JANUARY 2017

NEWSLETTER

International Regulatory Developments

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EUROPE

Commission's Guidance to enforce Ban on Defeat Devices

On 26 January 2017 the European Commission published a guidance document on the evaluation of Auxiliary Emission Strategies (AES) and the detection of defeat devices in line with the application of the Euro 5 & 6 Regulation (EC) No 715/2007.

Upon the request of various Member States, the guidance document aims at helping them evaluate if car manufacturers use defeat devices or other strategies that lead to higher vehicle emissions outside of the test cycle and analyse whether they are technically justified.

The guidance document contains examples of AES that, according to the Commission, need to be evaluated carefully according to the proposed methodology. Particular attention is recommended for:

- Strategies that lead to higher emissions when starting the engine in hot-start than in cold-start.
- "Thermal windows" where emissions increase below or above certain ambient temperature ranges.
- Parameters such as a timer or the vehicle's speed that are used to modulate emission control systems.

A car manufacturer using emissions abatement strategies should be able to justify questions such as:

- Is the increase of emissions kept at the lowest possible level?
- Is there no better technology or design on the market that would allow for improved emission control or safer operation of the engine?
- Can the risk of sudden and irreparable engine damage be appropriately demonstrated and documented?

In addition, the guidance also includes a detailed common methodology, elaborated with the help of the Joint Research Centre (JRC), to help Member States identify possible cases of defeat devices through targeted emission tests as part of their market surveillance obligations. It recommends how to ensure a relevant selection of vehicles and which emissions tests to carry out in the laboratory and in real-driving conditions to identify suspicious behaviour in vehicles' exhaust emissions.

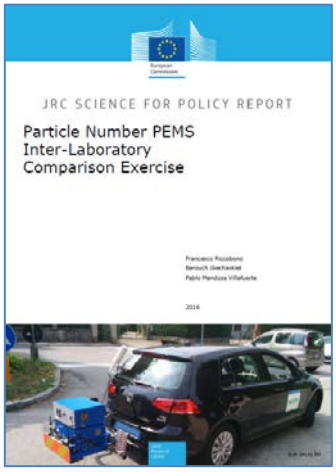
During lab or on-road testing, an emission test that falls above defined testing thresholds should be classified as a "suspicious" case. The Commission provides indicative testing thresholds for NOx emissions of 2 to 5 (different for diesel and gasoline).

This guidance should be updated yearly as new evidence becomes available.

The guidance document is available in all EU languages at http://ec.europa.eu/DocsRoom/documents/21144.

JRC Report on PN-PEMS Inter-Laboratory Comparison Exercise

On 22 December 2016 the European Commission's Joint Research Centre (JRC) published its final report on the Particle Number Portable Emissions Measurement Systems (PN-PEMS) Inter-Laboratory Comparison Exercise (ILCE) that took place between September 2015 and January 2016.



The accuracy and precision of two different PN-PEMS was assessed with one selected Golden Vehicle in seven different laboratories across Europe, providing indications for drafting the third package of the RDE Regulation.

The JRC report states that differences of the PN-PEMS to the reference system at the CVS were ± 40%; similar to those between the reference system at the tailpipe and the CVS. The accuracy and precision of the PN-PEMS, as estimated by comparing them with the reference system at the tailpipe were 10.4% ± 11.9% for the diffusion charger based PN-PEMS and -8.0% ± 9.5% for the CPC-based PN-PEMS. The larger differences compared to the reference system at the CVS can be explained by particle transformations between the vehicle tailpipe and the CVS and calibration uncertainties of the reference systems at the CVS.

On-road tests showed that the PN-PEMS were as stable as PN measurements in the laboratory. For the tested vehicle technology, there were no significant deviations between the PN emissions measured in the laboratory and the PN emissions measured under real- driving conditions at ambient temperatures between 3°C and 25°C.

The full JRC report on PN-PEMS is at http://publications.jrc.ec.europa.eu/repository/handle/JRC103206.

Antonio Tajani elected New President of the European Parliament

On 17 January 2017 MEP Antonio Tajani (EPP, Italy) was elected new President of the European Parliament.

Mr Tajani, former European Commissioner for industry between 2010 and 2014, won the Parliament's presidential election with 351 votes in a final face-off with MEP Gianni Pittella (S&D, Italy), who secured 282 votes.

Tajani took over from MEP Martin Schulz (S&D, Germany) who had been President of the European Parliament since January 2012.

Parliament Committees subsequently elected their new chairs and vice-chairs for the second half of the legislature. Amongst them, the Environment Committee (ENVI) will be chaired by MEP Adina Valean (EPP, RO), the Transport Committee (TRAN) will be chaired by MEP Karima Delli (Greens, FR), and MEP Vicky Ford (ECR, UK) was re-elected as the chair of the Internal Market Committee (IMCO).

Further Developments in Parliament's EMIS Committee

On 12 January 2017 the European Parliament's Committee of Inquiry into Emission Measurements in the Automotive Sector (EMIS) held another meeting.

In the first part of the meeting, the draft report and recommendations of the EMIS committee were considered. Rapporteurs Gieseke (EPP, Germany) and Gerbrandy (ALDE, Netherlands) thanked all committee members for the good and cooperative work. They briefly highlighted the main elements of the draft report. The discussions in the EMIS committee revealed on the one hand that it has taken too long to develop new test procedures in response to the growing evidence of a gap between real-world and lab emissions since 2010. On the other hand, the entire type-approval and market surveillance system has failed at both European Commission (EC) and Member State level. Rapporteur Gieseke added that in spite of the scandal, the diesel engine allows combination of low CO_2 and low NOx emissions when the right technology is used.

