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ARTICLE

Reinforcing EU testing methods of air emissions and the approval processes of vehicle compliance in the wake of the VW scandal

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Abstract Air pollution poses the single largest environmental health risk in Europe today. In the wake of the VW scandal (Dieselgate), the regulatory techniques aiming at tackling air pollution in the frame of the EU type-approval procedure are subject to significant changes. The article provides an analysis of the current emission standards and the improvements flowing from recent European Commission Regulations aiming at improving control of the emissions.

Keywords Air quality · Diesel scandal · Dieselgate · Defeat device · Emission limit values · Euro 6 standards · Environmental quality standards · Type-approval procedure · Testing of air emissions limits · Penalties

1 Introduction

Given that cars have become icons for flexibility, individuality, and freedom,[1] the passenger car fleet in almost all of the EU Member States is growing constantly. In 2010 there were about 239 million light-duty vehicles and 35 million heavy-duty vehicles in the 27 Member States, more than a quarter of the cars and trucks on the road worldwide. For 2030, it is expected that these numbers will grow by 31 %.[2] What is more, not only has the number of vehicles grown constantly over the past decades, but the distance travelled by each has increased as well.

[1] *Ashford/Caldart* [1], p. 462.

[2] *ICTT* [16], p. 6.

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It comes thus as no surprise that the automotive industry is a major player in the EU economy. It provided 2,3 million direct jobs and 9,8 million indirect jobs in 2012. The turnover totals EUR 859 billion, which represents 6,4 % of the EU gross domestic product.[3]

Cars, and the industries producing them, do however have significant impacts on the environment ranging from smog to climate change. Air pollution is deemed to be the most serious environmental impact of cars. Although air quality has improved over the past decade thanks to EU air quality standards, all EU citizens are still exposed to levels of air pollution the WHO considers harmful to health.[4] Given high levels of air pollution, there are 400,000 premature deaths annually, 10 times the number killed in road accidents. The health problems are particularly acute throughout the EU in urban areas and in densely populated regions. In addition, the Commission is of the view that air pollution is giving rise to 15 billion annual workday losses and annual damage between 330 and 940 billion euro.[5] According to the EEA 2015 report, 'the annual limit value for nitrogen dioxide (NO_2) was widely exceeded across Europe in 2013, with 93 % of all exceedances occurring close to roads. A total of 19 of the 28 EU Member States recorded exceedances of this limit value at one or more stations. Of the EU-28 urban population, 9 % lives in areas in which the annual EU limit value and the WHO AQG for NO_2 were exceeded in 2013'.[6]

Given that they have delivered substantial emission reductions across the range of regulated pollutants, new cars are polluting far less than old cars. However, nitrogen oxide emissions (NO_x) emitted from diesel engines, in particular light-duty vehicles, did not decrease significantly. Though diesel cars emit less carbon dioxide (CO_2), they emit more NO_x. Moreover, air pollution problems are compounded by the fact that diesel cars account in several Member States for nearly half of the cars after tax incentives encouraged a shift away from gasoline.

Against this backdrop, the scandal involving the use of defeat devices by the Volkswagen group in order to blur the testing of vehicles in artificial conditions shed light on the imperfections of the EU regulation on car emissions.

The scandal broke in September 2015. On 5 September, VW revealed to the California Air Resources Board and the EPA that some models marketed in the USA contained hidden software that could distinguish between testing conditions and real road conditions. Relying on sophisticated technology, VW installed a software, also-called a defeat device that switches off or turns down the car's emissions filtering system in certain diesel light vehicles. As a result, emissions from typical driving conditions were deliberately left much higher than promised or tested. This was done with the aim of optimising apparent emission performance during the emissions test cycle.

[3] Opinion of the European Economic and Social Committee on the 'Proposal for a Regulation of the European Parliament and of the Council on the approval and market surveillance of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles', para. 2.1., COM (2016) 31 final—2016/0014 (COD).

[4] *EEA* [8].

[5] *European Commission* [12].

[6] *EEA* [9], p. 8.

Though the use of a defeat device is expressly forbidden in EU law,[7] VW admitted on 20 September 2015 that it had been using systematically a defeat device in its engines marketed in the EU with a view to permitting deviations in NO_x emissions performances during the regulatory compliance-related test cycle.

On 23 September the undertaking admitted that worldwide some 11.5 million cars had been manipulated. On 3 November it acknowledged that up to 800.000 cars had been manipulated to show too low CO_2 emissions.

In the wake of the VW scandal, the German ministry of transport ordered a recall of 2,4 million VW cars to have their engine software retrofitted. In addition, the German type-approval authority (TAA) claimed that Fiat-Chrysler is using a defeat device in one of its diesel model.

As a matter of course, the European Commission came under harsh criticism. Given the sheer social and economic impacts of this scandal, the Commission adopted different legislative and regulatory proposals with a view to reinforcing the EU regulatory framework. The new acts aim at overcoming the regulatory and administrative flaws and at restoring consumer confidence. It is the aim of this article to explore several regulatory issues that arose with respect to the control of pollution emissions from light cars powered by gasoline and diesel.[8] CO_2 emissions are discussed incidentally.[9]

This article is structured as follows. The first section will provide an analysis of the current emission standards and the improvements flowing from recent European Commission regulations aiming at improving the controls of NO_x emissions. Just as important as the emission standards are the tests needed to ensure the proper compliance to these standards. In a second section, we take a closer examination of the inappropriateness of the different test methods that have been implemented in a haphazard fashion by 28 State authorities. A third section discusses the penalties set out by EU law and applied haphazardly by 28 Member States.

In order to understand this technically complex topic, lawyers have to juggle with a flurry of legislative and non-legislative acts that are to a great extent entangled.[10] In a nutshell, the EU has endorsed a three-pronged regulatory approach.

Firstly, the framework for the approval of motor vehicles and their trailers has been laid down by Directive 2007/46/EC of the European Parliament and the Council.[11] Based on Article 114 TFEU, that Directive must be modified in accordance with the ordinary legislative procedure. The framework established by that Directive will be

[7] Article 13 of Regulation (EC) No. 715/2007.

[8] For a general overview of the EU legislation regarding car emissions, see *de Sadeleer* [7].

[9] Attention should be drawn to the fact that light-duty vehicles—cars and vans—produce around 15 % of the EU's emissions of CO_2. These emissions are regulated by Regulation (EC) No. 443/2009 of the European Parliament and of the Council of 23 April 2009 setting emission performance standards for new passenger cars as part of the Community's integrated approach to reduce CO_2 emissions from light-duty vehicles, OJ L 140, 5.6.2009, pp. 1–15.

