



# Newsletter

March – April 2016

## INTERNATIONAL REGULATORY DEVELOPMENTS

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## EUROPE

### Two First Legal Packages on Real-Driving Emissions published

On 31 March 2016 the first legal package on Real-Driving Emissions (RDE) was published in the Official Journal as Commission Regulation (EU) 2016/427.

It amends the Euro 5 & 6 implementing Regulation (EC) 692/2008 and introduces a new Annex IIIA with provisions to measure on-road emissions with Portable Emissions Measurement Systems (PEMS) at type-approval.

On-road NO<sub>x</sub> emissions have to be measured on all Euro 6 vehicles (passenger cars and light-commercial vehicles), on-road PN emissions are to be measured on all Euro 6 vehicles which have a PN limit set (i.e. diesel and Gasoline Direct Injection). CO emissions also have to be measured and recorded on all Euro 6 vehicles. Cold start emissions, until engine coolant has reached 70°C (max. 5 minutes), must be recorded but are so far excluded from the RDE evaluation. If a DPF regeneration occurs during the PEMS trip, the RDE test may be voided and repeated once at the request of the manufacturer.

Moderate ambient conditions are defined as altitude between 0 and 700 m and temperature between 0 and 30°C. Extended conditions include altitudes between 700 and 1300 m and temperatures between -7 and 0°C and between 30 and 35°C. There are derogations on moderate (3°C minimum instead of 0°C) and extended (-2°C minimum instead of -7°C) temperature conditions that apply until 1 September 2019 for new types (and one year later for all new vehicles).

PEMS trips have to last between 90 and 120 minutes and are required to include urban (i.e. instantaneous vehicle speed <60 km/h), rural (60-90 km/h), and motorway (>90 km/h) driving portions preferentially in that order and with respective shares of one third. A minimum distance of 16 km is mandated for each of the three phases. RDE tests are to be conducted on open roads, during working days.

For type-approval, the exhaust mass flow has to be determined by measurement equipment functioning independently from the vehicle, without any vehicle ECU data.

Air conditioning and other auxiliary devices shall be operated in a representative way.

PEMS data are to be post-processed with both methods: the CO<sub>2</sub> Moving Average Window (EMROAD) and the power binning (CLEAR).

RDE results have to be made available on a publicly accessible website while a more detailed technical report is to be provided by the manufacturer upon request from interested parties.

This provides the requirements for the RDE monitoring phase (still without any Conformity Factors) for new type-approvals and entered force on 20 April 2016.

Commission Regulation (EU) 2016/427 is at <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R0427&from=EN>.

On 26 April 2016 the second legal package on Real-Driving Emissions (RDE) was published in the Official Journal as Commission Regulation (EU) 2016/646.

It introduces a Euro 6d-TEMP emission standard that corresponds to a NO<sub>x</sub> Conformity Factor (CF) of 2.1 applicable from 1/09/2017 for new types and 1/09/2019 for all new M and N1 Class I vehicles. A Euro 6d emission standard that corresponds to a NO<sub>x</sub> CF of 1+error margin (1.5 for the time being) then applies from 1/01/2020 for new types and 1/01/2021 for all new M and N1 Class I vehicles. There is a one year delay to all Euro 6d-TEMP and Euro 6d introduction dates for N1 Class II and III and N2 light-duty vehicles.

The error margin of the Euro 6d CF reflects additional measurement uncertainties introduced by the Portable Emissions Measurement System (PEMS) equipment, which are subject to an annual review and shall be revised as a result of the improved quality of the PEMS procedure or technical progress.

The concept of transfer function (TF) is introduced in the Not-to-Exceed (NTE) emissions formula below and is set to 1 for the time being.

$$NTE_{\text{pollutant}} = CF_{\text{pollutant}} \times TF(p_1, \dots, p_n) \times \text{EURO-6}$$

The Regulation says that 'if the transfer function is amended, this shall be done in a manner which is not detrimental to the environmental impact and the effectiveness of the RDE test procedures'.

The NTE emission limit is to be met for both the entire RDE trip but also for its urban part.

Trip requirements are generally maintained from the RDE package 1 content except that the average speed – including stops – of the urban driving part of the trip should be between 15 and 40 km/h (instead of 30 km/h); that stop periods (vehicle speed <1 km/h) shall account for 6-30 % (instead of >10%) of the duration of urban operation; that if a stop period lasts more than 180 s, emission during the 180 s following such a stop shall be excluded from the evaluation; and finally the altitude gain during the PEMS trip, calculated according to a new Annex 7b, cannot exceed 1200 m/100 km.

Once a PEMS trip has been conducted, the driving dynamic conditions have to be checked according to a new Appendix 7a, which establishes a maximum value for the 95<sup>th</sup> percentile of speed\*acceleration (of accelerations >0.1 m/s<sup>2</sup>) and a minimum Relative Positive Acceleration (RPA) in each speed bin (urban,

rural, and motorway). Only if dynamic conditions validate, then emissions data shall be post-processed for normality with both the CO<sub>2</sub> Moving Average Window (EMROAD) and the power binning (CLEAR) methods.

When ambient conditions (temperature and/or altitude) are in the extended area, emissions during that period are divided by 1.6 (i.e. 60% allowance) before post-processing.

Definitions of auxiliary emission strategy (AES) and base emission strategy (BES) are also introduced to align requirements with the Heavy-duty Euro VI Regulation and enhance supervision at type-approval of the emission control strategies applied by the manufacturer. Extended documentation on these AES and BES, including a description of the parameters that are modified by any AES and the boundary conditions under which the AES operate, and indication of the AES or BES which are likely to be active under the conditions of the type-approval test procedures, will have to be submitted by the vehicle manufacturer.

Commission Regulation (EU) 2016/646 is at <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R0646&from=EN>.

## **Provisional Trilogue Agreement on Non-Road Stage V Regulation**

On 6 April 2016 the Council of the EU announced that a provisional agreement with the European Parliament has been reached on the draft Stage V emissions Regulation for Non-Road Mobile Machinery (NRMM).

This agreement was unanimously adopted by the Environment Committee of the European Parliament on 26 April 2016, with 56 votes in favour and 3 abstentions. This vote represents the first step in the formal adoption of the Regulation and a plenary vote in the Parliament is scheduled in July 2016.

The agreement confirms that Stage V limits would enter force on 1/1/2018 (engine Type-Approval) and 1/1/2019 (placing engines on market) for most engine categories, except the 56-130 kW land-based (NRE) engines for which introductory dates are 1/1/2019-2020, inland waterways engines (IWA and IWP) >300 kW also on 1/1/2019-2020, and locomotive and railcar engines (RLL and RLR) on 1/1/2020-2021.

A PN limit of 1x10<sup>12</sup>/kWh would be set for NRE engines between 19 and 560 kW, for inland waterway engines >300 kW, and for railcars (but not for locomotives).

The possibility of self-testing for Original Equipment Manufacturer (OEMs) is removed.

Engines to be installed in launch and recovery of lifeboat machineries, portable fire-fighter pumps, engines for armed forces according to a narrower definition, and engines for use in railcars and

locomotives which are part of projects at 'advanced stage of development' would be exempted.

The transitional period between the previous emissions standard and the Stage V is extended from 12 to 18 months.

By 31 December 2018 the EC has to submit a report regarding the possibility of laying down retrofit measures (technical measures and financial incentives). By 31 December 2020 further emissions reductions (NO<sub>x</sub>, PN, A-factor for methane) and the introduction of a PN limit for applications where there is none have to be assessed. Finally, the EC needs to report by 31 December 2025 on in-service monitoring emissions (does it represent real-world and is it possible to add particulate emissions monitoring?).

The text of the agreement is at

<http://data.consilium.europa.eu/doc/document/ST-7795-2016-INIT/en/pdf>.

## **Activities of the Parliament's Inquiry Committee on Automotive Emissions**

The European Parliament's Committee of Inquiry into Emission Measurements in the Automotive Sector (EMIS) met for the first time on 2 March 2016.

At the first meeting MEP van Brempt (S&D, Belgium) was elected Chair of the Committee. Four Vice-Chairs were also elected: MEP Belet (EPP, Belgium), MEP Demesmaeker (ECR, Belgium), MEP Konečná (GUE-NGL, Czech Republic), and MEP Delli (Greens, France). MEP Gerbrandy (ALDE, Netherlands) MEP Zalba Bidegain (EPP, Spain) were later designated as co-Rapporteurs.

The Committee is investigating the European Commission's alleged failure to keep car test cycles under review and introduce automotive tests reflecting the real-world driving conditions; the alleged failure of the Commission and Member States' authorities to take proper and effective action to enforce and oversee enforcement of the explicit ban on "defeat devices" in cars' exhaust systems; the Member States' alleged failure to lay down provisions on effective, proportionate and dissuasive penalties applicable to car manufacturers for infringements; and whether the Commission and Member States had evidence of the use of "defeat mechanisms" before the VW scandal emerged on 18 September 2015. The Committee aims at delivering its final report in March 2017, with an interim report in August 2016.

The EMIS Committee interviewed on 7 April 2016 representatives from the European Commission's DG-GROW (Internal Market, Industry, Entrepreneurship, and SMEs), DG-CLIMA (Climate Action) and DG-ENVI (Environment). The hearing primarily focused on the use of defeat devices and the gaps in the emission

measurements between laboratory and real-world tests, in which the Commission explained that its role was to provide the legislation, and it was up to the Member States to implement and enforce it.

DG-GROW's Mr Peltomäki explained to MEPs that the approach of the Real-Driving Emissions (RDE) test procedures was chosen as it would be the most appropriate approach to improve air quality and combat cheating devices.

Co-Rapporteur MEP Gerbrandy (Netherlands, ALDE) asked whether there was an internal investigation in the Commission on the Volkswagen case. The Commission responded that they had not established any internal inquiry, but that they were contributing to the EMIS Committee work in a coordinated manner.

On 19 April 2016 the EMIS Committee held its first "witness" hearing. MEPs interviewed representatives of the European Commission's Joint Research Centre (JRC), Ms Al-Khudhairy and Mr Krasenbrink, as well as Mr Franco of the International Council on Clean Transportation (ICCT).

MEPs discussed with the guests the JRC's tasks and responsibilities; the differences between laboratory and real-driving emissions tests; defeat devices and their detection as well as legal position; and EU legislation related to type-approval and emissions.

The JRC's representatives said the differences between laboratory tests and real-driving emissions tests are due to the differences caused by the real-driving conditions; that the detection of defeat devices was not in the scope of the mandate given to the JRC; that studies done by the JRC on the RDE issue were commissioned in order to check the feasibility of road testing of cars, and to research methodologies for RDE test procedures – the use of defeat devices was not suspected during the research; and that the discovery of the use of defeat devices in the US on VW cars was not due to US legislation but due to NGO research.

In response to a question on whether it took a long time to develop the RDE test because of industry pressure or because of the speed of scientific research, the JRC representative stated that it was because the RDE test procedure was the most advanced in the world. The adaptation of PEMS from heavy-duty vehicles to light-duty vehicles took 4.5 years, and the JRC had a lot of trust in the developed test procedure.

