EEA Report | No 19/2017

Monitoring CO_2 emissions from new passenger cars and vans in 2016

ISSN 1977-8449

European Environment Agency

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Luxembourg: Publications Office of the European Union, 2017

ISBN 978-92-9213-925-4
ISSN 1977-8449
doi:10.2800/987976

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Abbreviations

AFV	Alternative fuel vehicle
BDR	Business Data Repository
BEV	Battery electric vehicle
CDR	Central Data Repository
E85	Petrol containing 85 % ethanol
EEA	European Environment Agency
ETC/ACM	European Topic Centre on Air Pollution and Climate Change Mitigation
HDV	Heavy-duty vehicle
IVA	Individual vehicle approval
LPG	Liquefied petroleum gas
NEDC	New European Driving Cycle
NG	Natural gas
NO_X	Nitrogen oxide
NSS	National small series
PHEV	Plug-in hybrid electric vehicle
PM	Particulate matter
UNECE	United Nations Economic Commission for Europe
VIN	Vehicle identification number
WLTP	World Harmonised Light Vehicle Test Procedure

Country groupings

Throughout this report, the following abbreviations are used to refer to specific country groupings:

- EU-13: Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia;
- EU-15: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and the United Kingdom;
- EU-27: EU-28 excluding Croatia;
- EU-28: EU-15 and EU-13.

Acknowledgements

This report was prepared by the European Environment Agency (EEA), supported by its European Topic Centre on Air Pollution and Climate Change Mitigation (ETC/ACM). The ETC/ACM is a consortium of European institutes assisting the EEA in its support to EU policy implementation in the field of air pollution and climate change mitigation. The ETC/ACM partner involved in the support for data quality assurance was EMISIA.

The author is Diana Vedlugaitė (EEA).
Cinzia Pastorello and Peter Christian Kjeld (EEA) are thanked for their assistance in compiling 2016 data, as well as other EEA colleagues for their support during the process of preparing this report.

Caveat

This report documents the latest official data submitted by Member States and vehicle manufacturers. It is not possible to assess the extent to which incorrect data from vehicle manufacturers may alter the analysis and conclusions. The final CO_2 performance for each manufacturer and pool is confirmed by a European Commission Decision.

It is also important to mention that, for both passenger cars and vans, the reported CO_2 emissions are based upon measurements performed in the laboratory using a standard European vehicle test cycle. Such measurements may not reflect real-world driving performance.

Executive summary

This report provides a summary of the CO_2 emission levels of new passenger cars and vans in the European Union in 2016. The report is based on the data collected by the European Environment Agency (EEA) concerning the CO_2 performance of passenger cars, in accordance with Regulation (EC) No 443/2009 (EU, 2009), and of light commercial vehicles (vans) in accordance with Regulation (EU) No 510/2011 (EU, 2011). The regulation for passenger cars sets a target for the average CO_2 emissions from new passenger cars of 130 g CO_2/km by 2015, while the regulation for light commercial vehicles sets the average CO_2 emissions target for new light commercial vehicles of 175 g CO_2/km by 2017. Stricter targets will apply under these regulations from 2020 (vans) and 2021 (cars). These regulations are based on emissions measured using the New European Driving Cycle (NEDC).

For each manufacturer, average specific emissions, defined as the average value for each manufacturer's fleet of newly registered vehicles in the EU that year, are compared with specific emission targets. Starting from 2013 for cars and 2014 for vans, a binding specific emission target applies for each manufacturer, based on a limit value curve according to the average mass of the new vehicles registered by that manufacturer.