[10] With the entry into force of the Lisbon Treaty, a distinction has been drawn between legislative and non-legislative acts. See Article 289(3) TFEU.

[11] Directive 2007/46/EC of the European Parliament and of the Council of 5 September 2007 establishing a framework for the approval of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles (Framework Directive), OJ L 263, 9.10.2007, pp. 1–160.

reinforced by an additional European Parliament and Council Regulation adopted in accordance with the legislative ordinary procedure.[12]

Secondly, Regulation (EC) No. 715/2007 is one of the separate regulatory acts under the type-approval procedure laid down by Directive 2007/46/EC of the European Parliament and of the Council.[13] This Regulation requires new light-duty vehicles to comply with certain emission limits and lays down additional requirements on access to information. It is a legislative act given that it was adopted by the European Parliament and the Council.

Thirdly, the specific technical specifications associated with the fundamental provisions necessary to implement Regulation (EC) No. 715/2007 have been fleshed out in Commission Regulation (EC) No. 692/2008.[14] This Regulation has been adopted prior to the entry into force of the Treaty of Lisbon and the new comitology rules. In the course of 2016, Regulation (EC) No. 692/2008 has been amended by Commission Regulations 2316/427 and 2016/646. These Amending Regulations were also adopted under the former comitology rules (regulatory procedure with scrutiny or RPS).[15]

With the entry into force of the Lisbon Treaty, 'comitology' underwent significant changes. Indeed, Articles 290 and 291 of the Treaty on the Functioning of the European Union (TFEU) provide for two possible venues for the EU lawmaker of conferring powers to the Commission. The lawmaker may either 'delegate' to the Commission the power to adopt acts of a quasi-legislative nature (Articles 290 TFEU) or confer implementing powers of an executive nature on the Commission (Articles 291 TFEU). Therefore, the forthcoming regulation improving the framework laid down by Directive 2007/46/EC will be completed by delegated acts adopted by the Commission in accordance with Article 290 TFEU[16] and by implementing acts setting out the administrative provisions, such as the template for the information document and the type-approval certificates, the certificate of conformity, etc. in accordance with Article 291 TFEU.[17]

[12]Proposal for a Regulation of the EP and the Council on the approval and market surveillance of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles (COM (2016) 31) (hereafter: "Proposed EU Type-Approval Regulation").

[13]Regulation (EC) No. 715/2007 of the European Parliament and of the Council of 20 June 2007 on type approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information, OJ L 171, 29.06.2007, pp. 1–16.

[14]Commission Regulation (EC) No. 692/2008 of 18 July 2008 implementing and amending Regulation (EC) No. 715/2007 of the European Parliament and of the Council on type-approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information, OJ L 199, 28.07.2008, pp. 1–136.

[15]See Article 5 bis of the "comitology" Council Decision 1999/468/EC. 300 existing legal acts still temporarily continue to apply the RPS procedure.

[16]The EU lawmaker may empower the Commission to adopt 'non-legislative acts of general application to supplement or amend certain non-essential elements of the legislative act'.

[17]Pursuant to Article 291(3) TFEU, the European Parliament and the Council, in accordance with the ordinary legislative procedure, enacted Regulation 182/2011 that lays down 'the rules and general principles concerning mechanisms' for comitology. Regulation (EU) No. 182/2011 of the European Parliament and the Council of 16 February 2011 laying down the rules and general principles concerning mechanisms for control by Member States of the Commission's exercise of implementing powers, OJ L 55, 28.2.2011, pp. 13–18.

2 Light-vehicles emission limit values

2.1 From Euro 1 to Euro 6 standards

EU harmonisation measures regarding car emissions are based on thresholds which may not be exceeded. These emission limit values are limiting the direct or indirect release of pollutants from cars emitted into the air.

Emission standards are currently in place for light–duty (cars, vans) and heavy-duty vehicles (coaches, buses, trucks), and for non-road mobile machinery.

Motor vehicle emissions have originally been regulated by Directive 88/77/EC (heavy-duty vehicles) and Directive 70/220/EEC (light-duty vehicles) and amendments to those Directives. In effect, a whole series of amendments have been issued to stepwise tighten the limit values.

For *heavy-duty vehicles*, Directive 2005/55/EC[18] and Directive 2005/78/EC (implementing provisions)[19] define the emission standards currently in force. Regulations on EURO VI for heavy duty vehicles have introduced new stricter emission limits. Euro VI standards became mandatory on 1 January 2013. In addition, it defines a non-binding standard called Enhanced Environmentally-friendly Vehicle (EEV).

For *light-duty vehicles*, the emissions standards were laid down by Directive 98/69/EC relating to measures to be taken against air pollution by emissions from motor vehicles, which was one of the directives amending Directive 70/220/EEC (replaced by Regulation 75/2007).

The Euro standards are formulated using a split-level approach:

- the key aspects are encapsulated in a legal act (Directive 70/220 and latter on Regulation 75/2007) that has to be adapted by the Council and the European Parliament in accordance with the ordinary legislative procedure,
- technical aspects are regulated by means of implementing measures to be adopted in accordance with Article 291 TFEU by the European Commission flanked by a Committee. With respect to implementing powers, the Commission is endowed with much leeway in setting out the thresholds.[20]

The type-approval emission requirements for motor vehicles pollutants (CO, NO_x) have been gradually and significantly tightened through the introduction and subse-

[18]Directive 2005/55/EC of the European Parliament and of the Council of 28 September 2005 on the approximation of the laws of the Member States relating to the measures to be taken against the emission of gaseous and particulate pollutants from compression-ignition engines for use in vehicles, and the emission of gaseous pollutants from positive-ignition engines fuelled with natural gas or liquefied petroleum gas for use in vehicles, OJ L 275, 20.10.2005, pp. 1–163.

[19]Commission Directive 2005/78/EC of 14 November 2005 implementing Directive 2005/55/EC of the European Parliament and of the Council on the approximation of the laws of the Member States relating to the measures to be taken against the emission of gaseous and particulate pollutants from compression-ignition engines for use in vehicles, and the emission of gaseous pollutants from positive ignition engines fuelled with natural gas or liquefied petroleum gas for use in vehicles and amending Annexes I, II, III, IV and VI thereto, OJ L 313, 29.11.2005, pp. 1–93.

[20]In sharp contrast, given the risk of regulatory capture, the US Congress chose in the 70s to establish the car emission standards itself rather than delegating the task to an administrative body. E.g. *Ashford/Caldart* [1], p. 472.

