea levels continued to rise, and Arctic sea-ice extent was well below average for most of the year. Each of the 16 years since 2001 has been at least 0.4°C above the long-term average for the 1961-1990 base period, used by WMO as a reference for climate change monitoring. Global temperatures continue to be consistent with a warming trend of 0.1 to 0.2°C per decade.

The WMO Global Atmosphere Watch Programme shows that globally averaged surface mole fractions for CO_2, methane (CH_4) and nitrous oxide (N_2O) reached new highs in 2015, with CO_2 at 400 ppm, CH_4 at 1845 parts per billion (ppb) and N_2O at 328 ppb. These values constitute, respectively, 144%, 256% and 121% of pre-industrial levels.

The increase of CO_2 from 2014 to 2015 was larger than that observed from 2013 to 2014 and that averaged over the past 10 years, despite no significant change in emissions from fossil fuel sources.



Globally averaged mole fractions of CO_2 (in ppm), CH_4 (in ppb), and N_2O (in ppb)

The increase of CH_4 from 2014 to 2015 was also larger than that observed from 2013 to 2014 and that averaged over the last decade. The increase of N_2O from 2014 to 2015 was similar to that observed from 2013 to 2014 and greater than the average growth rate over the past 10 years.

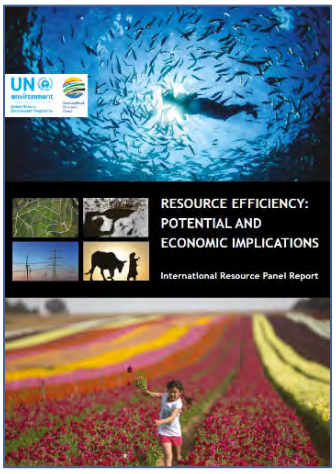
The WMO report also notes that the US National Oceanic and Atmospheric Administration's Annual GHG Index shows that, from 1990 to 2015, radiative forcing by long-lived greenhouse gases increased by 37%, with CO_2 accounting for about 80% of this increase.

The WMO report is at http://library.wmo.int/opac/doc_num.php?explnum_id=3414.

UNEP Report on Resource Efficiency

On 16 March 2017 the United Nations Environment Program (UNEP) released at the G20 meeting in Berlin a report on "Resource Efficiency: Potential and Economic Implications".

The report analysed four paths that countries could take over the next three decades, ranging from 'business as usual' (i.e. Existing Trends') to a scenario where countries adopt both ambitious climate policies and improve resource efficiency. Existing Trends project that natural resource use will increase from 85 billion to 186 billion tonnes over the next 35 years to 2050, reflecting a 28% increase in population size and a 71% increase in resource use per capita.



Modelling resource efficiency and ambitious climate policies and initiatives against this background suggests that they could reduce natural resource use globally by 28% in 2050, in combination with ambitious global action on climate change, and stabilize resource use per capita at current levels in G7 countries (the US, Canada, France, Germany, Italy, the UK, and Japan); reduce greenhouse gas emissions by up to 20% in 2050 (for a given set of greenhouse policies), with global emissions falling to 63% below 2015 levels and G7 emissions falling to 74% below 2015 levels by 2050, in combination with ambitious greenhouse gas abatement policies; more than offset the economic costs of ambitious climate action, so that income and economic growth are slightly higher than in the Existing Trends scenario; and deliver annual economic benefits of more than $2 trillion (€1.9 trillion) globally in 2050 relative to Existing Trends, including benefits of $600 billion (€560 billion) in G7 nations, while also helping put the world on track to limit climate change to 2°C or lower.

The UNEP report and a summary are available at www.resourcepanel.org/reports/resource-efficiency.

GENERAL

AECC Position on Replacement Emissions Control Systems

On 22 March 2017 AECC released a new position paper highlighting concerns on quality, performance and durability of replacement components.