Committee MEPs then shared their view on the draft report, mainly confirming the current draft conclusions and recommendations. MEP Revault d'Allonnes Bonnefoy (S&D, France) said that it is important that it is adopted in the EP plenary to show that the entire EP is supporting it and not only the EMIS committee members. She said that some progressive elements could not be included in the factual part, so these will be submitted as amendments for the recommendations. She mentioned that there is also a CO_2 gap which has not been considered in the report and that there is not enough focus on the lack of mandate from the EC to the Joint Research Centre (JRC) to investigate defeat devices.

MEP Dance (S&D, UK) said that there has been maladministration at different levels. National authorities have failed to properly do type-approval and market surveillance. The EC has not only failed to ensure timely introduction of RDE, it has also not taken over elements from Heavy-duty legislation regarding defeat devices. More EU oversight is needed and this should be done through a single agency similar to the US Environmental Protection Agency (EPA). The EC should furthermore deal with emissions and air quality legislations under a single portfolio.

MEP Evi (EFDD, Italy) said that the draft report is still ambiguous with respect to the definition and detection of defeat devices. Furthermore, she said that the forward looking elements of the report are still too weak. Public access to test results will be important.

MEP van de Camp (EPP, Netherlands) noted that it is unclear who will follow up that the EMIS recommendations are actually implemented.

Ms Szychowska (DG-Growth) then presented the views of the European Commission. She said that the EC has cooperated extensively and in full transparency and will continue to do so. The Commission acknowledges that the EMIS is looking into the past, but it is as important to look into the future. The EC hopes that the EMIS Report will recognize the steps that have been taken to improve the system and that it will strike the right balance in identifying the responsibilities. The Report touches on institutional issues that concern the Commission as a whole. She indicated that the Commission would have to reflect more thoroughly on these conclusions before it can provide a response.

Rapporteur Gieseke thanked all the colleagues for the unanimity and said the final report will be put for vote in the EMIS Committee on 28 February 2017 and in the plenary session of April 2017.

In the second part of the meeting, the EMIS Committee heard Mr Viktor Stromček, State Secretary of the Ministry of Transport, Construction and Regional Development in Slovakia.

Stromček indicated that more EU oversight is needed with a clear defined chain of responsibilities. He argued that Member States would not necessarily have to lose competences in order to have a centralised type-approval system. He agreed with Rapporteur Gieseke that a 2-track approach is needed to go forward: going for Electric Vehicles in the long term, but further developing the internal combustion engine in the meantime. When asked why the Council has not taken any specific action in response to the scandal, he replied that the Council has and will continue to have discussions on the topic. He did not agree that Slovakia was against the introduction of the RDE legislation and allowing in-service conformity checking by third parties, but Slovakia does request that legislation is clearer.

The EMIS debate and hearing of Slovakia can be watched at www.europarl.europa.eu/EMIS_170112AM.

The EMIS Committee then heard Mr Riccardo Nencini, Vice Minister for Infrastructure and Transport in Italy.

The debate focused mostly on questions around the type-approved vehicle by the Italian authorities which modulates emissions control technology after 22 minutes.

Nencini informed MEPs that the modulation was necessary in order to protect the engine, and he added that this was verified by recognised test centres. He also indicated that the modulation was compatible with existing standards and rules. When asked whether an EU type-approval agency should be established, Nencini indicated that some sort of coordinating body at EU level was needed. He would also welcome the introduction of surprise tests, like in the US.

The EMIS hearing of Italy can be watched at www.europarl.europa.eu/EMIS_170112PM.

On 24 January 2017 the EMIS Committee heard two representatives of Audi AG, Mr Florian Heuberger, Head of Technical Service and Mr Oliver Hoffmann, Vice President, Development Powertrain.

Questioned by co-Rapporteur Gieseke (EPP, DE), Hoffmann confirmed that under certain conditions the engine needs to be protected, therefore EGR sometimes needs to be modulated based on a number of parameters, but not a timer.

Co-Rapporteur Gerbrandy (ALDE, NL) challenged Audi on the claims that the A3's emissions strategy acted suspiciously but Hoffmann replied that the Joint Research Centre (JRC) has withdrawn its result. Turmes (Greens, LU) claimed that JRC results on Audi vehicles pointed to cold-start cycle optimization even on models not yet on the market.

Audi's Hoffmann saw a future for diesel but not necessarily for small passenger cars, for which it may be too expensive to make them clean.

The EMIS hearing of Audi can be watched at www.europarl.europa.eu/news/EMIS_170124.

The EMIS Committee MEPs will discuss amendments they have tabled to the draft Report and draft Recommendations at their next meeting on 9 February 2017.

Parliament discusses Type-Approval Framework Revision

On 25 January 2017 the European Parliament's Committee on Internal Market and Consumer Protection (IMCO) discussed the Commission's proposal to revise the vehicles type-approval framework.

Rapporteur MEP Dalton (ECR, UK) reported on the work performed with the Shadow-Rapporteurs in developing compromise amendments across political groups. He indicated that, although the discussions were politically difficult at times, he was confident that an agreement could be found that is acceptable to the vast majority of MEPs. He also stated that all political groups had moved substantially from their original positions in order to facilitate the compromises. He underlined two key elements: minimum requirements for market surveillance at Member State and EU level while avoiding overlap of actions, and closing loopholes within the Type-Approval. MEP Dalton indicated that a compromise was nevertheless still sought for the safeguard clauses and the system of sanctions and penalties.