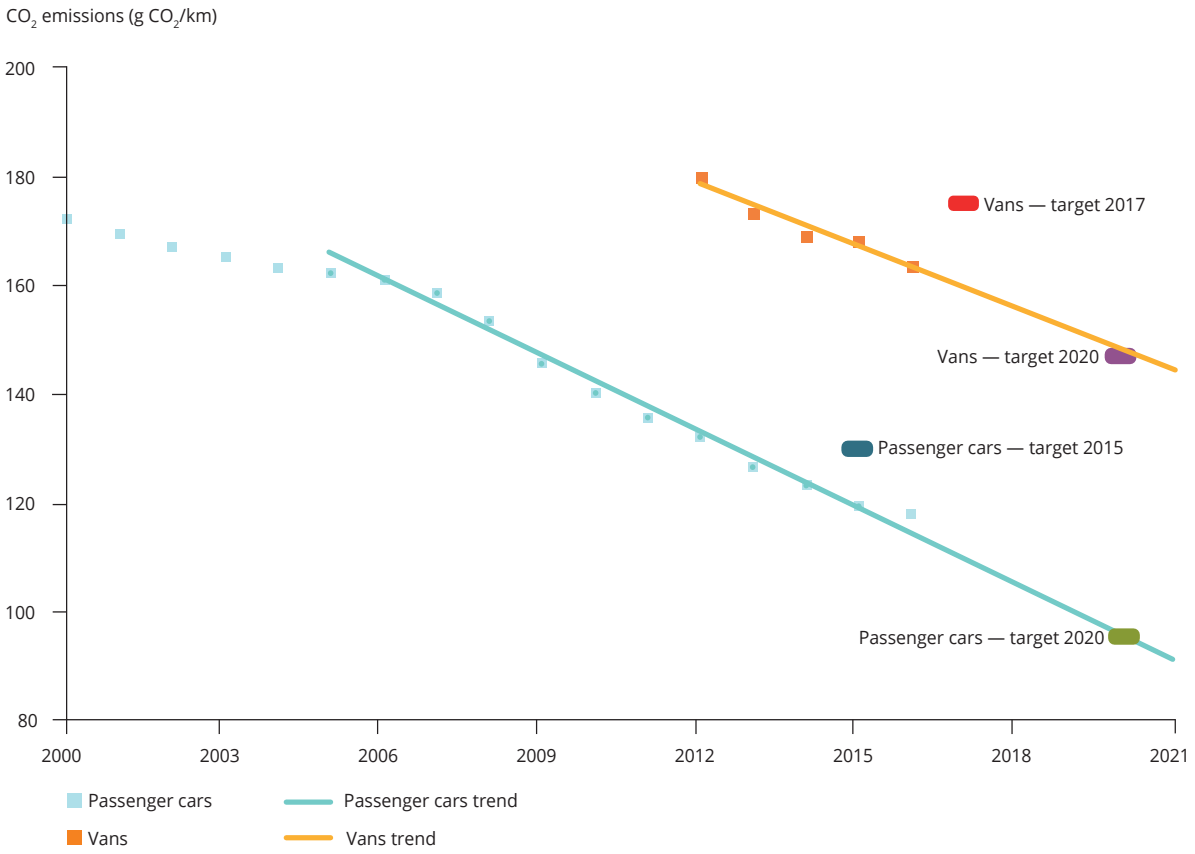
This report presents the main statistics reported by Member States, as well as the manufacturers' progress towards their targets. The EEA has collected and quality-checked data on CO_2 emissions from passenger cars and vans registered in all EU Member States ([1]) since 2010. Using Member State data, as verified by manufacturers ([2]), this report provides an overview of the performance of car and van manufacturers in meeting their 2016 CO_2 emission targets.

The main findings are:

- New cars sold in the EU in 2016 had average CO_2 emissions ([3]) of 118.1 g CO_2/km, which is 23 g/km above the 2021 target, and 1.5 g/km lower than in 2015.
- The average emissions of new light commercial vehicles registered in 2016 were 163.7 g CO_2/km, below the 2017 target of 175 g CO_2/km and a reduction of 2.8 % compared with 2015.
- Average NEDC type-approved CO_2 emissions from new cars have decreased by 27 % in the last 10 years, while the emissions of new vans decreased by more than 9 % in the last 5 years. In order to meet their EU 2020/21 targets, the average CO_2 emissions from new cars and vans will need to continue decreasing at a similar pace (Figure ES.1).
- The difference between provisional average specific emissions (the emission data reported earlier in 2016 by each of the Member States) and final average specific emission data (the emission data considering error notifications by manufacturers) was insignificant (below 0.1 g CO_2/km).
- As in recent years, diesel and petrol cars accounted for the large majority of the new fleet (96.5 % of new registrations), and diesel cars constituted the majority of the new registrations (49.4 %). The proportion of plug-in hybrid and battery electric vehicles remained similar to the 2015 level and constituted just over 1 % in 2016. Other alternative fuel vehicles, such as liquefied petroleum gas and

([1]) The geographical scope of the data changes over time. See Annex 1 for details.
([2]) Relevant registration data are reported to the EEA and the European Commission by EU Member States. The provisional data and the provisional calculations are then notified to manufacturers, which have 3 months to notify any errors to the Commission. The Commission then considers any notifications from manufacturers and either confirms or amends the provisional calculations. These amended/confirmed data are referred to as final average specific emissions.
([3]) Average CO_2 emissions are calculated as simple averages, without taking into account any adjustments.

Figure ES.1 Average CO_2 emissions historical development and targets for new passenger cars and vans in the EU-28



compressed natural gas vehicles, covered the remaining registrations (2 %).

- As in 2014 and 2015, the average diesel passenger car was more than 300 kg heavier than the average petrol vehicle.
- Diesel-fuelled passenger cars emitted on average 116.8 g CO_2/km, which is 4.9 g CO_2/km less than the average petrol vehicle, whereas in 2000 the emission difference between diesel and petrol vehicles was much larger (17.1 g CO_2/km).
- On average, the most efficient cars were bought in Portugal (104.7 g CO_2/km), Denmark, Greece and the Netherlands (106 g CO_2/km for the last three Member States). For new vans, average emission levels were lowest among those sold in Portugal (140 g CO_2/km), Bulgaria (141 g CO_2/km and Cyprus (144 g CO_2/km).

All car and van manufacturers met their CO_2 specific emission ([4]) targets in 2016 when taking into account the pools and derogations.

([4]) The figure for CO_2 specific emissions is, in relation to a manufacturer, the average of the specific emissions of CO_2 of all new passenger cars of which it is the manufacturer; it is calculated using all the adjustments described in Section 2.2.