With regards to the revision of the type-approval framework, the JRC indicated it would be able to take on its responsibilities regarding market surveillance through an extension of staff and labs. MEPs will furthermore visit the JRC labs in July 2016.

ICCT's Vicente Franco pointed out that PEMS were unlikely to reproduce the same test results as in the lab. This is however due to the nature of the test procedure

rather than the equipment used. He regarded this as a strength as it reflects real-world conditions. He also agreed that PEMS were likely to improve in the future.

On 28 April 2016 the Committee questioned AECC's Dirk Bosteels and Udo Lambrecht of the Institut für Energie- und Umweltforschung Heidelberg (IFEU).

Amongst numerous questions, Bosteels was asked in particular about the possibility to reduce CO<sub>2</sub> and NO<sub>x</sub> emissions simultaneously, about the feasibility to achieve low NO<sub>x</sub> Conformity Factors with diesel vehicles, and about the ambient temperature range at which emissions control technology can operate. Bosteels explained the decoupling of typical engine-out emissions 'trade-off' and those from the tailpipe using catalytic aftertreatment systems and replied that ambient conditions in Europe as such are not that relevant for the operation of the catalytic components of the emissions control system. The temperature conditions in the exhaust are of importance. Fast warm-up and thermal management strategies downstream of the engine are therefore crucial. According to AECC, diesel NO<sub>x</sub> emissions can be controlled to a low level in real-world provided an integrated approach is taken that includes advanced combustion, clean fuel, sensors, and proper integration of the aftertreatment.

The EMIS Committee also released a programme of hearings for the upcoming months: TNO and the European Environment Agency (EEA) on 24 May 2016; the Deutsche Umwelthilfe (DUH) and Corporate Europe Observatory (CEO) on 16 June 2016; Emissions Analytics and ADAC on 20 June 2016; Commission staff members, Type-Approval Authorities, national technical services, and Member States' TCMV representatives on 21 June 2016; automotive suppliers on 27 June 2016, car manufacturers on 13 July 2016; and Commissioners in charge of the dossier over the past years (i.e. Verheugen and Dimas, Tajani and Potočník, and Bieńkowska and Vella) on 15 July 2016 and 5 September 2016.

It was also announced that two studies have been launched by EMIS: an analysis of legal obligations with regards to EU law implementation, and a comparison of emissions legislations in the EU and the US.

## **Corrigendum to Euro 4&5 Motorcycles Regulation published**

On 23 March 2016 a corrigendum to Regulation (EU) 168/2013 setting the Euro 4&5 standards for powered two- or three-wheel vehicles and quadricycles was published in the Official Journal.

The corrigendum is limited to editorial changes and corrects obvious errors in the co-decision act.

The corrigendum is at [http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:JOL\\_2016\\_077\\_R\\_0004&from=EN](http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:JOL_2016_077_R_0004&from=EN).

## **Preliminary Report on Motorcycles Euro 5 Environmental Effect Study**

On 7 April 2016 the Joint Research Centre (JRC) of the European Commission published a report on the preparatory work for the environmental effect study on the Euro 5 step of L-category vehicles.

Regulation (EU) 168/2013 requires an effect study to confirm its Euro 5 provisions for the type-approval of L-category vehicles (two- or three-wheel vehicles and quadricycles, such as quads and minicars). The new JRC report describes the testing methodology and preliminary results as input to the main effect study.

The JRC undertook an experimental campaign on 12 L-category vehicles to test their propulsion unit and environmental performance. Tests included the current legislative test procedure, the provisional Euro 5 requirements, and a wide open throttle test to assess the maximum performance of the vehicles (max. power and torque).

The new test cycle proposed for Euro 5 type-approval, the Worldwide-harmonized Motorcycle Test Cycle (WMTC) proved to be better than the present driving cycle in terms of quantity, quality and dynamics of testing/sampling points, the JRC said.

The report provides recommendations for the Euro 5 effect study. In particular some mopeds may have difficulty to follow the accelerations of the WMTC speed profile especially at the beginning of the test when the engine is still cold. This can nevertheless be overcome by anticipating the accelerations by 1 to 2 seconds. Regarding the newly developed aging Standard Road Cycle (SRC), the effect study should contain a time plan and a cost-benefit analysis of the Test Type V (durability) to support the exclusion of the existing AMA aging cycle from L-category vehicles type-approval.

The JRC report is at <http://publications.jrc.ec.europa.eu/repository/bitstream/JRC100557/ld-na-27788-en-n.pdf>.

## **EEA Data on CO<sub>2</sub> Emissions from New Passenger Cars**

On 14 April 2016 the European Environment Agency (EEA) published the 2015 provisional data on CO<sub>2</sub> emissions from new passenger cars.

New cars sold in the EU in 2015 emitted on average 119.6 g CO<sub>2</sub>/km, more than 10 g CO<sub>2</sub>/km below the 2015 target, based on standardised laboratory conditions, following the requirements of the New European Driving Cycle (NEDC) test procedure.

The average fuel efficiency of petrol cars (122.6 g CO<sub>2</sub>/km) has been catching up with the fuel-efficiency of diesel cars (119.2 g CO<sub>2</sub>/km) in recent years.

Sales of new passenger cars in the EU increased in 2015 compared to the previous year. A total of 13.7 million new cars were registered, representing an increase of 9% compared to 2014. Registrations increased in all Member States except Luxembourg and Slovenia.

Diesel cars remain the most sold vehicles in the EU, constituting 52% of sales. As in past years, the countries with the highest proportions of diesel sales include Ireland and Luxembourg (71%), Portugal (69%), and Croatia, Greece and Spain (63%).

Sales of plug-in hybrids and battery-electric vehicles continued to increase. The relative share of plug-in hybrids and battery-electric vehicle sales was highest in the Netherlands and Denmark, reaching 12% and 8% respectively of national car sales in 2015. However, sales of such vehicles still remain a small fraction of total sales, accounting for just 1.3% of all new EU cars sold.

Around 57 000 pure battery-electric vehicles were registered in 2015, a 50% increase compared to 2014. The largest number of registrations were recorded in France (more than 17 650 vehicles), Germany (more than 12 350 vehicles) and the UK (more than 9 900 vehicles).

It has not yet been confirmed whether different manufacturers have met their own specific annual CO<sub>2</sub> targets, based on the average weight of the cars they sell. The EEA will publish the final data on OEM's individual performances in the autumn of 2016.

The data is at [www.eea.europa.eu/highlights/reported-co2-emissions-from-new](http://www.eea.europa.eu/highlights/reported-co2-emissions-from-new).

## **Commission Communication on EU Climate Objectives**

On 2 March 2016 the European Commission presented a communication assessing the implications for the EU of the new global climate agreement adopted at the COP21 in Paris in December 2015. The assessment was accompanied by a proposal for the EU to sign the Paris Agreement (*this was done on 22 April 2016 – see below*).

The Commission said that the early ratification and entry into force of the Paris Agreement will give the legal certainty that the Agreement begins operating quickly.

The EU will need to be ready to participate in the review processes to ensure the achievement of the goal of keeping climate change well below 2°C and pursuing efforts towards 1.5°C. The EU will provide input to the scientific work being carried out internationally for that purpose. Further, by 2020, all countries should communicate their 2050 long-term decarbonisation strategies.

In October 2014 the European Council agreed on the 2030 climate and energy policy framework for the EU setting a domestic target of at least 40% greenhouse gas emission reduction for 2030. The Paris Agreement vindicates the EU's approach and implementing the 2030 climate and energy framework agreed is a priority in follow up to the Paris Agreement.

## **Update on Heavy- and Light-duty CO<sub>2</sub> Legislation**

On 19 April 2016 Climate and Energy Commissioner Miguel Arias Cañete addressed the Environment Committee of the European Parliament and told the Commission's plans regarding on-road CO<sub>2</sub> legislation.

Cañete indicated that the Commission was currently working on a proposal on monitoring and reporting of CO<sub>2</sub> emissions from Heavy-duty vehicles (HDV). The Commission plans to adopt such a proposal in 2017. It would be on the monitoring and reporting to the Commission of new HDV CO<sub>2</sub> emissions as calculated by a computer simulation tool VECTO by Member States. Reporting would facilitate the monitoring and dissemination of certified newly registered HDV CO<sub>2</sub> values. The expected proposal would be part of the European Union's strategy for reducing CO<sub>2</sub> emissions and fuel consumption from HDVs.

Based on this first step, the Commission would assess the current gaps in measurements, and decide whether or not to come forward with CO<sub>2</sub> targets for HDVs.

Regarding post-2020 CO<sub>2</sub> targets for passenger cars and vans, Cañete said proposals were expected to be presented in 2017. Proposals should be ambitious, credible and realistic, and will be essential for the transport sector to achieve its 2030 target of a 30% reduction of emissions and other longer-term targets.

Commissioner Cañete also informed MEPs that the Commission was considering the possibility of real-driving emission (RDE) test procedures for the measurement of CO<sub>2</sub> emissions. He indicated that the Commission had requested scientific advice on the feasibility of these real-driving tests.

## **Report on Sulfur Emissions Control Area (SECA) Impact on Air Quality**

On 20 April 2016 CE Delft released a new report on "SECA assessment: impacts of 2015 SECA marine fuel sulphur limits".

Since 1 January 2015, the maximum sulfur content of marine fuels used in the North and Baltic Sea designed as a Sulfur Emissions Control Area (SECA) has been reduced from 1% to 0.1%. Before implementation, the reduction of the SECA fuel sulfur content led to discussions about the availability of marine gasoil (MGO), economic impacts, and the need for effective compliance and enforcement. The objective of the

study, commissioned by the German NGO NABU, is to present an ex-post assessment showing the first experiences under the 0.1% fuel sulfur regime.

The available studies show a noticeable improvement of the air quality in port areas and along coast lines in 2015, compared to the year before. Sulfur concentration reductions of 50% and more have been reported. The health benefits resulting from the air quality improvements range between €4.4 billion and €8 billion. The additional fuel costs for the maritime sector of the use of 0.1% MGO in the North and Baltic Sea have been quantified at €2.3 billion. So, the health benefits due to lower emissions of SO<sub>2</sub> and PM are 1.9 to 3.5 times higher than the increase in fuel cost. This shows that the benefits of the introduction of the new regulations have outweighed the costs of that policy.

The first year of the 0.1% sulfur SECA regulation has shown that in ports, where the controls are performed, a large majority of ships use a fuel that is compliant. Between 3 and 9% of the ships are non-compliant in the Baltic Sea and North Sea ports respectively.

CE Delft recommends to further develop monitoring and control techniques, including (remote) control on open seas, to increase the monitoring system. This will contribute to the effectiveness of the inspection regime.

The report is at

[www.cedelft.eu/publicatie/seca\\_assessment%3A\\_impacts\\_of\\_2015\\_seca\\_marine\\_fuel\\_sulphur\\_limits/1780](http://www.cedelft.eu/publicatie/seca_assessment%3A_impacts_of_2015_seca_marine_fuel_sulphur_limits/1780).

## **EEA Report on Renewable Energy in Europe 2016**

On 16 March 2016 the European Environment Agency (EEA) published the 2016 issue of their report on Renewable Energy in Europe.