MEP Štefanec (EPP, SK) indicated that the Commission should be empowered to undertake joint audits in case evidence or information was provided that indicated a breach of the rules. MEP Schaldemose (S&D, DK) said that since the Council does not expect to finalize its position until May 2017 because of remaining discrepancies of views amongst Member States, the IMCO Committee should use that time as much as possible to come up with robust improvements. MEP Durand (Greens, FR) noted that the EMIS report will be adopted on 28 February 2017 and will heavily criticize what happened in the past. He wished for the IMCO Report to bring solutions for the future.

The IMCO Committee vote, originally planned on the following day, was postponed to 9 February 2017.

Parliament Briefing on National Emission Ceilings (NEC) Directive

On 20 January 2017 the European Parliament published an updated briefing on the National Emission Ceilings (NEC) Directive (EU) 2016/2284 that was published in December 2016.

The updated briefing summarizes the developments during co-decision process in Council and Parliament and summarizes the main elements of the final act as:

- targets aimed at reducing premature deaths from air pollution by 49.6% by 2030 compared to 2005 levels; which implies reducing SO_2 emissions by 79%, NOx emissions by 63%, NMVOC emissions by 40%, NH_3 emissions by 19%, and $PM_{2.5}$ emissions by 49%;
- interim 2025 targets determined by Member States based on a linear reduction between 2020 and 2030;
- flexibilities in certain cases, such as problematic enforcement of source-based legislation, unforeseen events in energy supply and production systems, and particularly cold winters or dry summers;
- facilitate financial support from EU funds to meet the proposal's objectives;
- set up a European Clean Air Forum made up of representatives of the Commission, national

authorities, industry and civil society to facilitate the coordinated implementation of EU air quality policy;
- require Member States to update their national air pollution programmes and emission inventories every four years and their emission projections every two years; and
- require the Commission to publish detailed implementation reports every four years, and to put forward a review by 2025, with specific focus on ammonia and mercury emissions.

The Parliament briefing on the NEC Directive is at www.europarl.europa.eu/RegData/etudes/BRIE/2017/595893/EPRS_BRI(2017)595893_EN.pdf.

France defines Low and Ultra-Low Emission Vehicles

On 12 January 2017 two decrees were published in the French Official Journal that define a low and ultra-low passenger car or light commercial vehicle, and a low emission heavy-duty vehicle.

A low emission passenger car or van is characterized by CO_2 emissions of 60 g/km or less when tested according to the Euro 5&6 Regulation (EC) 715/2007.

Ultra-low emission passenger cars and vans are powered by electricity, hydrogen, plug-in or non plug-in hydrogen/electricity, or compressed air.

N2 and N3 low emission heavy-duty vehicles are those powered by electricity, hydrogen, natural gas including gaseous biomethane (Compressed Natural Gas or CNG) and Liquefied Natural Gas (LNG), Liquefied Petroleum Gas (LPG), or mechanical energy from on-board storage/on-board sources.

According to the French 'energy transition' law, the State and public bodies have to renew half of their fleets with such low emission vehicles while state-owned companies have to renew 20% of their fleets of more than 20 vehicles.

UK DfT Report Gas-Powered Heavy-duty Vehicles' Emissions

On 9 January 2017 the UK Department for Transport (DfT) released a report on emissions testing results of gas-powered Heavy-duty vehicles.

The test programme was launched to quantify the overall greenhouse gas (GHG) performance of gas-powered commercial vehicles as previous projects indicated a potential issue of methane slip that could offset reductions in CO_2 emissions.

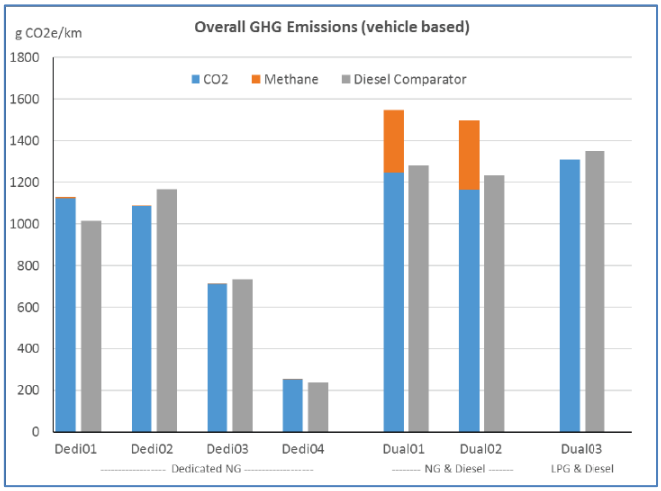
Vehicles tested included four dedicated natural gas Euro VI and three retrofit dual-fuel (one diesel/natural gas Euro V, one diesel/natural gas Euro VI, and one diesel/LPG Euro VI). Each dedicated gas vehicle was evaluated against an equivalent, conventional Euro VI diesel truck while the baseline case for the dual fuel vehicles was provided by comparing emissions performance under dual fuel operating conditions with those when the same vehicle was operating in diesel-only mode.

The test programme used a track-based test procedure with four drive cycles simulating long haul, regional delivery, urban delivery, and city-centre delivery operations, with emissions measured by a Portable Emissions Measurement System (PEMS).

The overall GHG performance of the four dedicated natural gas vehicles is mixed compared to their reference diesel version (from -10% to +15%). None of the gas vehicles was found to have significant methane slip.