Table 1 European emission standards for gasoline passenger cars, g/km

	Date	CO	NO_x	PM
Euro 5	September 2011	0.50	0.180	0.005
Euro 6	September 2014	0.50	0.80	0.005

quent revision of a flurry of Euro standards. The introduction of the Euro 1 standard in 1992 required the switch to unleaded petrol and the fitting of catalytic converters to petrol cars to reduce carbon monoxide (CO) emissions. The Euro 2 standard further reduced the limit for CO emissions and also reduced the combined limit for unburned hydrocarbons and oxides of nitrogen for both petrol and diesel vehicles. Since the Euro 2 stage, EU regulations introduced different emission limits for diesel and petrol vehicles. Euro 3 also added a separate NO_x limit for diesel engines and introduced separate HC and NO_x limits for petrol engines. With respect to light vehicles, Euro 4 lowered NO_x emissions from 0,50 to 0,25 g/km and PM10 emissions from 0.05 to 0,0025 g/km.

In 2007, Directive 70/220/EEC was repealed and replaced by Regulation (EC) No. 715/2007 of the European Parliament and of the Council of 20 June 2007 which harmonises the technical emission standards—known as EC type-approval—for motor vehicles.[21] Tighter emission limits, known as Euro 5 and Euro 6, of atmospheric pollutants such as particulates and NO_x were established. Manufacturers are called on to prove that all new vehicles sold, registered or put into service comply with these new emission standards.

Euro 5 applied to passenger cars and light duty vehicles of categories M1, M2, N1 and N2 (all with a reference mass not exceeding 2,610 kg) and was mandatory for vehicles registered from 1 January 2011 or from 1 January 2012 for some vehicles. Euro 5 further tightened the limits on particulate emissions from diesel engines from 25 mg/km to 5 mg/km. In addition, all diesel cars needed particulate filters to comply with the new requirements.

Given that the share of diesel vehicles in the overall sales of light duty vehicles is increasing, Euro 6 requires the reduction of NO_x diesel car emissions from 180 mg/km to 80 mg/km. Euro 6 thresholds apply to new vehicle registrations from 2015. Interestingly enough, the Euro 6 CO emission limits decreased by 68 % from those established under Euro 1 in 1992. Given the speed with which the different thresholds were reduced, some carmakers faced difficulties to adjust their new models. By way of illustration, in 2012, less than 1 % of new vehicles already complied with the Euro 6 standard, while 91 % of all cars sold complied with the Euro 5 standard.[22]

The Euro 5 and Euro 6 ELVs are summarized in the Tables 1 and 2.

[21] The specific technical provisions necessary to implement that Regulation were adopted by Commission Regulation (EC) No. 692/2008.

[22] *ICTT* [16], p. 6.

Table 2 European emission standards for diesel passenger cars, g/km

	Date	CO	NO_x	PM
Euro 5	September 2011	1.0	0.180	0.005
Euro 6	September 2014	1.0	0.80	0.005

All in all, NO_x emissions limits for diesel vehicles have been tightened as illustrated by the following table.

Euro standards	NO_x emissions thresholds	Entry into force
Euro 3	500 mg/km	January 2000
Euro 4	250 mg/km	January 2005
Euro 5	180 mg/km	September 2009
Euro 6	80 mg/km	September 2014

2.2 Advantages and drawbacks of the emission standards

The emission standards technique plays an essential yet controversial role in EU environmental law. At the outset, it is against the background of self-regulation that the value of regulatory emission standards must be assessed.[23] It must be noted that self-regulation has been seen as a response to deficiencies both of administrative regulation and economic instruments. However, several participatory approaches endorsed by the European Commission failed. The most well known and controversial of the agreements concluded under the aegis of the European Commission were that concluded between the federations of carmakers, which undertook to apply measures reducing CO_2 emissions—below the threshold of 140 gm/km. In 1999 and 2000, the Commission endorsed the three agreements concluded by the business federations regrouping carmakers.[24] The reduction targets relating to CO_2 were endorsed by the Commission.[25] Given that this approach has not borne fruit, the EU lawmaker adopted a decade later Regulation (EC) No. 443/2009 setting emission performance standards for new passenger cars.[26]

[23] *de Sadeleer* [6], pp. 199–202.

[24] ACEA—European Automobile Manufacturers' Association; JAMA—Japanese Automobile Manufacturers' Association, and KAMA—Korean Automobile Manufacturers' Association.

[25] See Communication from the Commission, Results of the review of the EU Strategy to reduce CO_2 emissions from passenger cars and light-commercial vehicles, COM (2007) 19 final. E.g. *Krämer* [17], p. 313.

[26] Given that the car industry was unable to reach its own objectives as set out in these three agreements, on February 2007 the Commission acknowledged the need to replace this conciliatory approach by a genuine regulatory approach. As a result, the Commission proposed the Council and the European Parliament to adopt a regulation setting emission performance standards for new passenger cars as part of the EU's

The enactment of the Euro emission standards entails three obvious advantages.[27]

Firstly, given that the Euro emission standards are binding, an infringement is an automatic result of any failure to respect them. The binding thresholds thus set a dividing line between what is lawful and what is unlawful.

Secondly, the harmonisation of emission standards on EU level is particularly valued by the car industry, since the adoption of uniform standards limits the distortions in competition resulting from decisions taken on a case by case basis by 28 national agencies, which creates uncertainty. Hence, thresholds are likely to buttress legal certainty and enhance a smooth functioning of the internal market.

Thirdly, emission standards should in principle be set in line with scientific criteria. Experts, who play an essential role, are accordingly consulted in order to identify the threshold above which pollution becomes problematic, and should accordingly be prohibited by EU law.

That being said, emission standards do offer absolute environmental protection provided that they are set and applied in order to avoid that air quality standards are exceeded.[28] In other words, emission standards have to be set with a view to improving air quality. Accordingly, thanks to the introduction of the tougher Euro 6 thresholds air quality should improve. However, the interconnection between emission standards and air quality standards is far from being obvious.

Firstly, in spite of their benefits, the scientific foundation of the emission standards is likely to be undermined where the thresholds result from a compromise between the car industry and the EU institutions.[29] It comes as no surprise that the protection level offered by setting out emission thresholds essentially remains the fruit of a political compromise, which proves to be particularly problematic since it is science itself which proves to be uncertain. In effect, the level of protection is more the result of a pragmatic and gradual approach and a search for the possibilities than a desire to implement in detail the scientific experts' recommendations.

Secondly, Directive 2008/50/EC on ambient air quality and cleaner air for Europe sets out limit values and target values for several pollutants released by different source among which transport: sulphur dioxide, PM10 and PM2.5, benzene, CO, lead, nitrogen dioxide and oxides of nitrogen. In addition it distinguishes alert and limit values (for human beings) from critical levels (for ecosystems, plants, and trees).

integrated approach to reduce CO_2 emissions from light-duty vehicles. See Regulation (EC) No. 443/2009 of the European Parliament and of the Council of 23 April 2009 setting emission performance standards for new passenger cars, OJ L 140, 5.6.2009, pp. 1–15.