This report complements the findings shown in the "Trends and Projections in Europe 2015 - Tracking progress towards Europe's climate and energy targets" report with details about the 2013 renewable energy sources progress at EU and at country level, and for key renewable energy sources technologies.

EEA calculations show that the EU-wide share of renewable energy in final EU energy use has increased from 14.3% in 2012 to 15.0% in 2013. The EEA approximated renewable energy sources estimate for 2014 indicates that the EU share of renewable energy continued to grow, reaching 15.2% in 2014.

At Member State level the renewable shares vary widely, ranging from over 30% of gross final energy consumption in countries such as Finland, Latvia and Sweden, to less than 5% in Luxembourg (3.6%), Malta (3.8%) and the Netherlands (4.5%).

EEA Report No 4/2016 is at

[www.eea.europa.eu/publications/renewable-energy-in-europe-2016](http://www.eea.europa.eu/publications/renewable-energy-in-europe-2016).

## **Commission Consultation on Lobbying Transparency Register**

On 1 March 2016 the European Commission launched a public consultation to gather input on the current regime for registration of interest representatives who seek to influence the work of the EU institutions and on its development into a mandatory lobby register covering the European Parliament and Council as well as the Commission.

This Commission is committed to increased transparency, in the way it operates and in EU decision-making overall. In that context it has announced its intention to propose improvements to the Transparency Register, which is a tool put in place by the European Parliament and the European Commission to cast light on lobbying activities seeking to influence European policy-making.

This public consultation has two objectives: to gather views on the functioning of the current Transparency Register and to receive input for the design of the future mandatory regime of registration announced in President Juncker's Political Guidelines.

The Consultation is open until 1 June 2016 and is at [http://ec.europa.eu/transparency/civil\\_society/public\\_consultation\\_en.htm](http://ec.europa.eu/transparency/civil_society/public_consultation_en.htm).

## **Dutch Report on Real-Driving Emissions of Euro 5 & 6 Diesel Passenger Cars**

On 10 March 2016 the Dutch research organization TNO published a new report on real-world NOx emissions tests that they carried out on behalf of the Dutch Ministry of Infrastructure and the Environment on Euro 5 and 6 diesel passenger cars.

Different tests were conducted on a chassis dyno (NEDC, CADC, WLTC and a TNO-specific cycle) and on the road (different routes, of which one complies with the adopted RDE legislative requirements). On-road NOx emissions measurements were conducted either with a commercially-available PEMS or with an in-house developed tool called SEMS (Smart Emissions Measurement System).

According to TNO, Euro 5 and 6 diesel cars emit much more NOx in daily use than during the chassis dyno type-approval test. On average the vehicles tested emitted 3 to 5 times more NOx on the road than in the type-approval test. Unlike in their previous reports, TNO shared details on makes and models of the vehicles tested. The Euro 6 passenger cars tested appear to have somewhat lower real-world NOx emissions than Euro 5 vehicles, but TNO said that definitive conclusions on the effectiveness of the current Euro 6 standard require more testing with a larger number of models including those in the medium and smaller size segments.

The report adds that it is technically feasible to reduce real-world NOx emissions using existing deNOx technologies. A number of vehicles actually show that a proper combination of existing emissions control technologies can ensure real-world emissions close to the type-approval value.

The TNO report is at [www.tno.nl/en/about-tno/news/2016/3/tno-publishes-overview-with-details-of-diesel-cars-tested-from-2010-to-2015](http://www.tno.nl/en/about-tno/news/2016/3/tno-publishes-overview-with-details-of-diesel-cars-tested-from-2010-to-2015).

## **German Report on Diesel Emissions Investigations**

On 22 April 2016 the German Federal Minister of Transport, Mr Dobrindt, presented the report of the "Volkswagen Commission of Inquiry".

Investigators from the German Federal Motor Transport Authority (KBA) checked emissions from 53 different vehicle models. Among those were 32 Euro 6 passenger cars, 24 Euro 5 passenger cars and 5 light commercial (N1) vehicles.

All vehicles were run through eight different tests. Three lab tests were conducted: 1) regulatory cold-start NEDC with preconditioning; 2) same as 1, but without preconditioning (warm engine); and 3) NEDC at 10°C instead of the regulatory 25°C. In addition, five on-road tests were performed: 4) NEDC on the road using PEMS; 5) NEDC backwards (i.e. first driving the extra-urban part and then the urban part of the cycle); 6) NEDC trace but with all velocities 10% higher; 7) NEDC trace but with all velocities 10% lower; and 8) according to the Real-Driving Emissions (RDE) test procedure.

Investigations have shown that only Volkswagen used a defeat device that detected test cycles and altered calibrations accordingly; the defeat device was identified on all four Euro 5 VW cars tested (Polo, Golf Plus, Beetle, and Passat). No such defeat device was found on the Euro 6 VW cars tested.

Emissions nevertheless increased drastically in a number of test vehicles. Amongst Euro 6 models tested, two Renault Kadjar were found to emit up to 18 times more NOx when tested on the road than in the laboratory, a Suzuki Vitara (14 times higher), a Dacia Sandero (12 times higher) and an Opel Zafira (11 times higher).

The Ministry for Transport shared the test results with manufacturers before they were publicly released, and asked them to explain the high emissions. Generally, the manufacturers claimed that at lower temperatures they have to reduce the exhaust aftertreatment of their vehicles to prevent damage to the engine. For some manufacturers "lower temperatures" means below 20°C (Alfa Romeo, Fiat, Hyundai, Jeep, Opel), others define it as below 17°C (Audi, Nissan, Porsche). Investigators doubted that such "thermal windows" are

fully justified by engine protection, Minister Dobrindt said. Manufacturers concerned have been asked to take measures to restrict the thermal window to what is actually necessary. All affected German manufacturers have declared in writing that they will perform the required optimizations.

Manufacturers who use the thermal window technique, Audi, Mercedes, Opel, Porsche and VW, will voluntarily recall approximately 630 000 vehicles produced in Europe for optimization of the emissions control. The KBA will check the improved emission control concepts for their effectiveness.

Prior to KBA approval of the optimized control software, a manufacturer must describe and explain the specific function in the control software to the KBA, as well as the reasons the manufacturer believes the engine protection is necessary.

The KBA will validate this. When in doubt, KBA will carry out additional measurements on the road with Portable Emission Measurement Systems (PEMS).

The report (in German) is at [www.bmvi.de/SharedDocs/DE/Anlage/VerkehrUndMobilitaet/Strasse/bericht-untersuchungskommission-volkswagen.pdf](http://www.bmvi.de/SharedDocs/DE/Anlage/VerkehrUndMobilitaet/Strasse/bericht-untersuchungskommission-volkswagen.pdf).

A summary (in English) of the KBA report has been published by the ICCT at <http://theicct.org/blogs/staff/first-look-results-german-transport-ministrys-post-vw-vehicle-testing>.

## **UK Report on Diesel Emissions Investigations**

On 21 April 2016 the UK Government published its research into emissions levels from leading diesel car models, fulfilling a commitment to consumers to investigate potential manipulation of emission controls.

Tests have been carried out on a total of 56 different vehicle types in Germany and 37 different vehicle types in the UK, over a period of 6 months. The Vehicle Certification Agency (VCA) on behalf of the Department for Transport (DfT) tested a representative selection of the UK's top selling diesel vehicles.

Several tests were conducted: the regulatory NEDC in the lab; cycle recognition lab tests to check whether vehicles were equipped with defeat devices (hot start NEDC, hot start reversed NEDC, hot start double NEDC, and a hot start NEDC with vehicle speed increased by 10%); NEDC tests on the test track, and on-road emissions examining what levels of NOx emissions are typically produced during real driving on public roads in the UK, covering urban, rural and motorway use.

The tests have not detected evidence of test cycle manipulation strategies as used by the VW Group. Tests have provided further evidence that NOx emissions are higher in real world conditions and on the test track than they are in laboratory conditions. This

was the case for all manufacturers' vehicles, with results varying significantly between different makes and models.

On average the measured on-road NOx emissions from Euro 5 vehicles were 1135 mg/km – over six times higher than the 180 mg/km legislative limit. The average on-road NOx emissions from Euro 6 cars were 500 mg/km, six times higher than the limit.

In general, vehicles that were tested on a test track or on the road at lower ambient temperatures tended to produce higher NOx emissions than those which were tested at higher ambient temperatures.

The report concludes that further improvements to European regulations will help avoid any uncertainty in how the systems are allowed to operate in the future. In particular, the new Real-Driving Emissions (RDE) tests will make it very difficult, if not impossible, for a vehicle manufacturer to manipulate type-approval emissions testing in the future - either through the use of cycle recognition or prohibited defeat devices.

The report is at [www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/518437/vehicle-emissions-testing-programme.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/518437/vehicle-emissions-testing-programme.pdf).

## **UK Parliament Report on Air Quality**

On 27 April 2016 the Environment Committee of the UK Parliament issued a new report on air quality.

The Committee's report presses for new Clean Air Zones in dozens of English towns and cities to cut the risk of cardiac, respiratory and other diseases caused by polluted air. The UK Government plans new Clean Air Zones for five of the most polluted cities but MPs say more is needed to cut the health and environmental impacts of pollutants, including particulates and nitrogen dioxide.

The Committee also urges the Government to consider introducing a diesel scrappage scheme for older vehicles where owners of more than 10 years old diesel cars would be offered a discount on buying an ultra-low emissions vehicle.

The report finally calls for more spread of modern farming practices aimed at cutting greenhouse gas emissions and other pollutants.

The report is at [www.publications.parliament.uk/pa/cm201516/cmselect/cmenvfru/479/479.pdf](http://www.publications.parliament.uk/pa/cm201516/cmselect/cmenvfru/479/479.pdf).

## **UK Parliament Hearing on EU Vehicle Type-Approval Reform**

On 14 March 2016 the UK Parliament's Transport Committee held a hearing on the EU vehicle Type-Approval reform.

The Society of Motor Manufacturers and Traders (SMMT) and the European Commission were heard.



SMMT Chief Executive Mike Hawes mentioned that Real-Driving Emissions (RDE) will be incredibly difficult to meet for the industry. RDE will require huge amounts of R&D investment – hundreds of millions of Euros or Pounds per company. Current projects may have to be cancelled because the envisaged technology is not sufficient to meet the 2017 Conformity Factor of 2.1, especially for smaller vehicles, he said.

Answering to a MP question on the reason why NO<sub>x</sub> should be measured on the road and CO<sub>2</sub> in the lab, Hawes said that NO<sub>x</sub> is a pass-fail test while CO<sub>2</sub> is the basis for taxation and provides a like-for-like comparison of vehicles.

Antti Peltomäki, Deputy Director-General of DG-Growth of the European Commission, then summarized the EC proposals on RDE and the Type-Approval framework review. Peltomäki noted that all evidence will be used for the review of the error margin of the second Conformity Factor for RDE and the JRC will be in charge of the review. Regarding the proposed Regulation for a new Type-Approval framework, market surveillance is the key aspect to close loopholes from the current system, he said.