For the dual-fuel retrofitted vehicles, the methane slip was however substantial, offsetting the savings in CO_2 emissions (4-11% reduction) and resulting in an increase in total GHG performance (10-35%).

N_2O emission measurements indicated an overall impact of 1-2% on total GHG performance for SCR-equipped diesel vehicles.



Pollutant emissions are reported as well, showing that the Euro VI dedicated gas vehicles emitted lower levels of NOx (around 135 mg/km) than their diesel counterparts (around 230 mg/km), but higher levels of CO and THC.

The UK DfT report is at www.gov.uk/government/uploads/system/uploads/attachment_data/file/581859/emissions-testing-of-gas-powered-commercial-vehicles.pdf.

London Mayor announces Ten New Low Emission Bus Zones

On 6 January 2017 the London Mayor, Sadiq Khan, announced plans for ten more Low Emission Bus Zones deploying the greenest buses on the UK capital's most polluted routes to cut NOx emissions.

The new routes include Edmonton, Stratford and Haringey, bringing the total number of Low Emission Zones planned to 12, including the previously announced zones in Putney High Street and Brixton.

The new greener buses, which will be a combination of hybrid and clean buses that meet Euro VI standards, are part of an improvement programme to 3000 buses outside central London.

The zones are expected to reduce NOx emissions from buses along the routes by around 84% and will fulfil the Mayor's manifesto commitment to introduce Low Emission Bus Zones by 2020.

The announcement came at the time when London breached its annual air pollution limits for 2017. According to the Air Quality Directive, hourly levels of NO_2 must not be more than 200 µg/m^3 more than 18 times in a whole year, but on 5 January 2017 this limit was already broken on Brixton Road in Lambeth.

NORTH-AMERICA

US EPA confirms 2025 GHG Standards for Light-Duty Vehicles

On 13 January 2017 the US Environmental Protection Agency (EPA) decided to maintain the current greenhouse gas (GHG) emissions standards for model years 2022-2025 cars and light trucks.

The mid-term evaluation process was established as a part of the 2012 final GHG emissions standards for model years 2017-2025. The final determination finds that a wide variety of effective technologies are available to reduce GHG emissions from cars and light trucks, and that automakers are well positioned to meet the standards through model year 2025 at lower costs than predicted.

The standards are projected to result in average fleet-wide consumer fuel economy values of 36 miles per gallon (mpg) (i.e. 6.5 l/100 km) by model year 2025, 10 mpg higher than the current fleet average.

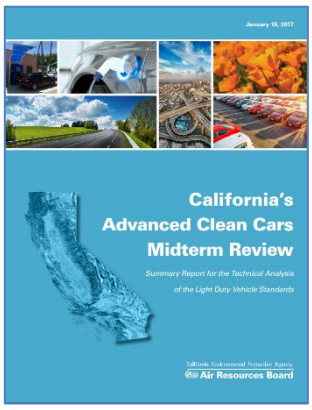
The US EPA Administrator is retaining the current standards to provide regulatory certainty for the auto industry despite a technical record that suggests the standards could be made more stringent.

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

California's Advanced Clean Cars Midterm Review

On 19 January 2017 the California Air Resources Board (CARB) released its report on advanced clean cars in the context of the mid-term review of the greenhouse gas (GHG) emission standards currently in place for model years 2022-2025.

CARB staff's recommendations align with the US EPA decision (*see above*). The CARB report confirms that the previously adopted package of GHG standards, technology-forcing zero-emission vehicle standards, and the most health-protective particulate matter standards in the world (1 mg/mi) are appropriate. The report also indicates that existing programs in California will add at least 1 million zero-emission vehicles on its roads by 2025.



CARB staff recommends that California's efforts now focus on stronger regulations for GHG reduction beyond 2025 and increased emphasis on a broad framework to support zero-emission vehicles.

The CARB report is at www.arb.ca.gov/msprog/acc/mtr/acc_mtr_finalreport_full.pdf.

US EPA and CARB accuse Fiat Chrysler of Alleged Defeat Device Software

On 12 January 2017 the US Environmental Protection Agency (EPA) and the California Air Resources Board (CARB) issued notices of violation to Fiat Chrysler Automobile (FCA) for alleged undisclosed engine management software in light-duty model years 2014, 2015 and 2016 Jeep Grand Cherokees and Dodge Ram 1500 trucks with 3.0 litre diesel engines sold in the US.

The software results in increased emissions of NOx from the FCA vehicles. The allegations cover roughly 104 000 vehicles, including 14 000 in California.

EPA and CARB have both initiated investigations based on FCA's alleged actions.

On the same day, FCA issued a press release on the subject and said that FCA US diesel engines are equipped with state-of-the-art emission control systems hardware, including selective catalytic reduction (SCR). FCA US believes that its emission control systems meet the applicable requirements.

FCA US has proposed a number of actions to address EPA's concerns, including developing extensive software changes to their emissions control strategies that could be implemented in these vehicles immediately to further improve emissions performance.

US EPA and CARB approve Technical Fix of VW 2.0l Generation 3 Diesels

On 6 January 2017 the US Environmental Protection Agency (EPA) and the California Air Resources Board (CARB) announced the approval of an emissions modification for "Generation 3" VW 2.0 litre diesel vehicles with a so-called defeat device.

The vehicles eligible for this modification are model year 2015 only. In a first phase, VW will remove the defeat device software and replace it with software that directs the emission controls to function effectively in all typical vehicle operations. The second phase will start about a year from now with further software updates as well as

installation of a second NOx sensor, a new Diesel Particulate Filter, Diesel Oxidation Catalyst, and NOx catalyst that will ensure vehicle reliability and emissions performance over time.