1 Introduction

To reduce CO_2 emissions in the road transport sector, the European Parliament and the Council adopted two regulations: Regulation (EC) No 443/2009, which introduced mandatory CO_2 emission performance standards for new passenger cars, and Regulation (EU) No 510/2011, which introduced mandatory CO_2 emission performance standards for new vans.

For new passenger cars, the regulation sets the average CO_2 specific emission target at 130 g CO_2/km by 2015, defined as the average value for the fleet of newly registered passenger cars in the EU. A target of 95 g CO_2/km has been set for 2021 (phase-in from 2020). The modalities for compliance with those targets are presented in Chapter 2.

For new light commercial vehicles, Regulation (EU) No 510/2011 sets the average CO_2 emissions target at 175 g CO_2/km by 2017, defined as the average value for the fleet of newly registered vans in the EU. A medium-term target of 147 g CO_2/km has been set for 2020.

The modalities of compliance with the targets have been established for both regulations and are presented in Chapter 2.

The progress of manufacturers in meeting the targets is evaluated on an annual basis by calculating the difference between their CO_2 average specific emissions; and their specific CO_2 emissions target for that year.

In May 2017, the European Commission presented the communication 'Europe on the Move', which was accompanied by a wide-ranging set of proposals aiming to achieve clean, competitive and connected mobility in the EU. This communication included a proposal for a Commission regulation on the determination, and a legislative proposal for the monitoring and reporting, of the CO_2 emissions and fuel consumption from heavy duty vehicles (HDVs) that have not yet been monitored and reported so far in the EU. EU standards for HDVs are also under consideration and are planned for the first half of 2018.

For both cars and vans, the Commission has started reviewing the legislation, and a proposal on post-2020/21 CO_2 emission standards for cars and vans is anticipated at the end of this year.

2 Overview of the monitoring system for passenger cars and vans

Since 2010, the EEA has collected data on passenger cars registered in all EU Member States. Since 2013, the EEA has been collecting data about vans as well. For both cars and vans, the same schedule applies for the data monitoring:

- Member States shall record information for each new passenger car and van registered in their territory and transmit this information to the Commission by 28 February of each year. Data are submitted to the Central Data Repository (CDR ([5])), managed by the EEA.
- For vans only, manufacturers submit the vehicle identification number (VIN) ([6]) for each new van sold in the EU-28 to the Commission by 28 February of each year. Data are submitted to the BDR ([7]), managed by the EEA.
- The EEA performs several quality checks to evaluate the accuracy and the quality of the data sets. On the basis of these checks and the feedback from Member States, the EEA finalises and publishes the provisional database. At the same time, notification letters are sent to manufacturers informing them of their provisional CO_2 performances.
- Manufacturers can, within 3 months of being notified of the provisional calculation, notify the Commission of any errors in the data.
- The EEA and the European Commission assess the manufacturers' corrections, and, where justified, take them into account for the calculation of the manufacturers' final average CO_2 emissions and specific emission targets. The final data and targets are to be published by 31 October each year.
- In the remainder of this chapter the process is presented in further detail.

2.1 Data quality

The EEA performs several quality checks to evaluate the accuracy and the quality of the Member States' data. These checks cover various areas, listed in the bullet points below:

- Completeness rate. This comprises two main components: numerical data, such as vehicle mass and emission values for each vehicle; and the extent to which more granular data — such as model type — are available for each vehicle that has been registered.
- Data plausibility and outliers ([8]).
- Assignment to a specific manufacturer using a harmonised denomination. Identical vehicles are often sold under different brand or model names in different countries. For the purposes of the monitoring, one naming system is used to ensure correct attribution to manufacturers.
- Data variability. For the same vehicle, an estimate of the variability of the mass, emissions and engine capacity has been developed.
- Fuel type classification.
- Handling of unknown individual vehicle approvals (IVAs) and national small series (NSS) vehicles ([9]).
- For vans, VINs provided by Member States and by manufacturers are compared. Whenever VINs are matching but data are missing in a Member State's

([5]) The CDR is an electronic online reporting system, making available data reports on the environment submitted by Member States (more information available at http://cdr.eionet.europa.eu).
([6]) The VIN is a unique code including a serial number, used by the automotive industry to identify individual motor vehicles, as defined in ISO 3833.
([7]) The BDR, or Business Data Repository, is an electronic online reporting system specifically developed for handling confidential company-based information (more information available at http://bdr.eionet.europa.eu).
([8]) An outlier observation is well outside the expected range of values in a study or experiment, and it is often discarded from the data set.
([9]) IVAs are made on vehicles imported from non-Member States or on own-build vehicles that have to be individually approved. NSS vehicles are vehicles that are approved nationally in very small numbers, typically because they are made by smaller manufacturers.

submission, the manufacturer's data ([10]) will be used to complete the data set for the main parameters (emission- and mass-related entries).