While legislative requirements are considered relatively robust for original equipment, durability requirements are lacking for replacement pollution control systems for cars and, as a consequence, low-quality and non-durable replacement products can be placed on the EU aftermarket. Legislation should ensure that tailpipe emissions from vehicles equipped with aftermarket emissions control systems are controlled not only on the regulatory test cycle, but also under the Real-Driving Emissions (RDE) test procedure, and that their performance remains for a reasonable part of the useful life of the vehicle.

Neither UN Regulation No 103 on uniform provisions concerning the approval of replacement pollution control devices for power-driven vehicles, nor the Euro 5&6 implementing Regulation (EC) No 692/2008 include any provisions on demonstration of compatibility of replacement pollution control devices with the RDE test procedure and not-to-exceed emissions requirements.

Therefore AECC recommends to already list pollution control devices in the second table of Annex XIII (parts with impact on environmental performance of vehicle) in the new type-approval framework Regulation, and to require demonstration of their emissions control performance not only on the regulatory test cycle but also in real-world, during the RDE test procedure.

The AECC position is at www.aecc.eu/wp-content/uploads/2017/03/170322-AECC-position-paper-replacement-ECTs.pdf.

ACEA 2016 Economic and Market Report

On 2 March 2017 the European Automobile Manufacturers' Association (ACEA) published its Economic and Market Report for the fourth quarter of 2016, with the latest figures on the economy as well as

registrations, production and trade of passenger cars and commercial vehicles.

Some of the report's key takeaways include:

- 14.6 million passenger cars were registered in Europe in 2016, up 6.8% compared to 2015 and representing the third consecutive year of growth.
- Globally, 77.3 million passenger cars were sold in 2016, 5.5% more than in the previous year.
- Overall in 2016, 49.5% of all new passenger cars registered in Western Europe ran on diesel, more than two percentage points less than in 2015.
- In the EU-15, diesel's market share fell from 52.1% to 49.9% throughout 2016.
- 609 629 alternative fuel vehicles were registered in the EU in 2016, up 4.1% compared to the prior year.
- Despite impressive growth in recent years, alternative fuel vehicles still only accounted for 4.2% of total EU passenger car registrations in 2016 (roughly similar to 2015).
- Electrically chargeable vehicles made up for about 1% of all car registrations in 2016.
- EU passenger car production increased by 2.7% in 2016, totalling 16.5 million units.
- Almost reaching the pre-crisis level of 16.6 million cars from 2007, the EU accounted for more than 21% of global passenger car production in 2016.
- In 2016, the EU exported about 5.5 million passenger cars worth around €125 billion.
- The US remained the EU's most valuable export market for passenger cars, with exports roughly totalling €38 billion – representing more than 30% of the total.
- The EU market for commercial vehicles expanded throughout 2016, reaching more than 2.3 million registrations – up 11.7% compared to 2015.
- In 2016, European commercial vehicle production grew by 5.9%, reaching 3.5 million units.
- EU commercial vehicle exports increased significantly (+59.1%) in 2016, when compared to one year earlier.

The ACEA economic and market report is at www.acea.be/uploads/statistic_documents/Economic_and_Market_Report_Q4_2016.pdf.

PSA publishes Real-World Fuel Consumption Data for 1000 Vehicles

On 7 March 2017 the PSA Group published, as promised in 2016, the results from the real-world fuel consumption test protocol established with Transport & Environment (T&E) and France Nature Environnement (FNE).

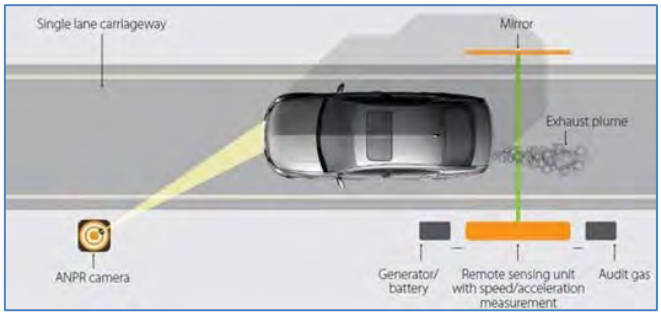
The measurements have been made on 58 models on public roads (23 km urban, 40 km rural, and 30 km motorways) under real driving conditions (air conditioning on, luggage and passengers, hilly terrain, etc.). The results make it possible to estimate the fuel consumption in real-world driving conditions for more than 1000 versions of Peugeot, Citroën and DS vehicles. For each model, the estimations have been made using the same engine and gearbox, plus three variants: body type, trim level and tires dimensions.