US EPA Settlement with Tauber on Unregistered Fuel Additive

On 18 January 2017 the US Environmental Protection Agency (EPA) announced a settlement with Tauber Oil Company, resolving alleged Clean Air Act violations stemming from the company's sale of a fuel additive that was not registered with the EPA.

The settlement resolves claims that Tauber produced a fuel additive called Mixed Alcohol by blending together various alcohol streams, then sold approximately 1.9 million gallons (7.2 million litres) of Mixed Alcohol without first registering it as a fuel additive with the EPA or meeting the requirement to be similar to what was used in the certification of motor vehicles.

Tauber stopped selling the unregistered fuel additive and will pay a $700 000 (€656 000) civil penalty.

ASIA PACIFIC

Beijing takes Actions to curb Air Pollution

At a press conference on 21 January 2017, Li Xiang, Deputy Director of the Atmospheric Environment Management Division of the Beijing Municipal Environmental Protection Bureau, announced a series of strict measures to fight smog in the Chinese capital in 2017.

Amongst these measures which address industrial, domestic, and transport emissions, Li said that light-duty gasoline vehicles of China National I and II emissions standards will be banned inside the fifth ring road from 15 February 2017 onwards, that diesel particulate filters will be installed on all new heavy-duty diesel vehicles; and that excess emissions from existing heavy-duty diesel vehicles will be strictly punished.

In addition, Beijing intends to enhance law enforcement and supervision and establish an environmental police force. Also regional collaboration mechanisms on the prevention of and emergency response to air pollution will intensify.

GENERAL

ICCT Report on RDE Legislation Impact on Diesel NOx Emissions

On 12 January 2017 the International Council on Clean Transportation (ICCT) published a new report on the impact of improved regulation of real-world NOx emissions from diesel passenger cars in the EU through 2030.

According to the ICCT, the RDE regulation and type-approval framework, as currently formulated, do not go far enough to eliminate the incidence of defeat devices and poor aftertreatment system calibrations and ensure that manufacturers achieve low NOx emissions in all real-world driving conditions.

The ICCT previously outlined five specific recommendations to strengthen the RDE regulation by building on the current framework. Some of these modifications are in line with the European Commission's proposal for an overhauled type-approval framework and the expected content of the third and fourth RDE packages, but others go beyond them (e.g. public access to type-approval information and expanded test boundaries).

This new paper examines the potential impact of the RDE regulation and ICCT's proposed modifications on real-world emission factors of new diesel cars and projected passenger car fleet NOx emissions in the EU through 2030.

The Baseline RDE scenario reflects the RDE programme as currently formulated (first and second packages), and two different RDE+ pathways with increasing levels of ambition. These pathways introduce successive improvements (RDE+a, RDE+b and RDE+c) based on ICCT's proposed modifications. The Conservative RDE+ pathway assumes the implementation of cold-start provisions (RDE+a) in 2020 followed by market surveillance and tightened conformity factors in 2023 (RDE+b). The Accelerated RDE+ pathway assumes the implementation of improvements in all five key areas on an accelerated implementation calendar, with the phase-ins of the different steps taking place in 2018, 2020, and 2022. The third step of the Accelerated RDE+ scenario, RDE+c, goes beyond the provisions that are expected under the third and fourth RDE packages. These additional measures include real-world emissions monitoring via remote sensing, expanding the boundaries of the RDE test procedure, and publishing RDE test results to enable independent verification.

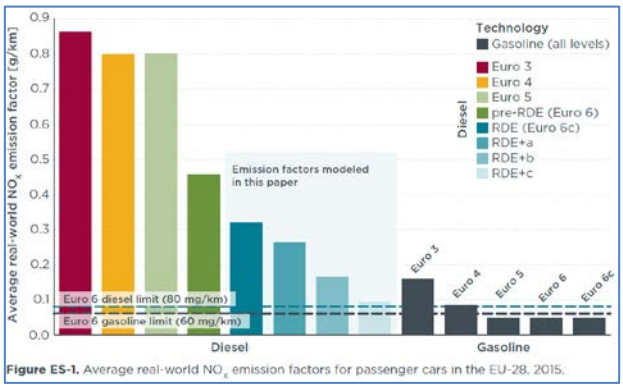


Figure ES-1. Average real-world NO_x emission factors for passenger cars in the EU-28, 2015.

The results of emission-factor modelling indicate that the Baseline RDE scenario will reduce real-world NOx emissions of new Euro 6 diesel cars from 5.7 times the Euro 6 limit of 80 mg/km to approximately 4 times that limit. The Conservative RDE+ scenario is estimated to further reduce this emission factor to 2.1 times the Euro 6 limit.

In contrast, the Accelerated RDE+ scenario is estimated to achieve a real-world NOx emission factor of 1.2 times the Euro 6 limit by 2022. Only the most stringent step of the Accelerated RDE+ programme, RDE+c, is estimated to effectively eliminate the presence of defeat devices and poor NOx emissions control implementations among new diesel cars.

The prospect that real-world NO_x emissions from diesel cars will remain higher than emission limits highlights the importance of further developing the RDE programme to incorporate the improvements evaluated in this paper as well as considering a Euro 7 standard that tightens NO_x emission limits for both diesel and gasoline cars, the ICCT concludes.