[27] *de Sadeleer* [6], pp. 211–212.

[28] The articulation between the two techniques is somewhat haphazard. In Joined Cases C-165/09 to C-167/09 *Stichting Natuur en Milieu and Others*, EU:C:2011:348, the CJEU looked into the question of the interpretation of IPPC Directive 2008/1, which establishes the principles that govern the procedures and conditions for granting permits for the construction and operation of large industrial installations, and of Directive 2001/81, which introduces a system of national emission ceilings for certain pollutants (SO_2 and NO_x). The Court held that, when granting an environmental permit for the construction and operation of an industrial installation, the Member States are not obliged to include among the conditions for grant of that permit the national emission ceilings for SO_2 and NO_x laid down by Directive 2001/81.

[29] In the course of the 90s, under the Auto/Oil I programme, the European Commission set up working groups where the representatives of European car associations and petrol industries were invited to share their expertise. NGOs were not taking part in these groups. In contrast, different stakeholders among which environmental NGOs took part in the Auto/Oil II programme. See *Krämer* [17], p. 316-15.

It is noteworthy that these thresholds are regularly exceeded in several Member States and that the more stringent Euro 5 standards have been falling short in addressing major ambient air pollution events in London, Paris, Brussels, Madrid, Lyon, etc. These infringements are giving rise to a flurry of challenges. On the one hand, the European Commission has initiated infringement proceedings in accordance with Article 258 TFEU against 18 Member States for breaching the limits on PM10 and NO_2. On the other hand, several NGOs are initiating proceedings against their national agencies on the grounds that they don't comply with the Directive 2008/50/EC air quality standards. By way of illustration, in *ClientEarth v Secretary of State for the Environment, Food and Rural Affairs*, the Supreme Court of the United Kingdom referred certain questions to the CJEU. That court has answered those questions in a judgement dated 14 November 2014.[30] In its judgement of 29 April 2015, the Supreme Court ordered the UK government to produce new plans to bring air pollution within legal limits as soon as possible. On 2 November 2016, the High Court ruled that the government's 2015 Air Quality Plan failed to comply with the Supreme Court ruling and relevant directives and held that the government had erred in law by fixing compliance dates based on over optimistic modelling of pollution levels.

Three factors explain why a clean air policy in major cities was doomed for failure.

On the one hand, EU emission standards do not influence the manner in which cars are driven, which significantly impacts air quality.[31]

On the other hand, the reductions in air emissions have constantly been eaten up by traffic increase. Indeed, accumulation of car exhausts within cities is giving rise to significant concerns on the ground that quality thresholds are exceeded. What indeed is the point of equipping cars with new technologies if the number of cars and of kilometres travelled is constantly on the increase?

Last, the technique of compartmentalising the regulations that applied to different media makes it possible to circumvent emission limits. In effect, as discussed below, the laboratory NEDC tests did not accurately reflect the amount of air pollution emitted during real driving conditions. As a result, while vehicles in general have delivered substantial emission reductions across the range of regulated pollutants, this was not the case for NO_x emissions from diesel engines, in particular light-duty vehicles.[32] To make matters worse, VW's diesel engines were equipped both in the US and in the EU with software reducing the NO_x output in order to satisfy stringent emission standards whereas cars were producing much higher emissions during normal driving conditions.

3 Emission test cycle

Just as important as the emission standards are the tests needed to ensure the proper compliance to these standards. These are laid out in standardised emission test cycles

[30] Case C-404/13 *ClientEarth*, EU:C:2014:2382.

[31] *Bell/ McGillivray/Pedersen* [2], p. 245.

[32] Preamble, para. 4 of Commission Regulation amending Regulation (EC) No. 692/2008 as regards emissions from light passenger and commercial vehicles (Euro 6).

aiming at measuring emissions performance against the regulatory thresholds applicable to the tested vehicle. At this stage, two separate, albeit related, issues must be distinguished. The first issue concerns whether the tests are rigorous enough. Closely related to this is the issue of the CE certificate procedure.

3.1 Testing of air emissions limits

3.1.1 The flaws of the testing

With respect to light vehicles, since the Euro 3 regulation in 2000, performance has been measured in applying the New European Driving Cycle (NEDC).

In spite the fact that air emissions limits for cars have been progressively tightened, the obsolete laboratory tests have meant that they failed to deliver. In effect, laboratory tests do not accurately reflect the amount of air pollution emitted during real driving conditions. Several devices are likely to be applied with a view to reducing the emissions (electrical instruments being switched off, battery fully charged, over-inflated tyres, folding of side mirrors, etc.). Regarding diesel cars, the actual NO_x output has been significantly greater than the lab output.

A consequence of the disparity between the recent Euro standards and the NEDC has been persistent air quality problems, in particular in urban areas. [33] It comes thus as no surprise that according to Commission data, currently produced Euro 6 diesel cars exceed the NO_x threshold 4–5 times (400 %) on average in real driving conditions compared to laboratory testing. By way of illustration, in testing 15 Euro 6 models, the ICCT found breaches of the 80 mg/km NO_x threshold ranging from 2 to 22 times in different vehicles.[34]

At least, the VW scandal highlighted the need to shift the tests out of the lab and onto the road. Given that the Commission's review found that the NEDC tests are no longer adequate or no longer reflect real world emissions,[35] this institution was called on in virtue of Article 14(3) of Regulation (EC) No. 715/2007 to adapt them 'so as to adequately reflect the emissions generated by real driving on the road'. The necessary measures, which are designed to amend non-essential elements of this Regulation, by supplementing it, had to be adopted in accordance with the regulatory procedure with scrutiny pursuant to Decision 1999/468/EC.

For the purposes of this article, it is useful to pay heed to two Commission Regulations (2016/427 of 10th March 2016 and 2016/646 of 20 April 2016) that are inserting new provisions in Regulation (EC) 692/2008 that is fleshing out the obligations laid down in Regulation (EC) No. 715/2007 as regards emissions from light passenger and commercial vehicles (Euro 6).

[33] *ICTT* [16], p. 11.

[34] *ICTT* [15].

[35] The Commission has performed a detailed analysis of the procedures, tests and requirements for type approval that are set out in Regulation (EC) No. 692/2008 on the basis of own research and external information and found that emissions generated by real driving on the road of Euro 5/6 vehicles substantially exceed the emissions measured on the regulatory New European Driving Cycle (NEDC), in particular with respect to NO_x emissions of diesel vehicles. See Recital 3, Preamble of the Commission Regulation amending Regulation (EC) No. 692/2008 as regards emissions from light passenger and commercial vehicles (Euro 6).