The PSA data are available from http://media.groupe-psa.com/en/press-releases/group/psa-publishes-real-world-fuel-consumption-data.

Real-World Vehicle Emissions Monitoring Service

On 20 March 2017 Ricardo Energy & Environment announced they have launched with technology partner OPUS Inspection, a real-world vehicle emissions monitoring service.

Installed at locations of interest, the measurement system instantaneously records in a completely non-intrusive manner, the real-world driving emissions – of nitric oxide (NO), nitrogen dioxide (NO_2), particulate matter (PM), hydrocarbons (HC), carbon monoxide (CO) and ammonia (NH_3) – from each passing vehicle.



The data recorded can be used to identify the most polluting vehicle types (i.e. buses, heavy goods vehicles, vans and cars) and their respective contributions to emissions. The system can be used to support Low Emission Zone enforcement management through the identification of non-compliant vehicles.

More info at http://ee.ricardo.com/cms/Vehicle-emission-measurement.

New ADAC EcoTest Results

On 20 March 2017 the German Automobile Club ADAC released results of its new EcoTest that now includes Real-Driving Emissions (RDE) tests.

Since September 2016 ADAC has tested 77 car models. The best performers currently include electric and hybrid vehicles, such as the BMW i3, the Toyota Prius 1.8 Hybrid Executive and the Nissan Leaf Acenta. Also the fuel cell car Toyota Mirai got the five star ranking. Five passenger cars with petrol engines achieved four stars. The cleanest petrol car under the Ecotest is the Suzuki Ignis 1.2 SHVS Comfort +. None of the three tested plug-in hybrids

performed well both due to CO_2 and pollutant emissions, ADAC said.

Of the 38 diesel cars tested, only the Mercedes E220d 9G-Tronic and the BMW 118d UrbanLine Steptronic were attributed four "environmental stars" and are, as a result, the only diesel vehicles that ADAC recommends.

While the majority of the diesel vehicles have too high emissions of NOx, many petrol direct injection engines show a markedly high output of fine particles (measured as Particle Number or PN) under stringent test conditions. Not only are heavily motorized models affected, such as the Ford Focus RS, but also very popular vehicles such as the VW Tiguan 1.4 TSI or the Opel Corsa 1.0 Turbo ecoFlex Edition. The GDI Mercedes SLC 200 however remains below the PN limit ($3.5x10^{11}$/km) and proves the Euro 6c PN limit can be achieved without a Gasoline Particulate Filter.

The Smart fortwo cabrio 0.9 turbo twinamic, using a gasoline MPI engine, emitted very high PN emissions that are not regulated for such engines.

Platz	Marke/aModell	Antrieb	Schad-stoffe	Punkte CO_2	EcoTest gesamt	Eco-Sterne
1	BMW i3 (94 Ah)	Elektro	50	50	100	★★★★★
2	Toyota Prius 1.8 Hybrid Executive	Hybrid	48	46	94	★★★★★
3	Nissan Leaf Acenta (inkl. Batterie 30 kWh)	Elektro	50	44	94	★★★★★
4	Toyota Mirai	Elektro/Wasserstoff	50	43	93	★★★★★
5	Skoda Octavia Combi 1.4 TSI G-TEC Style (Erdgasbetrieb)	Erdgas	50	43	93	★★★★★
6	Toyota Yaris Hybrid Style	Hybrid	49	39	88	★★★★
7	Tesla Model S P90D	Elektro	50	37	87	★★★★
8	Suzuki Ignis 1.2 SHVS Comfort+	Otto	48	36	84	★★★★
9	Mercedes E 220 d 9G-TRONIC	Diesel	50	30	80	★★★★
10	Mitsubishi Space Star 1.2 ClearTec Top	Otto	40	36	76	★★★★
11	BMW 118d Urban Line Steptronic	Diesel	41	34	75	★★★★
12	Citroen C3 PureTech 110 Stop&Start Shine	Otto	44	30	74	★★★★
13	VW up! 1.0 TSI BMT beats	Otto	37	34	71	★★★★
14	Mercedes C 200 Cabriolet	Otto	47	23	70	★★★★