The hearing can be watched at [www.parliamentlive.tv/Event/Index/d51f0870-82ca-4295-8ed2-975294a90ae9](http://www.parliamentlive.tv/Event/Index/d51f0870-82ca-4295-8ed2-975294a90ae9).

## **UK Report on EU Environmental Policy**

On 19 April 2016 the UK Parliament's Environmental Audit Committee released a report on EU and UK Environmental Policy.

The report summarizes six public hearings with academics, UK and EU stakeholders, business groups, the EU Commission, and the Parliamentary Under-Secretaries of State for Environment, Food and Rural Affairs (DEFRA) and for Energy and Climate Change (DECC) as well as a number of written contributions.

The report says that UK's EU membership has been a crucial factor in the shaping of its environmental policy since it joined the EU in the 1970s. The overwhelming view of witnesses was that EU membership has been positive for the UK environment. None of the witnesses to the inquiry, even those who made criticisms, made an environmental case for leaving the EU.

The influence of the UK in EU policy-making has been a central theme of this inquiry. The process of EU environmental policy development has been a two-way street. On the one hand, the EU has led the UK to improve environmental standards in areas such as air and water pollution and biodiversity. It has also given the UK a platform to pursue its environmental objectives internationally and has provided access to a useful pool of knowledge. On the other hand, the UK has been a major player in the EU, influencing the strategic and long term direction of EU environmental

policy and the design of specific laws and policies. The UK's membership of the EU has ensured environmental action was taken on a faster timetable and more thoroughly than would otherwise have been the case. The report also says that despite the UK's relatively good performance, environmental standards could be improved if the UK government took a more ambitious approach to implementation. Many of the concerns raised around EU policy related to implementation.

The overwhelming majority of witnesses believed that the UK's membership of the EU has improved the UK's approach to environmental protection and ensured that the UK environment has been better protected.

The report is at [www.publications.parliament.uk/pa/cm201516/cmselect/cmenvaud/537/537.pdf](http://www.publications.parliament.uk/pa/cm201516/cmselect/cmenvaud/537/537.pdf).

## **Emissions Inventory in the UK between 1990 and 2014**

On 15 March 2016 the UK Department for Environment, Food & Rural Affairs issued their emissions inventory report for the period 1990 to 2014.

The report presents an overview of institutional arrangements and the emission inventory compilation process in the UK, it presents the emission estimates for each pollutant up to 2014, it explains the methodologies for key pollutants and key sectors used to compile the inventories, including a brief summary of the projections, and it provides other supporting information pertinent to the UNECE Convention on Long-Range Transboundary Air Pollution (CLRTAP) data submission.

Between 1990 and 2014, nitrogen oxide emissions (as NO<sub>2</sub>) have been reduced by 68%, SO<sub>x</sub> (as SO<sub>2</sub>) by 92%, ammonia by 13%, Non-Methane Volatile Organic Compounds (NMVOC) by 70%, carbon monoxide by 73%, PM<sub>10</sub> by 50%, and PM<sub>2.5</sub> by 46%.

As far as the road traffic contribution is concerned, road traffic has grown over the period but there has been a decline in emissions. Since 1992, the requirement for new petrol cars to be fitted with three-way catalysts has reduced emissions of NO<sub>x</sub>, CO, and NMVOC, the report notes. The further tightening up of emission standards on petrol cars and all new diesel vehicles over the last decade has also contributed to the reduction in NO<sub>x</sub> emissions. Recent evidence has shown however that Euro 4 and 5 diesel cars exceed their type approval limit for NO<sub>x</sub> in real-world operation by significant amounts meaning that there has been little change in emission factors across the range of Euro standards for diesel cars.

The report is at [https://uk-air.defra.gov.uk/assets/documents/reports/cat07/1603150959\\_GB\\_IR\\_2016\\_Final.pdf](https://uk-air.defra.gov.uk/assets/documents/reports/cat07/1603150959_GB_IR_2016_Final.pdf).

## Interim Report on the French Diesel Car Emissions Programme

On 7 April 2016 the French Ministry for Environment issued an interim report on the state of play of the on-going evaluation of pollutant and CO<sub>2</sub> emissions of diesel vehicles available on the French market. This was followed on 28 April 2016 by an updated version of the report where the brands and models of vehicles tested were added.

To date 52 vehicles from 15 different brands have been randomly sampled on the French market and tested at UTAC. The test protocol includes three specific evaluations: “D1” is a modified type-approval chassis-dyno NEDC test (modified bonnet position, mobile non-driving wheels, rear gear engaged); “D2” is a type-approval chassis-dyno test where the beginning on the NEDC test has been modified, and “D3” is an NEDC speed trace performed on a track with on-board measurement of emissions with a PEMS instrument.

Looking at the 23 Euro 6 cars only, the Nissan Qashqai fitted with EGR and LNT was the worst on the D1 test with NO<sub>x</sub> emissions up to 300 mg/km (3.7 times higher than the limit). The Renault Captur tested (also EGR+LNT) emits more than 200 mg/km, the same is true for the Ford Kuga which however uses a combination of EGR, LNT, and SCR.

On the D2 test the Renault Captur performed the worst, followed by the Mercedes S350 and the Opel Zafira.

Finally, on the on-road D3 test, most models exceeded the Euro 6 limit, especially the Opel Zafira and the Renault Captur which NO<sub>x</sub> emissions reached more than 10 times the Euro 6 limit. Only the BMW 318 and Peugeot 208 met the standard on that test.

In regard to CO<sub>2</sub>, three quarters of the Euro 6 vehicles tested emitted 20 to 50% higher CO<sub>2</sub> than their certification value during the on-road D3 test. On the D1 tests, the closest one to the type-approval conditions, CO<sub>2</sub> discrepancies up to 30% were observed on some models like the Mercedes S350 and the Opel Zafira.

The updated report (in French) is at [www.developpement-durable.gouv.fr/IMG/pdf/DP\\_Resultats\\_Commission\\_UTAC\\_le\\_27-04-2016.pdf](http://www.developpement-durable.gouv.fr/IMG/pdf/DP_Resultats_Commission_UTAC_le_27-04-2016.pdf).

## Paris 2015 Air Quality Report

On 8 April 2016 Airparif, the organization accredited by the French Ministry of Environment to monitor the air quality in the Paris region, published its annual air quality report for the year 2015.

Despite some improvements on nitrogen dioxide concentrations in 2015, 1.5 million citizens of the Paris region are still exposed to levels higher than the regulatory limits. For particles and ozone, the situation

has not worsened but the concentrations levels remain unsatisfactory.

In 2015 five pollutants still exceeded the limits in the Paris region: nitrogen dioxide, particles (PM<sub>10</sub> and PM<sub>2.5</sub>), ozone, and benzene.

The report (in French) is at

[www.airparif.asso.fr/pdf/publications/Bilan\\_QA\\_IDF\\_2015.pdf](http://www.airparif.asso.fr/pdf/publications/Bilan_QA_IDF_2015.pdf).

## Report on France’s Environmental Concerns

On 12 April 2016 the French General Commission on Sustainable Development (CGDD) published its annual study on France’s environmental concerns.

French citizens ranked air quality as their second most pressing environmental concern in 2015. Never before has the issue been so prominent in the annual CGDD report on the environmental opinions and practices of the French population. One of the most plausible explanations for this change of attitude is the awareness raised by the implementation of road space rationing in Paris (on 17 March 2014, then again on 23 March 2015), following spikes in atmospheric pollution.

Almost half of French citizens still believe that it should be up to public authorities to protect the environment, before their individual actions have any effect.

Climate change held on top of the ranking, bolstered by the international climate conference (COP 21), held in Paris in December 2015.

The report (in French) is at [www.developpement-durable.gouv.fr/IMG/pdf/CS750.pdf](http://www.developpement-durable.gouv.fr/IMG/pdf/CS750.pdf).

## EU Mayors’ Open Letter on Air Quality and Vehicles Emissions Regulation

On 16 March 2016 Mayors from 20 big EU cities signed in the French newspaper Le Monde an open letter titled “priority to citizens’ health, not to industry lobbies”.

The Mayors attacked the EU institutions for relaxing vehicle emissions legislation and allowing some leeway in Diesel NO<sub>x</sub> real-driving emissions. They wrote “How can we protect the health of our fellow citizens when the European Union has rubber-stamped a permit to pollute, at the expense of public health? (...) What can we say to parents whose children are suffering from acute respiratory disorders, or to elderly people and to the most vulnerable? Should we tell them that their government has prioritised the health of the automotive industry over their own?”

The mayors appealed to European national governments to use all their political and legal means to ensure air pollution standards are applied consistently across industries.

Signatory Mayors are Anne Hidalgo (Paris), Yorgos Kaminis (Athens), Ada Colau (Barcelona), Manuela Carmena (Madrid), Giuliano Pisapia (Milan), Yvan Mayeur (Brussels), Eberhard van der Laan (Amsterdam), Ahmed Aboutaleb (Rotterdam), Fernando Medina (Lisbon), Frank Jensen (Copenhagen), Michael Häupl (Vienna), Raymond Johansen (Oslo), Nils Ušakovs (Riga), Yordanka Fandakova (Sofia), Karin Wanngård (Stockholm), Ioan-Razvan Sava (Bucharest), István Tarlós (Budapest), Alexiei Dingli (La Valette), Constantinos Yiorkadjis (Nicosia), and Hanna Gronkiewicz-Waltz (Warsaw).

## Italy in Infringement to Fuel Quality Directive

On 25 February 2016 the European Commission announced it has sent a reasoned opinion to Italy urging it to adopt and notify national transposition measures of the fuel quality Directive 2014/77/EU.

The purpose of the Directive is to update references to the petrol and diesel fuel technical standards sold within the EU. The Directive had to be implemented by 11 June 2015. Despite a letter of formal notice sent to Italy and other eight Member States on 22 July 2015, Italy is the only Member State that has not notified to the Commission its national measures to comply with these standards.

Italy now has two months to notify the Commission of the measures taken to transpose the Directive; otherwise, the Commission may decide to refer Italy to the Court of Justice of the EU. The Court may then decide to impose financial sanctions.

## Austrian Study on Fuel Consumption of Passenger Cars

On 15 March 2016 the Austrian Federal Chamber of Labour (AK), the Austrian Trade Union Federation (ÖGB), and the European Consumer Organisation (BEUC) organized a panel debate on “Fuel consumption of passenger cars: will EU measures restore trust among consumers?”

Günther Lichtblau, head of unit on mobility and noise in the Austrian Environment Agency (UBA) presented a new study commissioned by AK Wien “Passenger Car Emissions: Standard and Real-World Fuel Consumption” and stressed the impacts of too optimistic fuel consumption claims by carmakers on consumers in Austria. Based on the 30 car models most registered in Austria between 2000 and 2013, the report indicates that the fuel consumption difference between real world and type-approval values increased from 7% in 2000 to 27% in 2013. Extrapolation to 2030, assuming a CO<sub>2</sub> target of about 75 g/km by that date, the difference is expected to increase up to 72% if nothing changes.

The UBA suggested that WLTP will help but will not solve the issue. On-road fuel consumption and CO<sub>2</sub> measurements combined with publication of independent third-party testing results would help closing the gap.