The ICCT report on RDE legislation impact is at www.theicct.org/sites/default/files/publications/ICCT_real-world-NOX-RDE-2015-2030_dec2016.pdf.

ICCT Briefing comparing HD and LD Diesel NOx Emissions

On 5 January 2017 the International Council on Clean Transportation (ICCT) published a briefing paper comparing real-world performance and current type-approval requirements with respect to heavy-duty and light-duty diesel NOx emissions in Europe.

The ICCT has acquired data on real-world emissions for a total of 24 Euro VI vehicles (buses, tractor-trailers, and rigid trucks) from two sources: VTT labs in Finland, which provided chassis-dynamometer testing data, and the German type-approval authority (KBA), which provided PEMS in-service conformity testing data.

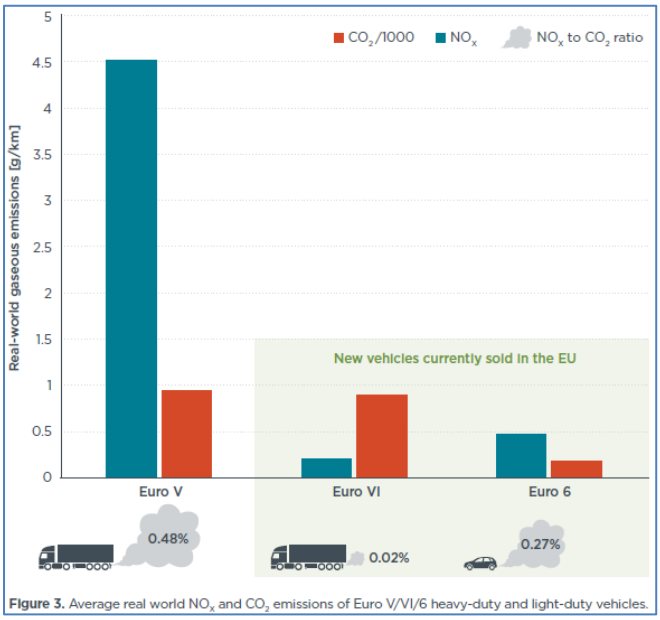


Figure 3. Average real world NO_x and CO_2 emissions of Euro V/VI/6 heavy-duty and light-duty vehicles.

The average NOx emissions of the testing data from the 24 heavy-duty vehicles was 210 mg/km, less than half the average NOx emissions from Euro 6 cars (480-560 mg/km) found by both independent measurements and Member State testing. In addition, the average conformity factor was less than 1, meaning that on-road emissions stayed below the Euro VI engine type-approval test limits.

Nevertheless, CO_2 emissions for heavy-duty vehicles are five times those of cars. This indicates that tailpipe NOx emissions have been essentially decoupled from CO_2 emissions.

The briefing states that three changes between Euro IV/V and Euro VI contributed to a significant improvement in heavy-duty vehicles' real-world NOx performance: an off-cycle test, an improved type-approval test cycle and a PEMS test for in-service conformity testing. In its current form, the light-duty Euro 6 legislation does not include these elements.

It is stated that the future Euro 6 legislation will incorporate some of the elements through the introduction of RDE and WLTP, but the ICCT calls for an expedited inclusion of RDE into the Euro 6 in-service conformity test protocol.

The ICCT briefing on NOx emissions is at www.theicct.org/sites/default/files/publications/Euro-VI-versus-6_ICCT_briefing_06012017.pdf.

ICCT Policy Update on EU Real-Driving Emissions

On 12 January 2017 the International Council on Clean Transportation (ICCT) published a policy update on Real-Driving Emissions (RDE) test procedure for exhaust gas pollutant emissions of cars and light commercial vehicles in Europe.

The paper summarizes the key elements of the first two RDE packages published in 2016. It identifies strengths of the RDE legislation but also areas for improvement. According to the ICCT, to achieve significant real-world emission reductions, it is important to ensure that new vehicles are tested not only under the most favourable RDE conditions but also under a range of possible boundary conditions, as defined in the legislative text. This is even more important given that vehicle makers can carry out as much as 50% of RDE tests themselves. Independent re-testing by authorities and third parties can help to ensure broader coverage of RDE tests. The fourth RDE package is expected to address this.

The current RDE regulation applies only to pre-production vehicles provided by manufacturers. In the future, the scope of testing should include surveillance of in-use vehicles, independently sourced and tested, to reliably achieve fleet-wide emission reductions. This issue will also be addressed in the fourth RDE package.

The current version of the RDE test still excludes a significant portion of real-world driving conditions, including a range of ambient temperatures and dynamic driving and altitude boundary conditions. Such conditions can potentially contribute disproportionately large amounts of NOx emissions, the ICCT said. Similarly, the current conformity factors allow on-road NOx emissions significantly higher than the Euro 6 limits.

Finally, although the present focus of the RDE regulation is on air pollutant emissions, RDE testing will also measure and record CO_2. The RDE procedure does not foresee systematically analysing the CO_2 information, even though doing so would allow for a better understanding of the real-world performance of new vehicles in terms of CO_2 emissions and fuel consumption.

The ICCT policy update on RDE is at www.theicct.org/sites/default/files/publications/EU-RDE_policy-update_Jan2017_vF.pdf.

FIA Foundation Report on preventing Another Dieselgate

On 12 January 2017 the FIA Foundation released a new report titled 'Can we prevent another Dieselgate?'