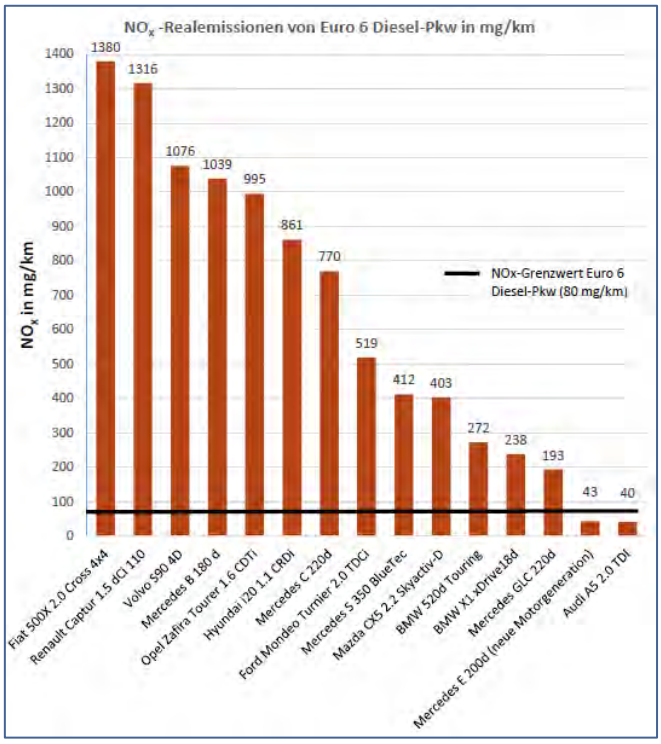
ADAC EcoTest results are at www.adac.de/infotestrat/tests/eco-test/default.aspx.

DUH Report on Real-World Emissions of Euro 6 Diesel Cars

On 29 March 2017 the Deutsche Umwelthilfe (DUH) published a report on real-world NOx emissions from fifteen Euro 6 diesel cars tested in winter conditions.

Ten different trips were carried out on a test track covering urban, rural and motorway driving. Emissions were measured on board the vehicle with a portable Emissions Measurement System (PEMS). Tests were conducted between September 2016 and March 2017, depicting emissions behaviour of vehicles at low ambient temperature.

According to DUH, the Euro 6 NOx limit of 80 mg/km was exceeded by a large majority of cars, reaching 17.2 times the regulatory limit in the case of the fiat 500X 2.0 cross 4x4. Nevertheless the Mercedes E 200d (new engine generation) and the Audi A5 2.0 TDI met the NOx Euro 6 limit, demonstrating availability of very low NOx RDE-compliant cars.



The DUH report (in German) is at www.duh.de/fileadmin/user_upload/download/Projektinformation/Verkehr/dieselgate/Wintermessungen_2016_2017/170329_EKI-Bericht_NOx-_und_CO2-Wintermessungen_EKI_DUH_01.pdf.

ICCT Report on Electric Vehicles Market

On 6 March 2017 the International Council on Clean Transportation (ICCT) published a report titled "Electric Vehicle Capitals of the World – Demonstrating the Path to Electric Drive" which assesses major cities around the world with high electric vehicle uptake and summarizes the policy, charging infrastructure, and consumer awareness actions in place to help develop the electric vehicle market in those cities.

The report also includes a comparison of vehicle life-cycle emissions data to assess new vehicles' carbon emissions impact in the main electric vehicle markets.