The UBA study is at

[www.akeuropa.eu/includes/mods/akeu/docs/main\\_report\\_en\\_398.pdf](http://www.akeuropa.eu/includes/mods/akeu/docs/main_report_en_398.pdf).

## Financial Incentives for Electric Vehicles in Germany

On 27 April 2016 German Federal Finance Minister Wolfgang Schaeuble announced a plan to invest about €1 billion to promote Electric Vehicles (EVs).

The plan will include subsidies of €4000 for buyers of electric cars and €3000 for those of plug-in hybrids. Subsidies will be shared equally by the Government and the car industry. Luxury cars of more than €60 000 are excluded from the plan.

The scheme is expected to start in May 2016 and the Government is considering additional steps such as tax incentives to make EVs even more attractive.

€300 million will also be used on the charging infrastructure between 2017 and 2020.

The German Government has said it wants to raise the number of electric vehicles on German roads to one million by 2020, from about 50 000 currently.

## NORTH AMERICA

### Canadian Health Risk Assessment of Diesel Exhaust

The Government of Canada released on 4 March 2016 the Human Health Risk Assessment for Diesel Exhaust, a comprehensive review and analysis of the potential adverse health effects associated with diesel fuel use in Canada.

The report focuses on diesel exhaust emissions from on-road and off-road vehicles (excluding rail and marine applications) and targets impacts resulting from general population exposures. The assessment includes a review of diesel fuels, engines and emissions, a review of exposure to diesel exhaust, an evaluation of the health effects associated with diesel exhaust exposure, as well as a quantitative analysis of the population health impacts associated with the contribution of diesel exhaust to air pollutant concentrations in Canada.

Overall, it is concluded that diesel exhaust is associated with significant population health impacts in Canada and efforts should continue to further reduce emissions of diesel exhaust, particularly in areas with large populations.

The modelling undertaken estimates that on-road diesel emissions are associated with 320 premature mortalities for 2015 (valued at \$2.3 billion or €1.4 billion), with 65% and 35% of the estimated mortalities attributable to ambient PM<sub>2.5</sub> and NO<sub>2</sub>, respectively. Together, on-road and off-road diesel emissions are associated with 710 premature mortalities (valued at \$5.1 billion or €3.4 billion), with 65%, 32% and 3% of the estimated mortalities being attributable to ambient PM<sub>2.5</sub>, NO<sub>2</sub> and O<sub>3</sub>, respectively.

Diesel emissions are also associated with significant numbers of acute respiratory symptom days, restricted activity days, asthma symptom days, hospital admissions, emergency room visits, child acute bronchitis episodes and adult chronic bronchitis cases across Canada.

The risk assessment report can be requested from <http://healthycanadians.gc.ca/publications/healthy-living-vie-saine/exhaust-diesel-gaz-echappement/index-eng.php>.

## **US EPA Research Funding for Climate Change Impact on Air Quality**

On 6 April 2016 the US Environmental Protection Agency (EPA) announced \$8.5 million (€7.3 million) in research funding to 12 universities to protect air quality from the current and future challenges associated with the impacts of climate change.

With the funding, researchers will expand investigations to understand health impacts from smoke due to a rise in wildfires that are increasing as a result of climate change; atmospheric changes in air pollution chemistry that are occurring due to climate change; potential consequences of increased levels of dust from particle pollution on human health and visibility; drought and land-use changes in the western US that may impact the incidence of dust storms; and impacts to air quality from increased nitrogen-based fertilizer use.

## **EPA Report on Diesel Retrofit**

On 23 March 2016 the US Environmental Protection Agency released a report on the highlights from their Diesel Emission Reduction Program.

Since its start in 2008, the Diesel Emission Reduction Act (DERA) program has significantly improved air quality for communities across the country by retrofitting and replacing older diesel engines.

The funding from the program has helped clean up approximately 335 200 tons of nitrogen oxides (NO<sub>x</sub>) and 14 700 tons of particulate matter (PM), which are linked to a range of respiratory ailments and premature death. The program has also saved 450 million gallons of fuel and prevented 4.8 million tons of carbon dioxide (CO<sub>2</sub>) emissions – equivalent to the annual CO<sub>2</sub> emissions from more than 900 000 cars.

The US EPA estimated that clean diesel funding generated up to \$13 of public health benefit for every \$1 spent on diesel projects.

The US EPA report is at [www.epa.gov/sites/production/files/2016-03/documents/420r16004.pdf](http://www.epa.gov/sites/production/files/2016-03/documents/420r16004.pdf).

## **California Strategy to reduce Short-Lived Climate Pollutants**

On 11 April 2016 the California Air Resources Board (CARB) released a new draft of California's Short-Lived Climate Pollutant Strategy to drastically reduce the near-term climate impacts of these potent pollutants.

Short-lived climate pollutants (SLCPs) are chemical agents with an outsized global warming impact up to thousands of times stronger than CO<sub>2</sub>. These agents include methane, black carbon (soot) and hydrofluorocarbons (HFCs).

Together, these pollutants represent about 12% of California's total annual greenhouse gas emissions inventory, but pose an immediate danger to the State and must be dealt with on a highly accelerated timeframe, CARB said.

The Proposed Strategy calls for effectively implementing regulations currently under development to cut methane emissions by 45% from oil and gas exploration, extraction, pipeline and storage facilities by 2025.

Regarding black carbon, California has already reduced black carbon emissions by more than 90% in the last 50 years, primarily through stringent diesel regulations. The Proposed Strategy highlights additional efforts such as working with local air districts to reduce black carbon from home woodstoves to achieve an additional 3 million metric tons of reductions by 2030. The Strategy also notes the need for further efforts to reduce black carbon from wildfires in the State's forests.

A final Reduction Strategy, including comments received on the environmental analysis, will be voted on by the CARB Board in the fall of 2016.

More info is available at [www.arb.ca.gov/cc/shortlived/shortlived.htm](http://www.arb.ca.gov/cc/shortlived/shortlived.htm).

## **California fines Shipper for Failure to switch to Cleaner Fuel in Coastal Area**

On 3 March 2016 the California Air Resources Board (ARB) announced it has fined the China Navigation Co. Pte. Ltd. for violating clean air regulation.

The shipper company was fined \$129 500 (€) for failing to switch its engines over from heavy diesel "bunker" fuel to cleaner, low-sulfur fuel when close to the California coast, as required by state law.

The ARB conducts an estimated 800 to 1000 ship inspections each year, checking for proper fuel usage, record-keeping and other compliance requirements. Part of the inspection involves sampling each vessel's fuel, and analysing the fuel sample for compliance with ARB fuel sulfur requirements. On 28 December 2012 an ARB inspector found that the vessel Chenan, managed by the China Navigation company, operated within regulated California waters (i.e. 24 miles or less from the coast) on non-compliant heavy fuel oil on 12 separate days (four voyages) between 5 August and 28 December 2012, while en route to and departing from the port of Los Angeles.

China Navigation took action after being notified of these violations and cooperated with the investigation, ARB said. In addition to paying a fine, the company agreed to comply with all fuel switchover requirements and to keep accurate records going forward.

## CENTRAL & SOUTH AMERICA

### ICCT Environmental Assessment of Diesel Cars in Brazil

On 1 March 2016 the International Council on Clean Transportation (ICCT) published a report titled "Environmental risks of diesel passenger vehicles in Brazil".

The analysis examines the environmental risks of the commercialization of diesel passenger cars in Brazil, including a potential increase in NO<sub>x</sub> and PM<sub>2.5</sub> emissions.

The ICCT concludes that, given current regulatory standards, the wide commercialization of diesel cars would significantly increase NO<sub>x</sub> and PM<sub>2.5</sub> emissions, contributing to poor air quality and adding 150 000 premature deaths through 2050. Even a moderate rate of dieselization, with diesel vehicles representing about 15% of light-duty vehicle sales after 2030, could result in as many as 32 000 additional premature deaths through 2050.

Increased climate impacts due to additional emissions of CO<sub>2</sub> and black carbon are also shown by the analysis, the ICCT said.

Recommendations to Brazilian regulators include to adopt stringent vehicle emissions standards (equivalent to either US Tier 2 or Euro 6) to ensure that diesel vehicles are equipped with particle filters; phase out 500 ppm sulfur diesel outside metropolitan areas to avoid the risk of misfueling and damaging aftertreatment control systems; and implement an effective in-use compliance and enforcement program, with real-world testing, to ensure that real-world NO<sub>x</sub> emissions from diesel vehicles are adequately controlled.

Until new stringent vehicle and fuel standards are in place and shown to be effectively controlling both PM and NO<sub>x</sub> emissions from diesel vehicles, any decision to lift diesel car restrictions would run counter to environmental and health goals, the ICCT concluded.

The ICCT report is at

[www.theicct.org/sites/default/files/publications/Brazil%20LDV%20Diesel%20White%20paper%20vF.pdf](http://www.theicct.org/sites/default/files/publications/Brazil%20LDV%20Diesel%20White%20paper%20vF.pdf).

## EURASIA

### ICCT Report on Turkish Automotive Sector

On 18 March 2016 the International Council on Clean Transportation (ICCT) published a report providing a baseline analysis on the automotive sector in Turkey.

The report assesses the vehicle fleet structure, fuel consumption and emissions, and compares it with the EU market and other key global markets, and with the German automotive sector in particular.

Passenger cars and light commercial vehicles account for three quarters of Turkey's vehicle fleet. The level of fuel efficiency of new cars and vans is similar to that of comparable vehicles in Germany and the EU. At present trends, CO<sub>2</sub> emissions from road transport in Turkey will approximately double by 2030. Turkey is however yet to introduce mandatory vehicle CO<sub>2</sub> standards.

About half of all new cars in Turkey are first registered in the Istanbul area. Urban areas are typically most affected by the negative impacts of road transportation, such as high levels of local air pollutants.

Heavy-duty vehicles account for only about one tenth of the market in Turkey, but they are responsible for more than half of fuel consumption and CO<sub>2</sub> emissions.

The ICCT report is at

[www.theicct.org/sites/default/files/publications/ICCT\\_Turkish-fleet-baseline\\_20160318.pdf](http://www.theicct.org/sites/default/files/publications/ICCT_Turkish-fleet-baseline_20160318.pdf).

## ASIA PACIFIC

### Japan said to introduce On-Road Emissions Tests for Diesel Vehicles

On 4 March 2016 the *Japan Times* newspaper reported that the Transport Minister of Japan Mr Keiichi Ishii reported on the outcome of on-road emissions tests conducted in the context of the Volkswagen scandal.

No defeat device was found in the six models recently evaluated but the four models from Toyota, Nissan and Mitsubishi emitted NO<sub>x</sub> emissions 2 to 10 times the maximum level allowed in bench tests. The reason was that the emissions control systems stopped functioning at low, winter ambient temperatures, according to the Ministry. NO<sub>x</sub> levels were mostly within the limits for the two other models tested, both from Mazda.