These changes were hailed by Commissioner Elżbieta Bieńkowska, responsible for Internal Market, Industry, Entrepreneurship and SMEs. She issued a clarion call: *"The EU is the first and only region in the world to mandate these robust testing methods. ...We will complement this important step with a revision of the framework regulation on type-approval and market surveillance of motor vehicles. We are working hard to present a proposal to strengthen the type-approval system and reinforce the independence of vehicle testing"*.

The following table highlights the relationship between these different acts:

Acts	Object	Nature
EP and Council Regulation (EC) No. 715/2007	General obligations on type-approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6)	Legislative act
Commission Regulation (EC) 692/2008	Specific technical provisions necessary to implement Regulation No. 715/2007	Non-legislative act
Commission Regulations 2016/427 of 10th March 2016 and 2016/646 of 20 April 2016	Amendments to Commission Regulation (EC) 692/2008 introducing RED tests and conformity factors	Non-legislative act

3.1.2 Commission Regulation 2016/427: shifting the tests out of the lab and onto the road

In the wake of the VW scandal, on 27 October 2015 the European Parliament adopted a resolution calling on the European Commission and Member States to introduce an ambitious on-the-road test in 2017 to finally meet the current Euro 6 limit for diesel cars of 80 mg of NO_x per km.

Commission Regulation 2016/427 introduces in Regulation (EC) No. 692/2008 testing in real-world conditions called Real Driving Emissions (RDE) in addition to laboratory tests.[36] This Amending Regulation is following the principles already applied to heavy duty vehicles by Euro VI Regulation (EC) 595/2009 and its implementing measures. It provides for a RDE procedure that shall complement the laboratory based procedure with a view to checking that the emission levels of NO_x, and at a later stage also particle numbers (PN), measured during the laboratory test are confirmed in real driving conditions. Practically speaking, cars will be tested on roads according to random acceleration and deceleration patterns. The pollutant emissions will be measured by portable emission measuring systems (PEMS) that will be

[36]Commission Regulation (EU) 2016/427 of 10 March 2016 amending Regulation (EC) No. 692/2008 as regards emissions from light passenger and commercial vehicles (Euro 6), OJ L 82, 31.3.2016, pp. 1–98.

attached to the car. In reflecting to a greater extent real-world driving style, the new tests should score more accurate results that the lab tests.[37]

In addressing the problem of NO_x emissions from diesel vehicles, this Amending Regulation should contribute to the decrease of the current sustained high levels of NO_2 concentrations in ambient air, which are a major concern regarding human health.[38]

3.1.3 Commission Regulation 2016/427: stringency of the new tests regarding the control of emissions

The Commission and the Member States have been at pains in finalising the dates of implementation and the stringency of the new tests. On 28 October 2015, the Technical Committee of Motor Vehicles (TCMV) watered down the proposal from the European Commission. Initially NO_x readings, primarily associated with diesel cars, could exceed an 80 mg/km limit by 60 % before falling to 20 %. In order to allow manufacturers to gradually adapt to the RDE rules, the TCMV took the view that the final quantitative RDE requirements should be introduced in two subsequent steps however with laxer requirements:

- in a first step, car manufacturers will have to bring down the discrepancy to a conformity factor of maximum 2.1 (110 %) for new models by September 2017 (for new vehicles by September 2019);
- in a second step, this discrepancy will be brought down to a factor of 1.5 (50 %), taking account of technical margins of error, by January 2020 for all new models (by January 2021 for all new vehicles).

The following table is setting forth these new arrangements.

Timetable	Vehicles	Conformity factor	Maximum overshoot
September 2017	New models	Maximum 2.1 (110 %)	168 mg/km NO_x
September 2019	New vehicles	Maximum 2.1 (110 %)	168 mg/km NO_x
January 2020	All new vehicles	Maximum 1.5 (50 %)	120 mg/km NO_x

The Commission hammered out a deal with the TCMV in accepting to water down its proposal. Nevertheless, it claimed that the compromise was a breakthrough on emissions testing.[39]

Given that the new tests had to be adopted by the Commission in accordance with the regulatory procedure with scrutiny,[40] the European Parliament was empowered

[37] *Transport & Environment* [21].

[38] Preamble of the "Proposed EU Type-Approval Regulation", recital 6.

[39] *European Commission* [11].

[40] The European Parliament and the Council has the right of scrutiny that enables it to pass a resolution if the institution believes that the proposed measure exceeds the implementing powers provided for in the

under Decision 1999/468/EC to object them. On 14th December 2015 in Brussels, the Parliament Environment Committee drafted a formal objection to the Commission proposal on the account that the requirements were too lax. The objection was adopted by 40 votes to 9 and 13 abstentions. However, on January 2016 in Strasbourg a deeply divided plenary session could not muster the objection endorsed by its Environment Committee. Whereas EEP and ECR political groups supported the compromise and the Greens opposed it, other groups, like the Liberals and the Socialists, broke ranks. Moreover, MPs from countries with car industries opposed the resolution. Hence it failed to overturn the standards agreed in comitology in October 2015 by 317 to 323 MEPs, with 61 abstaining. Commissioner Elżbieta Bienkowska promised the review of the emissions overshoot in order to eliminate it by 2020 at the latest.

On 26 April 2016, the test procedures were introduced by Commission Regulation (EU) 2016/646.[41]

To assess whether the new RDE requirements amount to a breakthrough or to a hoax depends on which side of the telescope one peers through into the issue. Peering from one end, one could take the view that the allowed divergence between the regulatory limit measured in real driving conditions and measured in laboratory conditions is still a significant reduction compared to the current discrepancy (400 % on average). A look from the telescope from the other end, however, produces a quite different picture. In effect, thanks to a conformity factor of 2.1 from late 2017, diesel cars could emit more than twice the Euro 6 legally binding thresholds. The permitted overshoot shall fall to 50 % by 2020. Needless to say, the new measure is especially controversial in the wake of the VW emissions cheating scandal and is likely to dent even more consumer confidence.[42] In addition, given the high concentrations of NO_x emissions in urban areas and the flurry of infringements of Directive 2008/50/EC, urgent consideration should be given to robust RDE test with a view to ensuring a significant decrease of NO_x emissions.