The top markets by electric vehicle share of new passenger vehicles are Oslo (27%), Utrecht (15%), Shanghai (11%), Shenzhen (10%), Amsterdam (10%), and San Jose (9.4%). In terms of total volume, the highest annual sales markets are Shanghai, Los Angeles, and Beijing, which recorded between 18 000 and 42 000 new electric vehicle registrations in 2015.

The ICCT highlights that nearly a third (32%) of global electric vehicle sales in 2015 are in just 14 cities representing only about 1.5% of the global population.

Electric vehicle capital cities use a comprehensive suite of electric vehicle promotion actions to spur the market (incentives, extensive charging infrastructure, and consumer awareness).

Electric vehicles deliver a low-carbon transport option. Cities that are accelerating the transition to electric drive are achieving significant carbon emission reductions in their transportation sector. Even after incorporating upstream emissions, electric vehicles provide carbon emission reduction benefits between 30-40% (China and the Netherlands) to more than 98% (Norway, Switzerland, and Sweden) compared to conventional vehicles across the China, European, and US markets. Further improvements are expected as the electric grids continue to decarbonize.

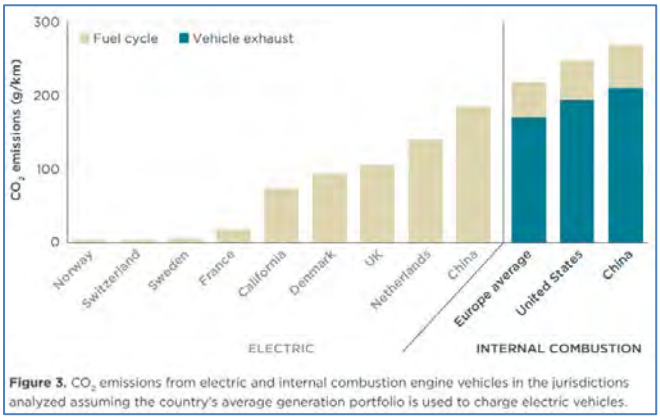


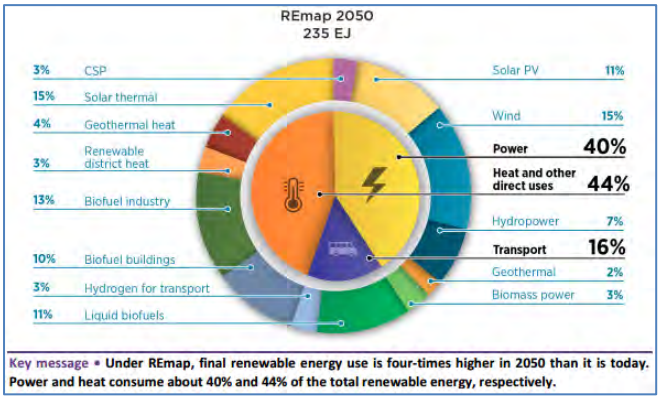
Figure 3. CO_2 emissions from electric and internal combustion engine vehicles in the jurisdictions analyzed assuming the country's average generation portfolio is used to charge electric vehicles.

The ICCT report is at www.theicct.org/sites/default/files/publications/Global-EV-Capitals_White-Paper_06032017_vF.pdf.

Report on Transition to Low-Carbon Energy System

On 20 March 2017 The International Energy Agency (IEA) and the International Renewable Energy Agency (IRENA) released a new report on 'Perspectives for the energy transition: investment needs for a low-carbon energy system' which was prepared at the request of the German Government to provide input for the G20 presidency.

Globally, 32 gigatonnes (Gt) of energy-related CO_2 were emitted in 2015. The report states that emissions will need to fall continuously to 9.5 Gt by 2050 to limit warming to no more than 2°C above pre-industrial temperatures. 90% of this CO_2 emission reduction can be achieved through expanding renewable energy deployment and improving energy efficiency.



Key message • Under REmap, final renewable energy use is four-times higher in 2050 than it is today. Power and heat consume about 40% and 44% of the total renewable energy, respectively.