After the quality checks the provisional database is finalised. Based on the provisional database, the EEA calculates the provisional performance of car and van manufacturers in meeting their specific emission targets. The performance is calculated as the difference between the average CO_2 specific emissions and the specific emission target for each manufacturer. The provisional calculations are notified by the Commission to each manufacturer (and pool) and the provisional data are published on the EEA website.

Manufacturers can notify the Commission of errors in the provisional CO_2 emission data set. The notification must be submitted within 3 months of the notification of the provisional calculations.

As it does for Members States' data, the EEA performs several quality checks to evaluate the accuracy and the quality of the data that have been corrected in the notification of errors. The verification process is very similar to the one performed for Member States' data, presented in the previous paragraphs. After this additional quality check the database is finalised.

Based on the final data, the EEA calculates the performance of car and van manufacturers in meeting their specific emission targets. The performance is calculated as the difference between the average CO_2 specific emissions and the specific emission target for each manufacturer. The final calculations are notified by the Commission to each manufacturer (and pool) and the final data are published on the EEA website.

2.2 Calculation of average specific emissions of CO_2

Average specific emissions of CO_2 are calculated as a weighted average of the manufacturer's fleet of new registrations in a particular year. The average specific emissions for each manufacturer are subsequently adjusted to take into account the following modalities (summarised in Table 2.1):

- phase-in;
- super-credits;
- eco-innovations.

Phase-in

A phase-in schedule applies for calculating average specific emissions.

For passenger cars:

- During the period 2012–2014, only a certain percentage (65 % in 2012, 75 % in 2013 and 80 % in 2014) of the best-performing registered cars had to be taken into account in determining the performance of manufacturers. For the period 2015–2019, 100 % of new cars from each manufacturer have to be taken into account.
- The 2021 specific emission targets will be phased in from 2020, taking into account 95 % of the best-performing cars in that year. From 2021, 100 % of new cars from each manufacturer will be taken into account (see also Table 2.2).

For vans:

- During the period 2014–2016, only a certain percentage (70 % in 2014, 75 % in 2015 and 80 % in 2016) of the best-performing registered vans had to be taken into account in determining the manufacturers' performance. From 2017, 100 % of new cars from each manufacturer will have to be taken into account.

Super-credits

The regulation provides for the allocation of super-credits for new passenger cars and new vans with CO_2 emissions lower than 50 g CO_2/km. These vehicles are temporarily given a greater weight in calculating the average specific emissions, as they are considered to have the following equivalences:

- For passenger cars: 3.5 cars in 2012 and 2013, 2.5 cars in 2014 and 1.5 cars in 2015. For the 95 g CO_2/km target, the super-credit weight factor will become 2 cars in 2020, 1.67 cars in 2021 and 1.33 cars in 2022. In the period 2020–2022, the use of super-credits is subject to a cap of 7.5 g CO_2/km for each manufacturer.
- For vans: 3.5 vans in 2014 and 2015, 2.5 vans in 2016 and 1.5 vans in 2017. For the duration of the super-credit scheme, the maximum number of vans per manufacturer to be taken into account for the application of the super-credit multipliers shall not exceed 25 000.

([10]) In addition to VINs, manufacturers may submit detailed monitoring data for the vehicles registered.

E85 extra credits

For years prior to 2015, additional reductions in average specific emissions were assigned to vehicles capable of running on a mixture of petrol with 85 % ethanol (E85). For these years, the emissions of such vehicles were counted as being 5 % less than their actual emissions in recognition of their ability to reduce emissions when running on biofuels. This reduction was applied only where at least 30 % of the filling stations in the Member State in which the vehicle was registered provided this type of alternative fuel. In 2015, as in the previous years, this applied only to Sweden.

Eco-innovations

Certain innovative technologies cannot demonstrate their CO_2-reducing effects under the current type-approval test procedure. To support technical development, a manufacturer or supplier can apply to the Commission for the approval of such innovative technologies. The approval conditions are set out in Commission Regulation (EU) No 725/2011. If a manufacturer fits its car fleet of new registrations with an approved eco-innovation, the average emissions of that manufacturer may be reduced by a maximum of 7 g CO_2/km on account of emission savings from eco-innovations.

Specific emission targets

Under the regulations, each manufacturer has an individual annual target, calculated on the basis of the overall target and the average 'mass in running order' ([11]) of its registered cars and vans. The following formulae apply to passenger cars (1) and vans (2) until 2020:

Passenger cars:

(1) Specific emission target of $CO_2 = 130 + a \times (M - M_0)$

Vans:

(2) Specific emission target of $CO_2 = 175 + a \times (M - M_0)$

where:

M is the average mass of the manufacturer's fleet of new registrations in kilograms;

M_0 is the reference mass (1 392.4 kg for passenger cars in 2016, 1 706.0 kg for vans);

a is 0.0457 for passenger cars and 0.093 for vans.

This means that, for example, if the average mass of a manufacturer's newly registered passenger car fleet in a given year is 1 392.4 kg, the target for that manufacturer is 130.0 g CO_2/km.

If the average mass of the newly registered passenger car fleet is 1 492.4 kg, the target for that manufacturer is 134.57 g CO_2/km. If the average mass of the newly registered passenger car fleet is 1 292.4 kg, the target will be 125.43 g CO_2/km. These formulae aim to guarantee undistorted competition between manufacturers while taking into account their differences.