On 21 April 2016 Japanese media *Jiji Press* reported that the Japanese Government released a report including a plan to use on-road tests as well as conventional laboratory-condition examinations in response to VW diesel emission test cheating scandal. The interim report, worked out by the Transport and Environment Ministries, won broad approval at a meeting of experts set up by the Ministries, officials said.

The Government aims to start the new Real-Driving Emissions test regime as early as autumn 2017 after setting its details and related rules, officials said.

## ICCT Reports on Indian Bharat Stage VI Standards

On 22 April 2016 the International Council on Clean Transportation (ICCT) released a report on the Indian Bharat Stage VI emissions standard and a technical background paper on the Bharat Stage VI fuel specifications.

The Bharat Stage (BS) VI standards proposed in February 2016 by the Indian Ministry of Road Transport and Highways (MoRTH) are far-reaching in scope and incorporate substantial changes to existing BS III and IV emission standards, the ICCT said. Of particular note is the tightening of particulate matter (PM) mass emission limits and the introduction of particle number (PN) limits for light- and heavy-duty vehicles (LDV, HDV) fitted with gasoline direct injection and diesel engines. This step will likely lead to the near-universal application of diesel particulate filters (DPF) to control PM emissions from new diesel LDVs and HDVs, the ICCT notes.

A second important component of the BS VI standards is the expansion of type approval and in-service conformity test requirements for LDVs and HDVs. For LDVs, provisions are included in the BS VI proposal for real-world driving cycle emission measurements using portable emissions measurement systems (PEMS). For HDVs, the European Stationary Cycle (ESC) and European Transient Cycle (ETC) used for BS III and IV type approval are replaced with the World Harmonized Steady-State Cycle (WHSC) and World Harmonized Transient Cycle (WHTC), respectively. In addition, off-cycle emissions testing requirements and in-service conformity testing for type approval and in-service vehicles using PEMS are introduced for HDVs in the BS VI proposal.

Additional noteworthy aspects of the BS VI proposal, according to the ICCT, include enhanced OBD requirements for all vehicle classes, with first-ever OBD specifications for two- and three-wheeled vehicles, and the introduction of emission limits on NO<sub>x</sub>, CO, and HC for two-wheelers that are equivalent to proposed BS VI norms for light-duty gasoline passenger vehicles. This

step will ensure that BS VI two-wheelers will be as clean as BS VI gasoline passenger vehicles on a per-kilometre-driven basis, the ICCT concludes.

The ICCT technical background paper on fuel specifications details the differences between commercial gasoline and diesel fuels in India and the EU, and assesses potential air pollutant emission impacts of these differences.

The ICCT report on BS VI emissions standards is at [www.theicct.org/sites/default/files/publications/India%20BS%20VI%20Policy%20Update%20vF.pdf](http://www.theicct.org/sites/default/files/publications/India%20BS%20VI%20Policy%20Update%20vF.pdf) and the ICCT report on BS VI fuel specifications is at [www.theicct.org/sites/default/files/publications/BS%20VI%20Fuel%20Spec%20Working%20Paper%20vF.pdf](http://www.theicct.org/sites/default/files/publications/BS%20VI%20Fuel%20Spec%20Working%20Paper%20vF.pdf).

## Restructuring Plan in China Ministry of Environmental Protection

On 3 March 2016 Xinhua state news agency reported that China plans a restructuring of the Ministry of Environmental Protection (MEP).

The current Departments of pollution prevention and control and pollution emission control will be revoked; three new Departments will be set up, dedicated to water, air, and soil protection respectively.

MEP said the move is vital for implementing the authority's requirement of strengthening environmental protection and improving environmental quality.

## MIDDLE EAST

### DPF Retrofit Funding in Haifa, Israel

On 10 March 2016 the Israel Ministry of Environmental Protection (MoEP) announced NIS 11 million (€2.5 million) to fund the installation of particulate filters in about 700 diesel vehicles ranging from heavy trucks and buses to light commercial vehicles.

The initiative is part of the Haifa Bay action plan to reduce pollution and environmental risks with the aim to significantly reduce vehicular emissions in the Haifa Bay area by 2020.

A tender has been published for the selection of car repair shops to be included on a list of sites that will be authorized by the MoEP to install DPFs. Car garages in the Haifa area are invited to submit proposals until 4 May 2016 to be included on the list.

Other initiatives being funded by the MoEP and other government agencies as part of the Haifa Bay action plan include a Low Emission Zone (LEZ) in the Haifa area, which will be restricted to diesel vehicles that are not fitted with DPF and subsidies for the purchase of natural gas-fuelled buses.

## UNITED NATIONS

### WHO Report on Disease Prevention through Healthy Environments

On 15 March 2016 the World Health Organization (WHO) released the second edition of its report “Preventing disease through healthy environments: a global assessment of the burden of disease from environmental risks”.

Analysing the latest data on the environment-disease nexus and the devastating impact of environmental hazards and risks on global health, this report covers more than 100 diseases and injuries.

An estimated 12.6 million people died as a result of living or working in an unhealthy environment in 2012 – nearly 1 in 4 of total global deaths, according to WHO. Environmental risk factors include air, water and soil pollution, chemical exposures, climate change, and ultraviolet radiation. Deaths due to non-communicable diseases, mostly attributable to air pollution (including exposure to second-hand tobacco smoke), amount to as much as 8.2 million of those deaths.

The report emphasizes cost-effective measures that countries can take to reverse the upward trend of environment-related disease and deaths. These include reducing the use of solid fuels for cooking and increasing access to low-carbon energy technologies.

Environmental risks take their greatest toll on young children and older people, the report finds, with children under 5 and adults aged 50 to 75 years most impacted.

Regionally, the report finds, low- and middle-income countries in the South-East Asia and Western Pacific regions had the largest environment-related disease burden in 2012, with a total of 7.3 million deaths, most attributable to air pollution. In Europe, 1.4 million deaths are related to unhealthy environment annually.

The WHO report is at [http://who.int/quantifying\\_ehimpacts/publications/preventing-disease/en](http://who.int/quantifying_ehimpacts/publications/preventing-disease/en).

### Signature of the Global Paris Climate Agreement

On 22 April 2016 170 countries, including the 28 EU Member States but also the US and China, signed the global Paris climate Agreement in a high-level ceremony in New York, USA.

The agreement was concluded at the UN climate change conference COP21 in December 2015 in Paris, France. Signing shows a country's intent to formally join the Agreement while they work through their domestic process.

The Paris Agreement will enter into force after ratification from at least 55 countries accounting together for at least 55% of global greenhouse gas

emissions. It will then become legally binding for the countries that have ratified it.

The Paris Agreement aims at keeping global temperature rise well below 2°C and to make efforts to keep it to 1.5°C compared to pre-industrial levels. To this end, countries have an obligation to take measures to reduce their emissions.

There will be a review process every five years to take stock and increase ambition over time. The progress of countries in their commitments will be tracked to ensure transparency and accountability. The need for all countries to adapt to climate change by preparing and reinforcing their resilience is also acknowledged.

In terms of solidarity, the EU and other developed countries commit to continue providing climate finance to developing countries.

## GENERAL

### PSA publishes First Real-World Fuel Consumption Figures

On 1 March 2016 PSA published the initial results on real-world fuel consumption for three models. PSA Peugeot Citroën is the first carmaker to adopt such an approach.

The results come from a test procedure established with two non-governmental organisations, Transport & Environment (T&E) and France Nature Environment (FNE), and are audited by Bureau Veritas.

The measurements were made on public roads near Paris (25.5 km urban, 39.7 km extra-urban, and 31.1 km motorway) and under real-life driving conditions, notably with passenger and luggage loads, road gradients, and use of air-conditioning systems. Based on the EU Real-Driving Emissions (RDE) project, the protocol measures fuel consumption by means of a portable emissions measurement system (PEMS) installed on the vehicle.

Model	Consumption under protocol (l/100 km)	Consumption from customer surveys (l/100 km)	Certification consumption data on NEDC (l/100 km)
Peugeot 308 1.6l BlueHDi 120 S&S BVM6 Allure	5.0	5.0 – 5.1	3.2
Citroën C4 Grand Picasso 1.6l BlueHDi 120 S&S BVM6 Exclusive	5.6	5.5 – 5.7	4.0
DS 3 1.6l BlueHDi 120 S&S BVM6 So Chic	4.9	5.1 – 5.3	3.6

The initial measurements are comparable to those made by customers, obtained from independent customer surveys.

## **Emissions Analytics' EQUA Index on Real-Driving NOx Emissions**

On 21 April 2016 UK company Emissions Analytics launched their EQUA Index rating scheme to help bring transparency on real-world NOx emissions from passenger cars.

The EQUA Air Quality Index is based on the level of emissions of NOx in grams per kilometre emitted during their real-world tests. The Index aligns the boundaries between ratings values as much as possible with recognisable points.

Using this scale, a diesel vehicle with an A EQUA Air Quality Index rating can be said to meet the Euro 6 regulatory level even in real-world driving.

The EQUA Index rating is at <http://equa.emissionsanalytics.com>.

## **ICCT Report on Defeat Devices in the US and in Europe**

On 22 March 2016 the International Council on Clean Transportation (ICCT) published a report reviewing provisions of the US and EU regulations that define and prohibit defeat devices, as well as automakers' public statements in the aftermath of Volkswagen's admission that it used such defeat devices.

The intent is to provide a useful context for evaluating proposals to revise and extend the regulations governing passenger vehicle type-approval and real-world testing in Europe.

According to the ICCT ambiguities in the EU regulation as it presently stands – and potentially in any regulation patterned on it, as many national vehicle emissions regulations are – should be corrected as part of any effort to ensure that vehicle emissions standards are met in practice and not just in theory. Proposals to reform the EU regulation should be scrutinized to assess the degree to which they would resolve those ambiguities. In particular, three questions should be asked: (1) whether and how proposed reforms would require manufacturers to disclose the presence of defeat devices as defined in the regulation; (2) what requirements would be imposed concerning how the listed exceptions to the prohibition on defeat devices must be claimed, evaluated, and approved or rejected; and (3) whether and how a proposed new regulatory text defines key terms and concepts such as normal operating conditions, normal vehicle operation and use, and emissions control systems.

The ICCT report is at [http://theicct.org/sites/default/files/publications/ICCT\\_defeat-devices-reg-briefing\\_20160322.pdf](http://theicct.org/sites/default/files/publications/ICCT_defeat-devices-reg-briefing_20160322.pdf).

## **ICCT Report on Light-Duty Vehicle OBD Requirements**

On 31 March 2016 the International Council on Clean Transportation (ICCT) published a review of light-duty vehicle On-Board Diagnostic (OBD) requirements.

OBD systems monitor the performance of engine and aftertreatment components, especially those responsible for controlling harmful pollutant emissions. The OBD system does not directly measure emissions, but detects system malfunctions that could potentially lead to high emissions.

Given that China is exploring the adoption of OBD requirements for light-duty vehicles (LDV) compatible with future China 6 vehicle emissions regulations, the ICCT report takes a closer look at three potential alternatives for OBD regulatory requirements: Korean OBD II, European OBD Euro 6, and Californian OBD II regulations.