Renewable energy now accounts for 24% of global power generation and 16% of primary energy supply. To achieve decarbonisation, the report states that, by 2050, renewables should be 80% of power generation and 65% of total primary energy supply.

The report finds that to achieve the climate objective a deep transformation of energy production and consumption needs to occur by 2050:

- Nearly 95% of electricity would need to be low-carbon by then, compared with about a third today, led by renewables;
- 7 out of every 10 new cars would need to be electric, compared with 1 in 100 today;
- The entire existing building stock would need to be retrofitted and the CO_2 intensity of the industrial sector would need to drop by 80% below today's levels;
- Fossil fuels, in particular natural gas, would still be needed in 2050, and would account for 40% of energy demand, around half of today's level;
- $3.5 trillion in energy-sector investments would be needed on average each year until 2050, which is around twice current levels of investment.

The IEA-IRENA report is at www.irena.org/DocumentDownloads/Publications/Perspectives_for_the_Energy_Transition_2017.pdf.

RESEARCH SUMMARY

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FORTHCOMING CONFERENCES

6th Southeast Asia Diesel Engine Summit 2017
11-12 April 2017, Singapore
www.borscon.com/2017apde/en/index.asp
The summit will focus on the actual situation of the diesel engine industry in Southeast Asia, discuss energy conservation and emission reduction policies and regulations that insiders are concerned about, fuel consumption standards, latest technology trends and future development trends, and share business model innovation hot spots.

Real Driving Emissions
19-20 April 2017, Amsterdam, Netherlands
www.bisgrp.com/portfolio/conferences/automotive/real-driving-emissions

CLEPA Policy Debate & Annual Reception
25 April 2017, Brussels, Belgium
http://clepa.eu/events/201704-clepa-policy-debate-annual-reception

6th Annual EU Biofuel Seminar
26 April 2017, Geneva, Switzerland
www.platts.com/events/emea/EU-Biofuels/index
The conference will debate the very latest issues impacting the European biofuels industry.

38th International Vienna Motor Symposium
27-28 April 2017, Vienna, Austria
https://wiener-motorensymposium.at/en/home/
Topics for the symposium include latest findings in engine development, on new engines, fuel cells, hybrid technology, exhaust gas treatment and Real-Driving Emissions (RDE).

Health Effects Institute 2017 Annual Conference
30 April - 2 May 2017, Alexandria (VA), USA
www.healtheffects.org/annual-conference

9th AVL International Commercial Powertrain Conference 2017
10-11 May 2017, Graz, Austria
www.avl.com/-/9th-international-commercial-powertrain-conference-2017
The 2017 ICPC conference is entirely dedicated to CO_2 reduction and innovations improving operating efficiency.

International Calibration Conference
11-12 May 2017, Berlin, Germany
www.iav.com/us/events/iav-conferences/international-calibration-conference-i-automotive-data-analytics-methods-doe
Real driving emissions (RDE), worldwide harmonized light-duty test procedures (WLTP) and the next round of CO_2 guidelines all demand ongoing technical refinement of the drive train. The conference will expand on the topics discussed at the IAV conference entitled "DoE in Powertrain Development" with the related areas of "machine learning" and "big data".

NOx and Particulate Real Drive Emissions (RDE)
15-19 May 2017, Leeds, UK
https://engineering.leeds.ac.uk/short-course/20
This course concentrates on engine technology for low emissions, fuel requirements and aftertreatment techniques.

10th Integer Emissions Summit & AdBlue® Forum China 2017
16-18 May 2017, Beijing, China
www.integer-research.com/conferences/ies-china-2017
The conference will address China's emissions control challenges and examine cost-effective, regulation compliant emissions reduction strategies.

CLEPA Materials Regulations Event
17 May 2017, Reutlingen, Germany

http://clepa.eu/events/201705-clepa-materials-regulations-event
Legislations on the agenda include among others IMDS, GADSL, ELV, REACH, and BPR.