The manufacturer complies with its specific emission target if its average specific emissions (taking into account all the relevant modalities described above) are lower than the target.

The reference mass (M_0) is adjusted every 3 years to reflect changes in the average mass of newly registered vehicles. For cars, the new M_0 was adjusted in 2014 and is 1 392.4 kg for 2016–2018. Since the average mass of the new fleet in the period 2011–2013 increased by 20 kg compared with the M_0 in formula (1), the target of a manufacturer that is responsible for an annual fleet of new registrations with an average mass of 1 392.4 kg became 130 g CO_2/km from 2016, while the target for that manufacturer was 130.9 g CO_2/km prior to the M_0 adjustment. A new M_0 value will be valid from 2019.

For vans, M_0 was amended in 2016 and will be 1 766.08 kg from 2018. Since the average mass of the new fleet in the period 2013–2015 increased by 60 kg compared with the M_0 in formula (2), the target of a manufacturer that is responsible for an annual fleet of new registrations with an average mass of 1 766.08 kg will become 175.0 g CO_2/km from 2018, while the target for that manufacturer was 180.6 g CO_2/km in prior to the M_0 adjustment.

([11]) According to Regulation (EC) No 443/2009, mass in running order means the mass of the car with bodywork, coolant, oils, fuel, spare wheel, tools and driver, as stated in the certificate of conformity and defined in Section 2.6 of Annex I to Directive 2007/46/EC.

Regulation (EU) No 333/2014 (EU, 2014) amended Regulation (EC) No 443/2009 with a view to defining the modalities for reaching the 2020 target to reduce CO_2 emissions from new passenger cars. The following formula applies to passenger cars from 2020:

(3) Specific emission targets of $CO_2 = 95 + a \times (M - M_0)$ where:

M is the average mass of the manufacturer's fleet of new registrations in kilograms;

M_0 is the reference mass (see above);

a is 0.0333.

For vans, Regulation (EU) No 253/2014 (EU, 2014) amended Regulation (EU) No 510/2011 with a view to defining the modalities for reaching the 2020 target to reduce CO_2 emissions from new vans. The following formula applies from 2020:

(4) Specific emission targets of $CO_2 = 147 + a \times (M - M_0)$ where:

M is the average mass of the manufacturer's fleet in kilograms;

M_0 is the reference mass (see above);

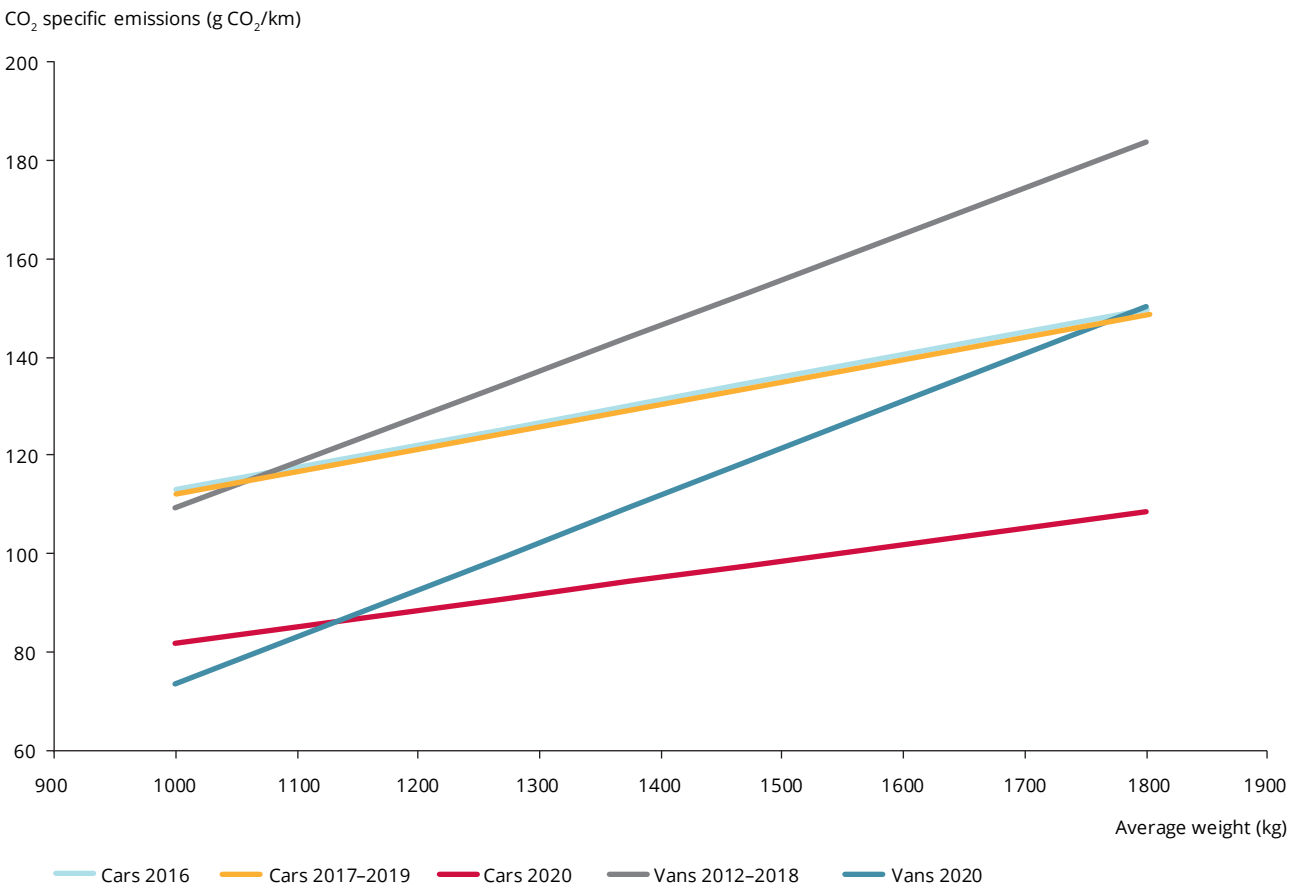
a is 0.096.