The ICCT analysis presents the three programmes side by side, exploring similarities and differences on the main OBD program technical elements including emission control systems monitored, monitoring conditions, OBD emission thresholds, frequency of monitoring, and communication protocols. Also the OBD elements that are relevant to inspection and maintenance (I/M) programs are compared; these elements are designed to prevent fraudulent passing inspections and tampering, improving the effectiveness of I/M programs.

Based on this work, the ICCT recommends adopting Californian OBD II, including the specific requirements for diesel vehicles, as part of the adoption of China 6 emission standards. The Euro 6 OBD program is not as comprehensive as the Korean and the Californian OBD programs according to the ICCT, leaving several emission control systems monitoring requirements open to interpretation. The Korean program is very similar to the Californian OBD program, resulting in similar level of effort for implementation, but its shortcomings on evaluation of communication protocols and treatment of diesel vehicles makes it a less desirable option.

The ICCT report is at [www.theicct.org/sites/default/files/publications/LDV%20OBD%20China%20White%20Paper%20vFinal.pdf](http://www.theicct.org/sites/default/files/publications/LDV%20OBD%20China%20White%20Paper%20vFinal.pdf).

## **RAC Foundation Report on Diesel Scrapage Scheme**

On 11 April 2016 the RAC Foundation, a transport policy and research organization which explores the economic, mobility, safety and environmental issues relating to roads and their users, published a working paper on the impact of a diesel scrappage scheme on air quality.



In the UK, approximately 1.9 million diesel cars fall into the oldest, most polluting Euro 1, 2, and 3 categories. They account for some 17% of all diesel cars on UK roads (11.2 million in total) and are responsible for 15% of total UK NOx emissions from diesel cars, based on estimates of real-world driving data and annual mileages from MOT records.

The RAC Foundation indicates that a scrappage scheme aimed at removing the dirtiest diesel cars from the roads would have to be on a huge scale to have any significant effect.

By taking the oldest 1.9 million Euro 1 to 3 diesel cars off the road, there could be a reduction in NOx emissions from diesel cars of 27% if they emitted at Euro standard limits. But based on estimates of real-world NOx emissions, the reduction is lower at 15.5%.

If 400 000 older cars (in line with the number of vehicles scrapped under the 2009/10 scheme) were replaced with a new zero-emission electric vehicle then the cut in annual NOx emissions from the diesel fleet would be about 4 900 tonnes or 3.2% of the total emissions from diesel cars. This drops to 2 000 tonnes per annum (1.3% of the total) if the scrapped cars were replaced with the latest Euro 6 diesel models and if driven the same distance as those scrapped.

The paper is at

[www.racfoundation.org/assets/rac\\_foundation/content/downloadables/Diesel\\_scrappage\\_scheme\\_calculation\\_AI\\_PG\\_Final\\_March\\_11\\_2016.pdf](http://www.racfoundation.org/assets/rac_foundation/content/downloadables/Diesel_scrappage_scheme_calculation_AI_PG_Final_March_11_2016.pdf).

## **T&E Study on Natural Gas Vehicles**

On 1 March 2016 EU green organization Transport & Environment (T&E) published a study prepared by Ricardo Energy & Environment on the role of natural gas and biomethane in the transport sector.

T&E said the study concludes that the increased use of natural gas in road transport is largely ineffective in reducing greenhouse gases (GHG) or air pollution. The immediate benefits are small or non-existent; while the environmental costs, societal costs and costs to operators are negative for almost all vehicle categories. Expanding the use of natural gas in vehicles also runs counter to efforts to reduce EU's gas imports and energy dependence.

While the study finds clear air pollution advantages from using Liquefied Natural Gas (LNG) in the shipping sector, its GHG emissions benefits are highly dependent on methane slip at the production, distribution and operational levels. LNG ships also incur higher infrastructure and capital costs.

T&E concludes that natural gas is not a 'bridge fuel', as claimed, but an expensive dead-end on the pathway to decarbonising transport. Supporting natural gas is not justifiable and is better spent on long-term solutions

such as fuel efficient, electricity-powered, and shared transport.

The study is at

[www.transportenvironment.org/sites/te/files/publications/2016\\_02\\_T&E\\_Natural\\_Gas\\_Biomethane\\_Study\\_FINAL.pdf](http://www.transportenvironment.org/sites/te/files/publications/2016_02_T&E_Natural_Gas_Biomethane_Study_FINAL.pdf).

## **IEA Workshop on Energy and Air Quality**

On 10 March 2016 the International Energy Agency (IEA) hosted in Paris, France, a workshop on energy and air quality.

IEA said they will publish in June 2016 a first special report on the role of the energy sector in air quality around the world. The special report will be part of the IEA's flagship World Energy Outlook (WEO) series, which presents authoritative energy market analysis and projections, including critical insights into trends in energy demand and supply and what they mean for energy security, environmental protection and economic development. The primary objective of this WEO-2016 special report is to make clear to decision-makers the critical role and responsibility that the energy sector has in tackling local air pollution, to provide new analysis that helps policymakers evaluate different policy paths (including the co-benefits and trade-offs with respect to other energy and climate objectives) and to provide clear recommendations for future action. It was noted that the global air quality modelling is performed by the International Institute for Applied Systems Analysis (IIASA).

In view of informing the WEO analysis, IEA organized a workshop that discussed the following areas:

- Analysis of the nexus between energy, development and air quality.
- Projections of the energy sector and related air quality pathways in different countries and sectors.
- Policy measures that can improve the outlook for energy-related air pollution, examining both the co-benefits and trade-offs with other energy and climate objectives.

## **IEA Report on Greenhouse Gas Emissions from Energy Sector**

On 16 March 2016 the International Energy Agency (IEA) released preliminary data on energy-related carbon dioxide (CO<sub>2</sub>) emissions in 2015.

Global emissions of CO<sub>2</sub> stood at 32.1 billion tonnes in 2015, having remained essentially flat since 2013. The IEA preliminary data suggest that electricity generated by renewables played a critical role, having accounted for around 90% of new electricity generation in 2015; wind alone produced more than half of new electricity generation. In parallel, the global economy continued to grow by more than 3%, offering further evidence that the link between economic growth and emissions growth is weakening.

In the more than 40 years in which the IEA has been providing information on CO<sub>2</sub> emissions, there have been only four periods in which emissions stood still or fell compared to the previous year. Three of those – the early 1980s, 1992 and 2009 – were associated with global economic weakness. But the recent stall in emissions comes amid economic expansion: according to the International Monetary Fund (IMF), global GDP grew by 3.4% in 2014 and 3.1% in 2015.

The two largest CO<sub>2</sub> emitters, China and the US, both registered a decline in energy-related CO<sub>2</sub> in 2015. In China, emissions declined by 1.5%, as coal use dropped for the second year in a row. In the US, CO<sub>2</sub> emissions declined by 2%, as a large switch from coal to natural gas use in electricity generation took place.

The decline observed in the two major emitters was offset by increasing emissions in most other Asian developing economies and the Middle East, and also a moderate increase in Europe.

More details on the data and analysis will be included in a World Energy Outlook special report on energy and air quality that will be released in June 2016.

The IEA preliminary data are at [www.iea.org/newsroomandevents/pressreleases/2016/march/decoupling-of-global-emissions-and-economic-growth-confirmed.html](http://www.iea.org/newsroomandevents/pressreleases/2016/march/decoupling-of-global-emissions-and-economic-growth-confirmed.html).

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## Emissions Control, Catalysis, Filtration

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## Transport, Climate Change & Emissions

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## FORTHCOMING CONFERENCES

### 9<sup>th</sup> Integer Emissions Summit & AdBlue® Forum China 2016

10-12 May 2016, Shanghai, China

[www.integer-research.com/conferences/ies-china-2016/](http://www.integer-research.com/conferences/ies-china-2016/)

*The conference will address Asia's unique emissions control challenges and examine cost-effective, regulation compliant emissions reduction strategies.*

### Advanced Emission Control Concepts for Diesel Engines 2016

10-12 May 2016, Bonn, Germany

[www.emission-control-diesel.com](http://www.emission-control-diesel.com)

*The conference will discuss methodologies to fulfil RDE requirements, future emission targets, and latest emission reduction technologies. It is co-located with the international conference "Emission Control Concepts for Gasoline Engines".*

### Advanced Emission Control Concepts for Gasoline Engines 2016

10-12 May 2016, Bonn, Germany

[www.emission-control-gasoline.com](http://www.emission-control-gasoline.com)

*The conference will discuss the latest legislative updates and technical developments for gasoline engines aimed at reducing and controlling emissions. It is co-located with the conference "Advanced Emission Control Concepts for Diesel Engines".*

*AECC will make a presentation.*

### Emissions 2016

17-18 May 2016, Troy (MI), USA

<https://gamcinc.com/conferences/emissions>

*The conference is organized by the Global Automotive Management Council (GAMC) and will discuss advances in emission technology and management systems.*

### International Transport Forum 2016 Summit on Green and Inclusive Transport

18-20 May 2016, Leipzig, Germany

<http://2016.itf-oecd.org>

*The summit will explore the importance of low-carbon transport as an essential element in the transition to a green growth economy as well as the changes needed to make transport more inclusive and provide access for everyone to jobs, public services, and other opportunities.*

### 5<sup>th</sup> International Exhaust Emissions Symposium

19-20 May 2016, Bielsko-Biala, Poland

[www.bosmal.com.pl/News/7/167/5th+Emissions+Symposium.html](http://www.bosmal.com.pl/News/7/167/5th+Emissions+Symposium.html)

*Main topics of the symposium include emissions legislation - for all automotive sectors, fuel economy, new methods of PM testing, compounds which are potential candidates for emissions regulation, emissions test equipment (including PEMS), emissions reduction technology, aftertreatment system and catalyst technologies for the various automotive sectors, emissions simulation, powertrain development and electrification, IC engine test method development, vehicular fuel development, alternative fuels, fuel additives and fuel blends, gaseous fuels: CNG & LPG, engine oil development, commercial vehicles, heavy-duty and off-road engines and vehicles, and synergies and shared challenges/solutions for the automotive sectors.*

### CTI 14<sup>th</sup> International Conference: Exhaust Systems

23-25 May 2016, Frankfurt, Germany

[http://cti.euroforum.de/en/events/exhaust\\_systems](http://cti.euroforum.de/en/events/exhaust_systems)

*Conference topics include energy and powertrains for CO<sub>2</sub>-free mobility, international emission legislation, challenges relating to NO<sub>2</sub>-pollution and Real-Driving Emissions, the new simulation tool VECTO, large-scale PEMS testing in Europe, new challenges relating to SCR and DPF, development of innovative components, and sensors, control and OBD.*

## **21<sup>st</sup> International Transport and Air Pollution (TAP) Conference**

24-26 May 2016, Lyon, France

<http://tap2016.sciencesconf.org>

*The aim of TAP 2016 will be “Towards energy transition and cleaner transport” and their implication to air quality, with an emphasis on the exhaust and non-exhaust emissions from transport modes, emission control and technologies, transport, energy consumption and greenhouse gas emissions, urban and suburban air quality, and transport policies and mobility challenges towards cleaner cities. Modes addressed include road, rail, air, waterborne, and cross-modality.*