International Transport Forum – 2017 Summit – Governance of Transport

31 May-2 June 2017, Leipzig, Germany
http://2017.itf-oecd.org
The ITF's 2017 Summit on Governance of Transport will explore the trends shaping transport governance and identify the most pressing challenges in the transport sector. Through the governance lens, it will focus on infrastructure, global connectivity, the right regulation for innovation, and urban access and mobility.

29th International AVL Conference "Engine & Environment"

1-2 June 2017, Graz, Austria
www.avl.com/engine-environment-2017
Competition of powertrain systems to reduce CO_2 and emissions 2020/2025.

CITA International Conference

6-8 June 2017, Zagreb, Croatia
http://cita2017.citainsp.org
This edition's theme is "Partnering to Improve Road Safety and the Environment" and the programme aims to highlight the role of whole-life vehicles' roadworthiness in comprehensive road safety and transport environmental protection strategies.

International Conference SIA Powertrain

7-8 June 2017, Versailles, France
www.sia.fr/evenements/66-sia-powertrain-versailles-2017
The conference will focus on the low CO_2 spark ignition engine of the future and its hybridization.

21st ETH-Conference on Combustion Generated Nanoparticles

19-22 June 2017, Zürich, Switzerland
www.nanoparticles.ch
The conference serves as an interdisciplinary platform for expert discussions on all aspects of nanoparticles, freshly emitted from various sources, aged in ambient air, technical mitigation aspects, impact of particles on health, environment and climate and particle legislation.

Engine Emissions Measurement

19-23 June 2017, Leeds, UK
https://engineering.leeds.ac.uk/short-course/22
This course is directed at both emissions legislation compliance, and at engine and catalyst development for low emissions.

Cambridge Particle Meeting 2017

23 June 2017, Cambridge, UK
www.cambridgeparticlemeeting.org/2017
Topics of interest include combustion aerosols and their effects, aerosol-based nanotechnology, and new instrumentation.

13th Integer Emissions Summit & AdBlue® Forum Europe 2017

27-29 June 2017, Dresden, Germany
www.integer-research.com/conferences/ies-europe-2017
The conference will discuss the most challenging issues facing the industry, including how commercial vehicle and engine manufacturers will further reduce CO_2 emissions and improve fuel efficiency beyond Euro VI, Euro 6c for light-duty vehicles and passenger cars – what will be the likely scenario for the European car industry when RDE regulation and WLTP procedures are adopted in September 2017?, which technologies will prove to be best-suited to meeting Stage V regulations for the non-road mobile machinery sector?, and what are the optimum strategies for meeting upcoming emissions legislation in the marine sector following European and IMO efforts to tighten emission standards.

VII International Congress on Combustion Engines

27-29 June 2017, Poznan, Poland
www.congress.ptnss.pl/
The congress is organized by the Polish Scientific Society of Combustion Engines (PTNSS). The main topics of the congress include fuel injection systems and mixture formation; combustion processes control in SI and CI engines; emissions measurements and aftertreatment; engine testing, durability, reliability and diagnostics; and global trends in engine technology.

4th International Conference: Sensors for Exhaust gas Aftertreatment and CO_2 Reduction

27-29 June 2017, Augsburg, Germany

www.sv-veranstaltungen.de/fachbereiche/conference-sensors-for-exhaust-gas/?lang=en
Top issues to be discussed include state-of-the-art sensor technology for pressure & temperature, radio-frequency-sensors, nitrogen oxide & ammonia, multi-gas sensing, soot & soot loading, and implementation of sensors in ECUs & OBD.

CLEPA Innovation Awards 2017

29 June 2017, Rome, Italy
http://clepa.eu/events/201706-clepa-innovation-awards
Automotive suppliers, irrespective of size, are eligible for innovations in the fields of connectivity and automation, cooperation, environment and safety.

13th International CTI Conference: SCR Systems/Off-Highway Applications

5-7 July 2017, Stuttgart, Germany
http://cti.euroforum.de/en/events/scr_systems_2017
The conference will discuss international emissions legislation; real-driving emissions legislation and experience; global SCR trends and product line evolution to support changing market needs; development of innovative SCR components; new sensor developments; retrofitting; and off-highway technology trends.