Pools

Manufacturers may form a pool with other manufacturers in order to create a common target.

In this case, the binding target will be the pool target (calculated on the basis of the whole fleet of new registrations of the pool registered in that year). In 2016, 14 pools for passenger cars (Table 2.3) and nine pools for vans (Table 2.4) were declared.

Figure 2.1 Limit value curves for cars and vans



Note: 2020 limit curve for vans is calculated using M_0 = 1 766.35 kg.

Derogations

For passenger cars, manufacturers selling fewer than 10 000 vehicles per year can apply for a small-volume derogation. In this case, a specific emission target consistent with the manufacturer's economic and technological potential to reduce specific CO_2 emissions can be granted. In 2016, 31 manufacturers were granted a small-volume derogation target (Table 2.5).

Niche derogations are available to manufacturers responsible for between 10 000 and 300 000 new passenger car registrations. In this case, a special target is established, corresponding to a 25 % reduction from the average specific emissions of that manufacturer in 2007 for the period 2012-2019 and a 45 % reduction from the 2007 level as of 2020. In 2016, five niche derogations were granted for passenger cars (Table 2.6).

For vans, six manufacturers were granted a derogation target (Table 2.7)

De minimis exemptions

A manufacturer that, together with all of its connected undertakings, is responsible for fewer than 1 000 new registered cars may be exempt from meeting a specific emission target pursuant to Regulation (EC) No 443/2009 and Regulation (EU) No 510/2011, as amended by Regulation (EU) No 333/2014 and Regulation (EU) No 253/2014. In 2016, 48 manufacturers, responsible for a total of around 8 600 registrations, benefited from an exemption (26 for passenger cars and 22 for vans).

Table 2.1 Summary of the parameters applying to the calculation of manufacturer performance from 2016 to 2019

Parameter	Vehicles	2016	2017	2018–2019
Phase-in	Passenger cars	100 %	100 %	100 %
	Vans	80 %	100 %	100 %
Super-credit for vehicle emitting less than 50 g CO_2/km	Passenger cars	1.0	1.0	1.0
	Vans	2.5	1.5	1.0
Emission reduction for E85 vehicles ([a])	Passenger cars/vans	0 %	0 %	0 %

Note: ([a]) Applies only where at least 30 % of the filling stations in the Member State in which the vehicle is registered provide this type of alternative fuel.

Table 2.2 Summary of the parameters applying to the calculation of passenger cars manufacturer performance from 2020

Parameter	2020	2021	2022	2023
Phase-in	95 %	100 %	100 %	100 %
Super-credit for vehicle emitting less than 50 g CO_2/km	2.0	1.67	1.33	1.0

([12]) Subject to a cap of 7.5 g CO_2/km in the period 2020–2022 (relates to Table 2.2).

Table 2.3 Manufacturers' pools in 2016 (passenger cars)

Pool	Manufacturer
BMW Group	Bayerische Motoren Werke AG
	BMW M GmbH
	Rolls-Royce Motor Cars Ltd
Daimler AG	Daimler AG
	Mercedes-AMG GmbH
FCA Italy SPA	Alfa Romeo SPA
	FCA US LLC
	FCA Italy SPA
Ford-Werke GmbH	CNG-Technik GmbH
	Ford India Private Limited
	Ford Motor Company of Australia Limited
	Ford Motor Company
	Ford-Werke GmbH
General Motors	Chevrolet Italia SPA
	General Motors Company
	General Motors Holdings LLC
	GM Korea Company
	Adam Opel AG
Honda Motor Europe Ltd	Honda Automobile China Co Ltd
	Honda Motor Co Ltd
	Honda Turkiye AS
	Honda of the UK Manufacturing Ltd
	Honda Automobile Thailand Co Ltd
Hyundai	Hyundai Motor Company
	Hyundai Assan Otomotiv Sanayi ve Ticaret AS
	Hyundai Motor Manufacturing Czech SRO
	Hyundai Motor Europe GmbH
	Hyundai Motor India Ltd
Kia	Kia Motors Corporation
	Kia Motors Slovakia SRO
Mitsubishi Motors	Mitsubishi Motors Corporation MMC
	Mitsubishi Motors Europe BV MME
	Mitsubishi Motors Thailand Co Ltd MMTH
Pool Renault	Avtovaz JSC
	Automobile Dacia SA
	Renault SAS
Suzuki	Magyar Suzuki Corporation Ltd
	Maruti Suzuki India Ltd
	Suzuki Motor Corporation
	Suzuki Motor Thailand Co Ltd
Tata Motors Ltd, Jaguar Cars Ltd, Land Rover	Jaguar Land Rover Limited
	Tata Motors Limited
Toyota-Dahaitsu Group	Daihatsu Motor Co Ltd
	Toyota Motor Europe NV SA