With respect to software devices, Commission Regulation (EU) 2016/646 included new provisions in Regulation (EC) 692/2008 that require the disclosure of the existence of all potential defeat devices during the vehicle type-approval process. TAAs are called on to supervise the emission control strategy applied by the manufacturer at type-approval, following the principles already applied to heavy-duty vehicles by Euro VI Regulation (EC) No. 595/2009 and its implementing measures. On the other hand, the European Commission has invited Member States to investigate the presence of defeat devices in the vehicles circulating on their territories and to report back. On 27 July 2016, the Commission transmitted to the European Parliament a

basic act. The "Comitology" Regulation No. 182/2011 on 16 February 2011 did not have the effect of abrogating the Regulatory procedure with scrutiny (RPS) introduced by Council Decision 2006/512/EC. Although regulation No. 182/2011 introduced considerable changes to existing comitology mechanisms, nonetheless the RPS 'shall be maintained for the purposes of existing basic acts making reference thereto'. See Regulation (EU) 182/2011, Art. 12(2) and recital 21.

[41] Commission Regulation (EU) 2016/646 of 20 April 2016 amending Regulation (EC) No. 692/2008 as regards emissions from light passenger and commercial vehicles (Euro 6), OJ L 109, 26.4.2016, pp. 1–22.

[42] *de Sadeleer* [5]; *Gurzu* [14].

first overview on the national investigations. However, the data submitted by Member States is still incomplete.[43]

3.2 The type-approval procedure

3.2.1 The flaws of the type-approval procedure

Type-approval requirements for motor vehicles and their trailers are currently set out in Directive 2007/46/EC of the European Parliament and of the Council.[44] This Framework Directive provides the Member States with a common legal framework for the approval of motor vehicles. In particular, it aims at facilitating the free movement of motor vehicles and trailers in the internal market by laying down harmonised requirements designed to achieve common environmental and safety objectives.

Under the type-approval regime, before being placed on the market, the vehicle type is tested by a national technical service. The national approval authority then delivers the approval ('CE certificate') on the basis of these tests. The manufacturer may make an application for approval in any EU country. In virtue of the principle of mutual recognition the CE certificate is valid throughout the EU. In other words, it suffices that the vehicle is approved in one EU Member State for all vehicles of its type to be registered with no further checks throughout the EU on the basis of their certificate of conformity.

However, as hinted above, from an environmental perspective, the VW scandal shed light on the flaws of the EU scheme. Several factors are coming into play.

Firstly, the type-approval framework is based on the principle of mutual recognition, according to which all new vehicles produced in conformity with a type of vehicle approved by one Member State benefit from the right of being freely marketed and registered in the other Member States. Given that the type-approval granted is valid all over the EU, the competent TAAs are likely to compete with each other.[45] To make matters worse, the current system of information among TAAs does not preclude a car manufacturer from requesting a type approval from a Member State after its request has been rejected in another one. Moreover, the risk of competition between the TAAs is exacerbated by the fact that the current rules for type approval are not clear enough and are not homogeneously applied in the Member States.[46] In case a Member State becomes stricter, there is a chance that affected carmakers seek the approval from one of the other 27 Member States.[47]

Secondly, the TAAs did not investigate whether car emissions exceeded the EU thresholds when car models were driven on the road instead of in a laboratory. They argue that EU legislation had not spelled out how to carry out the surveillance of

[43] *Bieńkowska* [3].

[44] Directive 2007/46/EC of the European Parliament and of the Council of 5 September 2007 establishing a framework for the approval of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles (Framework Directive), OJ L 263, 9.10.2007, pp. 1–160.

[45] *EMIS* [10].

[46] Ibid.

[47] *Teffer/Armellini/Iftodi/Morris* [20].

air pollutants emitted by cars. To make matters worse, these authorities did not have access to the software which the manufacturer uses. As a result, checking for defeat devices has never been a high priority among the TAAs.

Thirdly, several TAAs do receive substantial income from car manufacturers for issuing the certificates, called type approvals. Accordingly, one could call into question their independence.

Fourthly, although Regulation 715/2007 prohibits the use of defeat devices[48] except in specified circumstances, they were applied by some car manufacturers. Whereas the U.S. guidance explicitly puts the burden on manufacturers to prove they are not using a prohibited defeat device, this type of guidance is so far missing in the EU system. Accordingly, the lack of guidance has contributed to inconsistency and uncertainty in how the Regulations are to be enforced.[49]

Needless to say, these flaws have seriously been undermining the decentralized car-approval scheme flowing from Directive 2007/46/EC. Indeed, in order to avoid that non-compliant products are placed on their territory, Member States depend to a large extent on the effectiveness of the enforcement policy of the other Member States. Consequently, weaknesses in enforcement by one single Member State seriously undermine the efforts taken by other Member States to prevent non-compliant products from entering their market.[50]

3.2.2 EMIS Committee

The European Parliament decided on 17 December 2015 to set up a Committee on Inquiry to investigate alleged contraventions and maladministration in relation to emission measurements in the automotive sector (EMIS Committee). The scope of the investigation concerns Directive 2007/46/EC establishing a framework for the approval of motor vehicles and their trailers and Regulation (EC) 715/2007. Acknowledging an obvious 'lack of control after type approval', EMIS Committee is requesting for 'a drastic strengthening of market surveillance'.[51] The Committee strongly supports the current proposal of the Commission to reform the legislative framework for type-approval requirements for motor vehicles and their trailers discussed below.

3.2.3 The reform of the legislative framework for type-approval requirements for motor vehicles and their trailers

As stressed above, the VW scandal highlighted weaknesses in the implementation of type-approval rules for motor vehicles in the European Union, in particular as regards standards on emissions of NO_x and CO_2. On 5 October 2015, the European Parliament adopted a Resolution on emission measurements in the automotive sector, calling on the Commission for significantly strengthening the current EU type approval regime including more EU oversight, in particular with regard to market surveillance,

[48] Regulation (EC) No. 715/2007 provides a definition of "defeat device".

[49] *Grabiel/Grabile* [13].

[50] Preamble, "Proposed EU Type-Approval Regulation".

[51] *EMIS* [10].

coordination and follow up regime for vehicles sold in the Union. Within a week of the outbreak of the scandal, the Commission announced that it would reinforce the type-approval system, in particular by ensuring adequate supervisory mechanisms to ensure a correct and harmonised application of the type-approval procedures.

On 27 January 2016, the Commission adopted its proposal to revise the legal framework.[52] In particular, this 'fundamental revision' aims at ensuring 'a robust, transparent, predictable and sustainable regulatory framework that provides a high level of safety and of health and environmental protection'.[53]

The "Proposed EU Type-Approval Regulation" aims, among others, to introduce market surveillance provisions to complement the type-approval requirements and to improve the enforcement of the type-approval framework by harmonising and enhancing the type-approval and conformity of production procedures applied by Member State authorities and technical services.