Diesel Powertrains 3.0

11-12 July 2017, Ludwigsburg, Germany
www.fev.com/events/fev-conferences/fev-conference-diesel-powertrains-30.html
The international conference will highlight current developments in the Light-Duty Diesel Powertrain segment with a widespread list of topics, offering multiple interesting paths for best compliance with upcoming demands.

13th International Conference on Engines & Vehicles (ICE2017)

10-14 September 2017, Capri, Italy
www.sae-na.it/index.php/en/2016-03-19-14-13-16/2016-03-19-14-14-16/welcome
Topics to be addressed include engine modelling and diagnostics; engine combustion; new engines, components, actuators & sensors; hybrid and electric powertrains; fuels and lubricants; and exhaust aftertreatment and emissions.

Emissions 2017

12-13 September 2017, Frankfurt, Germany
https://gamcinc.com/conferences/emissions/?id=1
The forum will address advances in emission technology and management systems related to OEMs, suppliers (all tiers), component manufacturers, governmental and non-governmental agencies.

10th Integer DEF Forum USA 2017

26-28 September 2017, San Antonio, USA
www.integer-research.com/conferences/def-forum-usa-2017

2017 Aachen Colloquium Automobile and Engine Technology

9-11 October 2017, Aachen, Germany
www.aachener-kolloquium.de
The congress provides a wide range of technical presentations addressing current challenges of the vehicle and engine industry.

7th Integer Emissions Summit & AdBlue® Forum India 2017

11-12 October 2017, New Delhi, India
www.integer-research.com/conferences/ies-india-2017
The conference will examine the progress made towards Bharat VI a year on from the government's announcement regarding plans to implement the stringent emissions standards by 2020.

GreenPort Congress 2017

11-13 October 2017, Amsterdam, Netherlands
www.greenport.com/congress
The Congress aims to highlight innovations in equipment and technology to allow port users to adhere to policy, whilst illustrating practical solutions through case studies from the global logistics chain.

SAE 2017 International Powertrains, Fuels and Lubricants Meeting

16-19 October 2017, Beijing, China
www.sae.org/events/pfl

G.STIC 2017 – Global Science Technology & Innovation Conference

23-25 October 2017, Brussels, Belgium

www.gstic.org
The objective of this conference is to underpin the technological discussions in the UN and other international forums as they relate to the Sustainable Development Goals, the climate goals and Means of Implementation.

10th Integer Emissions Summit USA 2017

7-8 November 2017, Pittsburgh, USA
www.integer-research.com/conferences/ies-usa-2017

15th FAD-Conference

8-9 November 2017, Dresden, Germany
www.fad-diesel.de/conference-2017
The FAD conference will focus on drive technologies and environmental impact; Real-Driving Emissions – milestones of implementation; exhaust aftertreatment for on-road applications; contributions of science and research; emission concepts for non-road diesel engines; exhaust aftertreatment for gas engines; special requirement of exhaust aftertreatment for hybrid drives; emission strategies and solutions for large engines; new exhaust aftertretment concepts; service time and aging of exhaust aftertreatment systems; and future fuels and exhaust aftertreatment.

Heavy-Duty, On- and Off-Highway Engines 2017

28-29 November 2017, Augsburg, Germany
www.atzlive.de/en/events/heavy-duty-on-and-off-highway-engines
Main subject areas of the conference include new diesel, gas, and dual-fuel engines, electrification, and reducing pollution.
Deadline for abstract: 5 May 2017

10th International AVL Exhaust Gas and Particulate Emissions Forum

20-21 February 2018, Ludwigsburg, Germany
www.avl.com/web/guest/-/10th-avl-international-exhaust-gas-and-particulate-emissions-forum

8th AVL Large Engines TechDays

11-12 April 2018, Graz, Austria
www.avl.com/-/8th-avl-large-engines-techdays