This report summarises the findings of an event hosted by the FIA Foundation in London in June 2016, which gathered a group of world experts to discuss how civil society could contribute towards ensuring vehicles comply with emission legislation and consumers are provided with reliable information. The meeting was held in part in response to the "Dieselgate" scandal, where vehicles have been shown to be emitting more pollution on the road than in laboratory type-approval tests.

The FIA Foundation report is at www.fiafoundation.org/connect/publications/can-we-prevent-another-dieselgate.

ICCT Summary of EU 2030 Renewable Energy Proposal

On 20 January 2017 the International Council on Clean Transportation (ICCT) published a summary of the European Commission's (EC) proposal to recast the Renewable Energy Directive (RED) 2009/28/EC, which will expire at the end of 2020.

The EC proposed the new directive, called RED II, on 30 November 2016 as part of its "Clean Energy for All Europeans" package. RED II would succeed the existing Directive and enter into effect on 1 January 2021. It proposes a set of policy measures to achieve a 27% renewable energy share from energy consumed by the electricity, heating and cooling, and transportation sectors by 2030. The 27% target was endorsed by the EU Council in October 2014 and is binding at the EU level.

Regarding renewable energy for transportation, RED II would mandate that 6.8% of transportation fuels must derive from renewable sources, specifically advanced alternative fuels and renewable electricity. The proposed mandate would apply to fuel suppliers rather than Member States, as is the case with the existing RED. According to the proposal, food-based biofuels cannot be counted toward the mandate, and their role in achieving the 27% renewable energy target should decline over time. Advanced alternative fuels, renewable electricity, and food-based biofuels must demonstrate proof of compliance with the sustainability criteria set by RED and extended by the proposed RED II, as well as additional criteria for biomass produced from forestry feedstock.

The Commission's proposal for RED II will go through the ordinary legislative procedure.

The ICCT summary of the RED II proposal is at www.theicct.org/sites/default/files/publications/RED%20II_ICCT_Policy-Update_vF_jan2017.pdf.

BP Energy Outlook 2035

On 25 January 2017 BP released its 2017 edition of the BP Energy Outlook which looks at long-term energy trends and develops projections for world energy markets over the next two decades.

The Energy Outlook sets out a base case which outlines the 'most likely' path for global energy markets until 2035, based on assumptions and judgments about future changes in policy, technology and the economy. Beyond the base case, the BP Energy Outlook examines some of the big issues that will shape energy supply and demand through to 2035 - and beyond such as the impact of electric cars on oil demand, oil supplies in a world of increasing abundance, the effect of Liquefied Natural Gas (LNG) growth on the global market, and China's changing energy landscape. It also develops alternative cases to explore key uncertainties including a faster mobility revolution, paths to a lower carbon world, and risks to gas demand.

According to BP, global energy demand is to increase by around 30% to 2035, driven by increasing prosperity in developing countries, partially offset by rapid gains in energy efficiency. Technological improvements and environmental concerns are changing the mix of primary energy demand but oil and gas, together with coal, remain the main source of energy to 2035.

The transport sector continues to consume most of the world's oil with its share of global demand remaining close to 60% in 2035. However, non-combusted use of oil, particularly in petrochemicals, takes over as the main source of growth for oil demand by the early 2030s.

In the base case, the global car fleet is expected to double from 0.9 billion cars in 2015 to 1.8 billion by 2035 as rising incomes and improving road infrastructure boosts car ownership. Within the same timeframe, the non-OECD fleet will triple - from 0.4 billion cars to 1.2 billion. Overall, global demand for car travel roughly doubles until 2035.

The number of electric cars also rises significantly, from 1.2 million in 2015 to around 100 million by 2035 (6% of the global fleet). Around a quarter of these electric vehicles (EVs) are plug-in hybrids (PHEVs) and three-quarters are pure battery electric vehicles (BEVs).

Fuel demand for use in cars continues to rise, despite efficiency improvements and EV switching.

The 2017 BP Energy Outlook is at www.bp.com/en/global/corporate/energy-economics/energy-outlook.html.

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Multiple sclerosis and air pollution exposure: Mechanisms toward brain autoimmunity, Sayed Mousavi, et al.; *Medical Hypotheses (March 2017), Vol. 100, pp. 23-30,* doi: 10.1016/j.mehy.2017.01.003.

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FORTHCOMING CONFERENCES

UNECE/ITC-UNEP Conference Ensuring Better Air Quality and Reduced Climate Emissions through Cleaner Used Vehicles

20 February 2017, Geneva, Switzerland
www.unece.org/trans/events/2017/itc-70th-anniversary/itc_unep_conference.html
The event will discuss a possible global approach to controlling the environmental performance of used vehicles, in order to ensure that used vehicles can contribute to better air quality and reduced climate emissions.

SAE 2017 On-Board Diagnostics Symposium – Europe

27 February - 1 March 2017, Turin, Italy
www.sae.org/events/obd-eu
The conference will discuss the latest CARB, US EPA, and EC requirements and regulations, as well as details of the associated SAE standards regarding light- and heavy-duty emissions controls.

12th CONCAWE Symposium

20-21 March 2017, Antwerp, Belgium
www.concawe.eu/calendar/24/17/Save-the-Date-12th-Concawe-Symposium
The symposium will explore scientific and technical challenges for the production and use of petroleum refined products in the EU in the 21st century.

NGV Global 2017 Conference

20-23 March 2017, Rotterdam, Netherlands
www.ngv2017.com

27th CRC Real World Emissions Workshop

26-29 March 2017, Long Beach (CA), USA
https://crcao.org/workshops/27th_RWE_Workshop/Index.html
The main topics of interest of the workshop are emissions modelling, improving the emissions inventory, Particulate Matter emissions, measurement methods (improvements and new techniques), unregulated emissions, Inspection/Maintenance (I/M) and OBD, fuel effects on exhaust emissions, Off-Road/ Non-Road emissions.