## **SIA Powertrain: The clean compression ignition engine of the future**

1-2 June 2016, Rouen, France

[www.sia.fr/evenements/12-sia-powertrain-rouen-2016](http://www.sia.fr/evenements/12-sia-powertrain-rouen-2016)

*The topics to be addressed include new Diesel engines for passenger cars, commercial vehicles, Heavy-duty trucks, off-road, industrial applications, and range extenders; downsizing, fuel injection technology, combustion processes, turbocharging, air & EGR management systems and exhaust aftertreatment; electrification and hybridization; innovative concepts for emissions and CO<sub>2</sub> reduction; engine, vehicle tests & calibration techniques; new fuels and lubricants; future emission regulations; environment and air quality; eco-mobility; and worldwide market evolution.*

## **8<sup>th</sup> Emission Control 2016 – Real Driving Emissions**

2-3 June 2016, Dresden, Germany

<http://emission-control-dresden.de>

*The conference will focus on the control of exhaust emission, fuel consumption and energy management of the vehicle during dynamic driving conditions (Real-Driving-Emissions) which shall be qualified to achieve the optimum for the entire vehicle system.*

## **20<sup>th</sup> Anniversary Celebration and Conference of the Aerosol & Particle Technology Laboratory**

2-3 June 2016, Thessaloniki, Greece

[http://apt.cperi.certh.gr/index.php?option=com\\_content&view=article&id=161%3Aaptl-20th-anniversary-celebration-conference&catid=1%3Anews&Itemid=19&lang=en](http://apt.cperi.certh.gr/index.php?option=com_content&view=article&id=161%3Aaptl-20th-anniversary-celebration-conference&catid=1%3Anews&Itemid=19&lang=en)

*Topics to be addressed include clean engines & emission control, low/zero-carbon energy, solar fuels and hydrogen, and nanoparticle technology.*

## **NO<sub>x</sub> and Particulate Real Drive Emissions (RDE)**

6-10 June 2016, Leeds, UK

[www.engineering.leeds.ac.uk/short-courses/automotive/diesel-particulates-NOx-emissions-UK/index.shtml](http://www.engineering.leeds.ac.uk/short-courses/automotive/diesel-particulates-NOx-emissions-UK/index.shtml)

*The course was previously titled as “Diesel Particulates and NO<sub>x</sub> Emissions”.*

## **28<sup>th</sup> CIMAC World Congress**

6-10 June 2016, Helsinki, Finland

[www.cimaccongress.com](http://www.cimaccongress.com)

*The congress will address large diesel and gas engines, covering also turbine applications.*

## **6<sup>th</sup> Freiburg Workshop “Air Pollution and models”**

7-8 June 2016, Freiburg, Germany

[www.ivu-umwelt.de](http://www.ivu-umwelt.de)

## **28<sup>th</sup> International AVL Conference “Engine & Environment”**

9-10 June 2016, Graz, Austria

[www.avl.com/engine-environment-2016](http://www.avl.com/engine-environment-2016)

*The topic of the conference is “Powertrains for the Chinese market: a challenge for the global automotive industry”.*

## **Cambridge Particle Meeting 2016**

10 June 2016, Cambridge, UK

[www.cambridgeparticlemeeting.org/](http://www.cambridgeparticlemeeting.org/)

## **20<sup>th</sup> ETH Conference on Combustion Generated nanoparticles**

13-16 June 2016, Zurich, Switzerland

<http://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.*

## **Diesel Powertrains 3.0**

14-15 June 2016, Leipzig, Germany

[www.fev.com/fev-conferences/fev-conference-on-diesel-powertrains-30.html](http://www.fev.com/fev-conferences/fev-conference-on-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.*

## **Engine Emissions Measurement**

20-24 June 2016, Leeds, UK

[www.engineering.leeds.ac.uk/short-courses/automotive/engine-emissions-measurement/index.shtml](http://www.engineering.leeds.ac.uk/short-courses/automotive/engine-emissions-measurement/index.shtml)

*The course is directed at emissions legislation and engine and catalyst development for low emissions. The course also covers the in-vehicle emissions measurement for real world driving emissions measurement, and areas that are not regulated in Europe but in the USA and may be regulated in the future in Europe. This includes VOC speciation for ozone forming potential evaluation as well as air toxics and PAH speciation of diesel articulates for carcinogenic toxic emissions evaluations.*

## **12<sup>th</sup> Integer Emissions Summit & AdBlue® Forum Europe 2016**

21-23 June 2016, Brussels, Belgium

[www.integer-research.com/conferences/ies-europe-2016](http://www.integer-research.com/conferences/ies-europe-2016)

*The conference will address emissions control strategy and technology for the on-road, non-road and marine sectors.*

*AECC will make a presentation.*

## **6<sup>th</sup> International Conference on MinNOx**

22-23 June 2016, Berlin, Germany

[www.iav.com/MinNOx](http://www.iav.com/MinNOx)

*MinNOx has become an internationally established conference, focusing on minimizing nitrogen oxide emissions from combustion engines using exhaust gas aftertreatment.*

*AECC will make a presentation.*

## **3<sup>rd</sup> International Specialist Conference: Sensors for Exhaust Gas Cleaning and CO<sub>2</sub> Reduction**

28-30 June 2016, Leipzig, Germany

[www.sv-veranstaltungen.de/site/fachbereiche/2nd-international-specialist-conference-sensors-for-exhaust-gas-cleaning-and-co2-reduction/?lang=en](http://www.sv-veranstaltungen.de/site/fachbereiche/2nd-international-specialist-conference-sensors-for-exhaust-gas-cleaning-and-co2-reduction/?lang=en)

*Top issues include opportunities and risks of the modification of exhaust gas systems with delete kits, capacitive soot sensors: particle filter OBD monitoring, new ePM sensor for the recognition of particle emissions, new NOx sensor design for OEM applications, and sensor technology in exhaust gas cleaning of medium-speed large motors.*

## **12<sup>th</sup> International CTI Conference: SCR Systems / Off-Highway applications**

5-7 July 2016, Stuttgart, Germany

[http://cti.euroforum.de/en/events/scr\\_systems\\_2016](http://cti.euroforum.de/en/events/scr_systems_2016)

## **Advanced Emission Control Concepts USA 2016**

25-27 July 2016, Ann Arbor, USA

[www.automotive-emission-control-usa.com](http://www.automotive-emission-control-usa.com)

*Topics include current and future emissions legislations and developmental pathways to production; the potential of gasoline and diesel engine optimization to reduce emissions; innovative concepts for aftertreatment systems in diesel engines to minimize NOx; filter technologies for medium and heavy-duty diesel engines; innovative strategies of fuel injection as one of the key in-engine technologies to comply with current and future emission targets; and the consequence of the VW saga.*

## **6<sup>th</sup> International Congress on Ceramics (ICC6)**

21-25 August 2016, Dresden, Germany

[www.icc-6.com](http://www.icc-6.com)

*ICC6 topics include ceramic materials and systems for energy conversion and storage; additive*

*manufacturing; novel, green and energy efficient processing and manufacturing technologies and new equipment trends; cellular and porous ceramics; new trends in silicate and traditional ceramics; materials and process diagnosis for quality assessment/non-destructive testing; ceramic coatings for structural, environmental, functional and bioapplications; nanoscaled ceramics and composites; functional ceramic materials and systems; advanced structural ceramics and their applications; precursor-derived ceramics; max phases and ultra-high temperature ceramics; ceramic matrix composites; and ceramic materials and systems for thermoelectric applications.*

## **SAE 2016 Heavy-Duty Diesel Emissions Control Symposium**

20-21 September 2016, Gothenburg, Sweden

[www.sae.org/events/hddec](http://www.sae.org/events/hddec)

*The programme will focus on regulatory facts and trends, technical information and the latest strategies regarding Heavy-duty diesel emissions control technologies.*

## **20<sup>th</sup> International Forum on Advanced Microsystems for Automotive Applications (AMAA 2016)**

22-23 September 2016, Brussels, Belgium

[www.amaa.de](http://www.amaa.de)

*The conference theme will be "Smart systems for the automobile of the future". Topics include some discussion on how to minimize CO<sub>2</sub> and pollutant emissions.*

## **FISITA 2016 World Automotive Congress**

26-30 September 2016, Busan, South Korea

[www.fisita2016.com](http://www.fisita2016.com)

*FISITA 2016 will focus on energy-efficiency, safety, eco-friendly technology, and connectivity.*

## **VPC – Simulation und Test 2016**

27-28 September 2016, Hanau, Germany

[www.atzlive.de/VPC-Simulation-und-Test-201618--MTZ-Fachtagung/konferenzen/761.html](http://www.atzlive.de/VPC-Simulation-und-Test-201618--MTZ-Fachtagung/konferenzen/761.html)

*The conference will discuss the challenges of Real-Driving Emissions (RDE).*

## **NGV Global 2016 Conference**

4-7 October 2016, St Petersburg, Russia

[www.ngvglobal.org/events/ngv-global-2016-conference-and-exhibition](http://www.ngvglobal.org/events/ngv-global-2016-conference-and-exhibition)

## **25<sup>th</sup> Aachen Colloquium**

10-12 October 2016, Aachen, Germany

[www.aachener-kolloquium.de](http://www.aachener-kolloquium.de)

## **GreenPort Congress 2016**

11-14 October 2016, Venice, Italy

[www.greenport.com/congress](http://www.greenport.com/congress)

*The congress will discuss alternative fuels for port infrastructure and maritime transport; reducing the carbon footprint of the logistics chain; port reception facilities/dust/noise/air emissions; circular economy; and industrial symbiosis.*

### **9<sup>th</sup> Integer Emissions Summit & DEF Forum USA 2016**

25-27 October 2016, Chicago, USA

[www.integer-research.com/conferences/ies-usa-2016](http://www.integer-research.com/conferences/ies-usa-2016)

*The conference will host dedicated streams examining the regulatory and emissions reduction challenges for Heavy-duty commercial vehicles, off-highway vehicles, Light-duty vehicles and passenger cars, marine vessels, and DEF Forum.*

### **14<sup>th</sup> FAD-Conference**

3-4 November 2016, Dresden, Germany

[www.fad-diesel.de/news/14th\\_FAD\\_Conference](http://www.fad-diesel.de/news/14th_FAD_Conference)

*The conference will discuss state of the art, new technologies as well as innovative ideas in the field of exhaust aftertreatment.*

### **Ricardo Motorcycle Conference 3.0 – Riding Future Technologies**

7 November 2016, Milan, Italy

[www.motorcycleconference.com](http://www.motorcycleconference.com)

*The conference will explore the current trends and needs of the motorcycle world, including the challenges relating to future emissions legislation, latest developments of rider assistance systems and urban mobility.*

### **Advanced Fuels for Sustainable Mobility**

9-10 November 2016, Aachen, Germany

[www.fev.com/fev-conferences/fev-conference-advanced-fuels-for-sustainable-mobility.html](http://www.fev.com/fev-conferences/fev-conference-advanced-fuels-for-sustainable-mobility.html)

*The FEV conference will discuss future-oriented developments in engine technology, fuels and fuel system components.*