Account must be taken of the following improvements:

- mandatory periodic audits of the conformity control methods and the continued conformity of the products concerned,
- reinforcement of the requirements relating to the competence, obligations and performance of the technical services that carry out tests for whole-vehicle type-approval under the responsibility of type-approval authorities,
- improvement of the criteria for designating technical services,
- supervisory controls at EU level of the national technical services, which should be regularly and independently audited to obtain and maintain their designation.
- right and duty of the national technical services to carry out unannounced factory inspections and to conduct physical or laboratory tests on products covered by the proposed Regulation,
- reinforcement of the independence of technical services vis-à-vis manufacturers,
- scheme for a national fee structure with a view to avoiding financial links between testing laboratories and manufacturers, which could lead to conflicts of interest and compromise the independence of testing,
- time validity of a type-approval certificate, which would expire after 5 years, with the possibility of being renewed if the type-approval authority certifies that it still complies with the applicable rules,
- invalidation of type-approval certificates, in the case of administrative non-conformities.

All in all, the oversight of the harmonised type approval shall be improved. Nevertheless, the idea that a single authority, such as an independent EU agency that would be in charge of supervising the framework, has been discarded so far.

The "Proposed EU Type-Approval Regulation" is currently being discussed in the internal market committee, which is leading the parliamentary legislative process and should vote on the amendments to the draft proposal by the end of 2016.

[52] Proposal for a Regulation of the EP and the Council on the approval and market surveillance of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles (COM (2016) 31) ("Proposed EU Type-Approval Regulation"). The legal framework for the two other vehicle categories, motorcycles, and tractors, has already been the subject of a major revision in 2013.

[53] "Proposed EU Type-Approval Regulation", preamble, para. 5.

4 Penalties

Article 197 TFEU requires an "effective implementation of Union law by the Member States".[54] Therefore, penalties play a key role in avoiding frauds that undermine the regulatory framework established at EU level. In virtue of Article 13 of Regulation (EC) No. 715/2007, Member States are called on to lay down the provisions on penalties applicable for infringement by manufacturers of the provisions of this Regulation and to take all measures necessary to ensure that they are implemented. The types of infringements which are subject to a penalty include falsifying test results for type approval.[55] The use of defeat device that reduce the effectiveness of emission control systems are prohibited.[56] By the same token, the "Proposed EU Type-Approval Regulation" shall oblige the Member States to lay down penalties for infringements by economic operators falsifying the results for type-approval.[57]

Given that the penalties have not been harmonized,[58] Member States are empowered to choose the penalties that seem to them to be appropriate. Given a shortage of data, it is difficult to assess the impact of the existing national penalties. In contrast to US federal law,[59] the national sanctions for marketing a car which is not conform to a type-approved car appear to be ineffective.[60] It is worthy of note that a number of Member States have not set up appropriate sanctions for infringement of the relevant legislative provisions.[61] Moreover, whether recent infringements to Regulation 715/2007 are likely to be prosecuted remains to be seen.

What is more, in order to assess whether the penalty in question is consistent with the principle of proportionality, account must be taken of different factors (the economic benefits for the wrongdoer, previous convictions, etc.). In particular, the national courts will have to pay heed to the nature and the degree of seriousness of the infringement which the penalty seeks to sanction and of the means of establishing the amount of the penalty.[62] In a recent judgement regarding a case of transfrontier movement of waste, the CJEU held that:

'As regards the penalties imposed for infringement of the provisions of Regulation No. 1013/2006, which aims to ensure a high level of protection of the environment and human health, the national court is required, in the context of the review of the proportionality of such penalty, to take particular account of the risks which may be caused by that infringement in the field of protection of the environment and human health.'[63]

[54] *Nicolaides/Geilmann* [18].

[55] Article 13(2)b.

[56] Article 5(2). Regarding the definition of defeat device, see Article 1(3).

[57] Article 89(2)(b).

[58] The penalties provided for must be 'effective, proportionate and dissuasive'.

[59] § 7522(a)(1) Clean Air Act.

[60] *L. Krämer*, personal communication.

[61] *EMIS* [10].

[62] See, inter alia, Case C-259/12 *Rodopi-M 91*, EU:C:2013:414, para. 38; Case C-487/14 *SC Total Waste Recycling SRL*, EU:C:2015:780, para. 53.

[63] Case C-487/14 *SC Total Waste Recycling SRL*, EU:C:2015:780, para. 55.

5 Conclusions

According to the EEA, air pollution poses the single largest environmental health risk in Europe today.[64] In spite of many improvements, substantial challenges remain and considerable impacts on human health and on the environment persist.

Against this backdrop, several regulatory issues arise for comment here.

The core issue is whether EU environmental regulations on cars resemble more an approach accompanying the growth of the car industry and enhancing the automotive society, rather than a move to call the environmental legacy of car transportation in question. As a matter of fact, all noise, pollution, nuisances, or attacks on the natural environment cannot be prohibited because were this to be done, life within society would become impossible. The only viable solution therefore involves authorising polluting activities and requiring compliance with thresholds (emission standards, air quality standards, product standards) over which the environmental harm is considered to be unacceptable. Therefore, since a certain level of environmental pollution can be sustained without significant environmental harm, certain limits have been set by the EU institutions on the technical characteristics of cars and fuels and the ability of the ecosystems and human beings to withstand their environmental impacts. In fact, the aim of the EU environmental law model is not to eliminate pollution, but rather to contain its most serious consequences. Yet the picture is not as idyllic as one might think.

The following paradox lies at the heart of the EU clean air policy. Though the type-approval emission requirements for motor vehicles have been gradually and significantly tightened through the introduction and subsequent revision of Euro standards, ambient air quality in a number of cities has not really improved. In particular, emissions of NO_x from road transport have not sufficiently decreased to meet air quality standards in many urban areas.[65] Accordingly, air quality standards and economic imperatives appear to clash.

Needless to say, the path ahead which must be followed in order to reconcile growth with environmental protection, under the aegis of sustainable development, remains littered with at least four pitfalls.

The success of a clean air policy reckons upon a genuine coordination of regulations on fuel efficiency, tailpipe emissions, engine performance, and fuel content. EU law is falling short of meeting that objective. In order to understand the subject matter, one has to juggle with numerous Directives and Regulations spewing out excessive detailed technical measures, measurements, controls which are constantly modified. Given the absence of consolidating texts, one is struck by the lack of transparency[66] and the shortage of interactions between these different regulations.

In addition, the common playing field envisioned at EU level is constantly hindered by centrifugal forces. The decentralisation of the type-approval scheme is increasing the competition between TAAs and between technical services. In our view, it would be more efficient and cheaper to set up one single authority in charge of

[64] *EEA* [9], p. 7.