Table 2.3 Manufacturers' pools in 2016 (passenger cars) (cont.)

Pool	Manufacturer
VW Group Pc	Audi AG
	Audi Hungaria Motor KFT
	Bugatti Automobiles SAS
	Man Truck & Bus AG
	Dr Ing HCF Porsche AG
	Quattro GmbH
	Seat SA
	Skoda Auto AS
	Volkswagen AG

Table 2.4 Manufacturers' pools in 2016 (vans)

Pool	Manufacturer
Daimler	Daimler AG
	Mitsubishi Fuso Truck & Bus Corporation
	Mitsubishi Fuso Truck Europe SA
	MFTBC
FCA Italy SPA	FCA US LLC
	FCA Italy SPA
Ford-Werke GmbH	CNG-Technik GmbH
	Ford India Private Limited
	Ford Motor Company of Australia Limited
	Ford Motor Company
	Ford-Werke GmbH
General Motors	Chevrolet Italia SPA
	General Motors Company
	General Motors Holdings LLC
	GM Korea Company
	Adam Opel AG
Hyundai	Hyundai Motor Company
	Hyundai Assan Otomotiv Sanayi VE
	Hyundai Motor Manufacturing Czech SRO
Kia	Kia Motors Corporation
	Kia Motors Slovakia SRO
Mitsubishi Motors	Mitsubishi Motors Corporation MMC
	Mitsubishi Motors Europe BV MME
	Mitsubishi Motors Thailand Co Ltd MMTH
Renault	Avtovaz JSC
	Automobile Dacia SA
	Renault SAS

Table 2.4 Manufacturers' pools in 2016 (vans) (cont.)

Pool	Manufacturer
Volkswagen Group LCV	Audi AG
	Audi Hungaria Motor KFT
	Bentley Motors Ltd
	Bugatti Automobiles SAS
	Automobili Lamborghini SPA
	Man Truck & Bus AG
	Dr Ing HCF Porsche AG
	Quattro GmbH
	Seat SA
	Skoda Auto AS
	Volkswagen AG

Table 2.5 Manufacturers with low volume derogations granted for 2016 (passenger cars)

Manufacturer	Specific emissions targets in g CO_2/km
Alpina Burkard Bovensiepen GmbH e Co KG	220.00
Artega Automobil GmbH e Co KG	286.00
Aston Martin Lagonda Ltd	309.00
Automobili Lamborghini SPA	318.00
Bentley Motors Ltd	294.00
Caterham Cars Limited	210.00
Donkervoort Automobielen BV	178.00
DR Motor Company SRL	130.00
Ferrari SPA	290.00
Great Wall Motor Company Limited	188.00
Koenigsegg Automotive AB	275.00
KTM-Sportmotorcycle AG	185.00
Litex Motors AD	154.00
Lotus Cars Limited	280.00
Mahindra & Mahindra Ltd	144.00
Marussia Motors LLC	270.00
Maserati SPA	245.00
Mclaren Automotive Limited	275.00
MG Motor UK Limited	146.00
Morgan Technologies Ltd	168.00
Noble Automotive Ltd	360.00
Pagani Automobili SPA	340.00
PGO Automobiles	160.00
Potenza Sports Cars	205.00
Perusahaan Otomobil Nasional SDN BHD	167.00
Radical Motosport Ltd	198.00
Secma SAS	131.00
Spyker Automobielen BV	330.00
Ssangyong Motor Company	180.00
Wiesmann GmbH	274.00
Zejiang Zoyte Automobile Manufacturing Co Ltd	159.50

Note: This table includes all manufacturers that benefitted from a small volume derogation target even if they did not sell any vehicles in 2016.

Table 2.6 Niche derogations granted for 2016 (passenger cars)

Manufacturer/pool	Specific emission targets in g CO_2/km
Fuji Heavy Industries Ltd	164.616
Tata Motors Ltd, Jaguar Cars Land Rover	178.025
Mazda Motor Corporation	129.426
Suzuki Pool	123.114
Ssangyong Motor Company	167.573

Table 2.7 Manufacturers with derogations granted for 2016 (vans)

Manufacturer	Specific emission targets in g CO_2/km
Gonow Auto Co Ltd	175.00
Jaguar Land Rover Limited	276.93
Mitsubishi Motors Pool	210.00
Piaggio & C SPA	155.00
Ssangyong Motor Company	210.00
Great Wall Motor Company Limited	205.00

Note: This table includes all manufacturers that benefitted from a small volume derogation target even if they did not sell any vehicles in 2016.