7th International PEMS Conference & Workshop

30-31 March 2017, Riverside (CA), USA
www.cert.ucr.edu/events/pems
Discussion topics will include: How will the regulatory environment evolve internationally to address real-world and off-cycle emissions? How might this differ for light-duty and heavy-duty vehicle technologies? What are the most recent developments in PEMS technology for the measurements of gas-phase and particle mass and number emissions? How might the development of low cost or micro PEMS/sensors or remote sensing techniques provide for greater opportunities for monitoring the in-use fleet? As the level of data for PEMS and activity measurements continues to expand, how can this data be managed to provide greater access to a wider range of stakeholders?

SAE 2017 High Efficiency IC Engine Symposium

2-3 April 2017, Detroit, USA
www.sae.org/events/hee

WCX17: SAE World Congress Experience

4-6 April 2017, Detroit, USA
www.wcx17.org
AECC will present a joint paper with Ricardo and Concawe "Real-World Emissions Measurements of a Gasoline Direct Injection Vehicle without and with a Gasoline Particulate Filter"

2nd Integer Emissions Summit & AdBlue® Forum Asia Pacific 2017

5-6 April 2017, Seoul, South Korea
www.integer-research.com/conferences/ies-apac-2017
Topics of discussion will include the challenges that lie ahead for the heavy-duty commercial vehicle manufacturers in Asia Pacific, the key issues affecting the AdBlue® business in Korea, updates on the passenger car market in Asia Pacific, developments in Asia Pacific's leadership of the marine emissions technology market, the future of off-highway emissions regulations and how it will impact the Asia Pacific market, and emissions control regulations and technology innovations that shape the on- and non-road industries.

6th Southeast Asia Diesel Engine Summit 2017

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

Real Driving Emissions

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

38th International Vienna Motor Symposium

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

Health Effects Institute 2017 Annual Conference

30 April - 2 May 2017, Alexandria (VA), USA
Info will be at www.healtheffects.org/annual-conference

9th AVL International Commercial Powertrain Conference 2017

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

NOx and Particulate Real Drive Emissions (RDE)

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

10th Integer Emissions Summit & AdBlue® Forum China 2017

16-18 May 2017, Beijing, China
www.integer-research.com/conferences/ies-china-2017
The conference will address China's emissions control challenges and examine cost-effective, regulation compliant emissions reduction strategies.

29th International AVL Conference "Engine & Environment"

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

CITA International Conference

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

International Conference SIA Powertrain

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

21st ETH-Conference on Combustion Generated Nanoparticles

19-22 June 2017, Zürich, Switzerland
www.nanoparticles.ch
The conference serves as an interdisciplinary platform for expert discussions on all aspects of nanoparticles, freshly emitted from various sources, aged in ambient air, technical mitigation aspects, impact of particles on health, environment and climate and particle legislation.
Deadline for abstract: 24 March 2017

Engine Emissions Measurement

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

Cambridge Particle Meeting 2017

23 June 2017, Cambridge, UK
www.cambridgeparticlemeeting.org/2017
Topics of interest include combustion aerosols and their effects, aerosol-based nanotechnology, and new instrumentation.
Deadline for abstract: 1 April 2017

13th Integer Emissions Summit & AdBlue® Forum Europe 2017

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

VII International Congress on Combustion Engines

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

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

27-29 June 2017, Augsburg, Germany
www.sv-veranstaltungen.de/fachbereiche/conference-sensors-for-exhaust-gas/?lang=en
The conference will discuss sensors for emissions control and engine management such as temperature sensors, differential pressure sensors, soot sensors, NOx sensors, and many more.

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

5-7 July 2017, Stuttgart, Germany
http://cti.euroforum.de/en/events/scr_systems_2017

Diesel Powertrains 3.0

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

Deadline for abstract: 17 February 2017

13th International Conference on Engines & Vehicles (ICE2017)

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

Emissions 2017

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

10th Integer DEF Forum USA 2017

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

2017 Aachen Colloquium Automobile and Engine Technology

9-11 October 2017, Aachen, Germany
www.aachener-kolloquium.de
The congress provides a wide range of technical presentations addressing current challenges of the vehicle and engine industry.
Deadline for abstract: 15 February 2017

7th Integer Emissions Summit & AdBlue® Forum India 2017

11-12 October 2017, New Delhi, India
www.integer-research.com/conferences/7th-integer-emissions-summit-adblue-forum-india-2017
The conference will examine the progress made towards Bharat VI a year on from the government's announcement regarding plans to implement the stringent emissions standards by 2020.

SAE 2017 International Powertrains, Fuels and Lubricants Meeting

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

G.STIC 2017 – Global Science Technology & Innovation Conference

23-25 October 2017, Brussels, Belgium
www.gstic.org
The objective of this conference is to underpin the technological discussions in the UN and other international forums as they relate to the Sustainable Development Goals, the climate goals and Means of Implementation.

10th Integer Emissions Summit USA 2017

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

15th FAD-Conference

8-9 November 2017, location tbd
www.fad-diesel.de/news/15th_FAD_Conference

10th International AVL Exhaust Gas and Particulate Emissions Forum

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

8th AVL Large Engines TechDays

11-12 April 2018, Graz, Austria

www.avl.com/-/8th-avl-large-engines-techdays