[65] *EEA* [9], p. 9.

[66] *Krämer* [17], p. 317.

supervising the system instead of 28 TAAs. By the same token, harmonisation of penalties would be needed to achieve better enforcement. Last, poor environmental results can be explained by the absence of harmonisation of eco-taxes. A 2005 proposal from the Commission to fix the tax for individual cars according to their CO_2 emissions was withdrawn in 2015.[67] As a result, Member States have significant freedom to adopt their environmental tax policies with a view to encouraging the best environmental standards.[68] By way of illustration, the mayor of London has recently been unveiling a new daily fee on top of the existing £11.50 congestion charge, for cars sold before 2005,[69] a move that's likely to remove cars not complying with Euro 5 standards. Other cities, like Brussels, are intent upon banning old diesel cars, however without recourse to tax schemes.

What is more, given the sheer increase of cars placed on the market and the distances covered by car drivers, the EU standards should be technology-forcing. However, account must be taken of the fact that so far the EU standards did not succeed to force the manufacturers and the importers to produce alternatively powered vehicles that are releasing a lesser amount of pollutants. In fact, the vast majority of Europe's new cars remain powered by gasoline or diesel motors.[70] Despite an increase over the last years, passenger cars powered by alternative fuels, including hybrid cars, only made up a small share of the fleet of passenger cars in the EU in 2013.

A final issue touches upon the question of inefficacy of EU law regarding testing car emissions. Here it is necessary to face hard facts: the main weakness of EU rules is, as recognised by the Commission, their lack of efficacy, with Directives and Regulations appearing as paper tigers. As a matter of principle, the Commission, as Guardian of the Treaties, should pursue these infringements relentlessly. Here too there are numerous pitfalls. Firstly, given the decentralised nature of the EU, compliance with EU emission standards depends on at least 28 different legal and administrative systems underpinned by different cultural factors.[71] Secondly, the Commission is not sufficiently well informed. Since it does not have any general powers of inspection, nor a body of inspectors, the control exercised by this institution over the national authorities is based largely on the reports transmitted by the Member States. Thirdly, the EU institutions do not appear to be really willing to take bold steps in improving the enforcement. The Commission has been criticised for its inaction in the aftermath of the VW scandal. The European Parliament has been unwilling to object to the Amending Regulation on RDE.

With hindsight, it appears that the EU approach to air pollution caused by light cars has turned out to be little more than a sticking plaster on a weeping sore.

[67] *Krämer* [17], p. 309.

[68] Taxation of more polluting second-hand vehicles compatible with Euro standards has been giving rise to litigation. *de Sadeleer* [6], pp. 237–259. Regarding the compatibility of a pollution tax levied on first registration of second-hand vehicles compatible with Euro 3 and Euro 4 air pollution standards is consistent with Article 110 TFEU, see Case C-254/13 *Orgacom BVBA*, EU:C:2014:2251. Whether a Romanian environmental tax levied on first registration of motor of second-hand vehicle compatible with Euro 2 air pollution standards is discriminatory, see Case C-263/10 *Iulian Nisipeanu v Direcţia Generală a Finanţelor Publice Gorj and Others*, EU:C:2011:466.

[69] *Carrington* [4].

[70] *ICTT* [16], p. 6.

[71] *Sobotta* [19].

References

1. Ashford, N.A., Caldart, A.C.: Environmental Law, Politics, and Economics. MIT Press, Cambridge (2008)
2. Bell, S., McGillivray, D., Pedersen, O.: Environmental Law, 8th edn. Oxford University Press, Oxford (2013)
3. Bieńkowska, E.: Meeting of the Committee of Inquiry into Emission Measurements in the Automotive Sector (EMIS). Speech of the commissioner for internal market and services, Strasbourg, 12 September 2016. Available at: https://ec.europa.eu/commission/2014-2019/bienkowska/announcements/emission-measurements-automotive-sector-emis_en
4. Carrington, D.: Sadiq Khan unveils plans for extra charge on London's most polluting cars. The Guardian, 5 July 2016
5. de Sadeleer, N.: Dieselgate. Quand l'enfer est pavé de bonnes intentions. L'Echo, p. 12, 25 November 2015
6. de Sadeleer, N.: EU Environmental Law and the Internal Market. Oxford University Press, Oxford (2014)
7. de Sadeleer, N.: Harmonizing car emissions, air quality, and fuel quality standards in the wake of the VW scandal: how to square the circle? Eur. J. Risk Regul. (1), 1–14 (2016)
8. EEA: Air quality in Europe—2013 Report. (2013). Available at: http://www.eea.europa.eu/publications/air-quality-in-europe-2013/at_download/file
9. EEA: Air quality in Europe—2015 report. (2015). Available at: http://www.eea.europa.eu/publications/air-quality-in-europe-2015/at_download/file
10. Committee of Inquiry into Emission Measurements in the Automotive Sector (EMIS): Considerations on the Commission proposal for a Regulation on the approval and market surveillance of mother vehicles and their trailers, GEDA D (2016) 46898 AA/db, 21 October 2016
11. European Commission: Press release: Commission welcomes Member States' agreement on robust testing of air pollution emissions by cars. Brussels, 28 October 2015. Available at: http://europa.eu/rapid/press-release_IP-15-5945_en.htm
12. European Commission: Report: Improving Air Pollution (2013)
13. Grabiel, T., Grabile, P.: Strengthening the regulation of defeat devices in the European Union, ICCT, 12 August 2016
14. Gurzu, A.: Parliament fails to overturn weak emissions tests. Politico, p. 14, 4 February 2016
15. ICTT: Assessment of PEMS datasets from modern diesel passenger cars. In: 20th International Transport and Air Conference (2014)
16. ICTT: European vehicle market statistics (2013). Available at: http://www.theicct.org/sites/default/files/publications/EU_vehiclemarket_pocketbook_2013_Web.pdf
17. Krämer, L.: EU Environmental Law, 8th edn. Sweet & Maxwell, London (2016)
18. Nicolaides, P., Geilmann, M.: What is effective implementation of EU law? Maastricht J. Eur. Comp. Law **19**(3), 383–399 (2012)
19. Sobotta, C.: Compliance with European environmental law—deficiencies and approaches. J. Eur. Env. Plan. Law **9**(1), 93 (2012)
20. Teffer, P., Armellini, I., Iftodi, D., Morris, S.: EU states forsook oversight on car emissions, EU observer, 14 October 2016
21. Transport & Environment: Realistic real-world driving emission tests: the last chance for diesel cars? (2015). Available at: https://www.transportenvironment.org/sites/te/files/publications/2015%2007%20RDE%20position%20paper%20FINAL.pdf