Box 2.1 New legislative driving cycle

The new World Harmonised Light Vehicle Test Procedure (WLTP) is mandatory for all new vehicle types from September 2017 and for all new vehicles from September 2018 (EU, 2017a; EU, 2017b; EU, 2017c). The WLTP will provide more realistic CO_2 emissions and fuel consumption values, which will benefit consumers and regulators at both EU and national levels. As the existing EU CO_2 regulations for cars and vans are based on emissions measured using the New European Driving Cycle (NEDC), and as many Member States have taxation systems in place based on NEDC-based CO_2 figures, it will be necessary to determine NEDC-based CO_2 emission figures for some time after the WLTP has been introduced. Therefore, a specific computer simulation programme called CO_2MPAS ([13]) has been developed to calculate NEDC-based CO_2 emission figures.

([13]) https://CO2mpas.io.

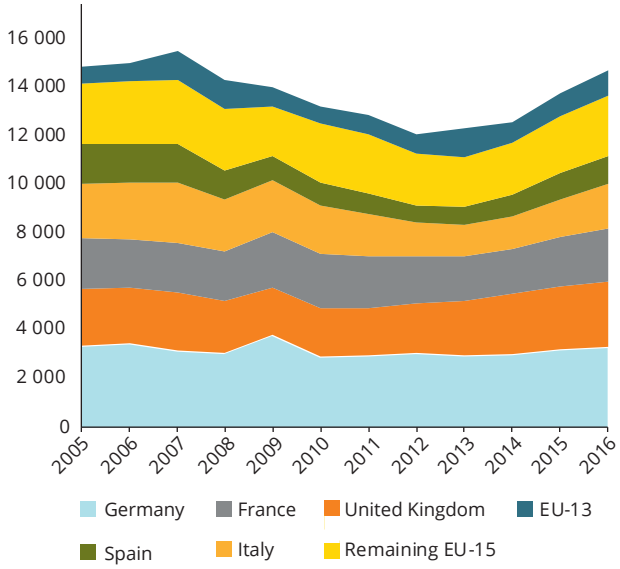
3 Passenger cars

3.1 Number of new registrations

Since 2007, when 15.5 million passenger cars were registered in the EU-27 (see Figure 3.1 and Table A1.1), the number of new registrations continuously decreased until 2013 (11.9 million). In 2016, for the third year in a row, the number of new passenger car registrations again increased, reaching 14.7 million, which is nearly a million more than in 2015. The number of registrations increased in 25 out of the 28 Member States, with the biggest increases observed in Croatia (+26 %), Cyprus (+25 %), and Hungary (+24 %). The largest decrease was seen in the Netherlands (–14 %).

The EU new passenger car market is centred on a few countries, as 76 % of all registrations occur in Germany, the United Kingdom, France, Italy and Spain. Germany is the largest new vehicle market in Europe, with 23 % in 2016, followed by the United Kingdom (18 %) and France (15 %). Together, these countries represent 56 % of the EU fleet of new car registrations. Italy and Spain registered 12 % and 8 % respectively of the EU fleet of new car registrations in 2016. In these countries, the number of new car registrations has fallen by 27 % and 26 % respectively since 2007, but vehicle sales have been rising sharply again in the last few years: in 2016, registrations in Italy and in Spain were about 16 % and 10 % above 2015 levels.

Figure 3.1 Number of vehicles registered in EU-28 between 2005 and 2016



Note: Remaining EU-15 includes Austria, Belgium, Denmark, Finland, Greece, Ireland, Luxembourg, the Netherlands, Portugal and Sweden.

3.2 Average CO_2 emissions from new passenger cars

The final data presented here confirm the provisional data published by the EEA earlier in 2017. The average CO_2 emissions from the new passenger car fleet in the EU in 2016 were 118.1 g CO_2/km (Table 3.1), which is 1.45 g CO_2/km lower than in 2015 (1.3 %). Since the entry into force of the legislation, in 2009, the average CO_2 emissions have decreased by 27.6 g CO_2/km, by an average of 4 g CO_2/km per year.

The average CO_2 emissions have dropped for all engine technologies. Compared with 2015, the emissions decreased by 2.4 and 0.8 g CO_2/km respectively for diesel and petrol vehicles. The difference between the diesel and petrol fleets of new passenger cars has started to increase in the past few years, and in 2016 it increased to 4.9 g CO_2/km, almost reaching the same level as in 2007 (Table 3.1 and Figure 3.2).

The distribution of emissions and mass across the new passenger car fleet in five selected years (2005, 2010, 2015 and 2016) are shown in Figure 3.3. The emission distribution of newly registered cars has not changed significantly in the last 2 years. In this period, the largest group of cars emitted between 100 and 120 g CO_2/km (39.3 % in 2015 and 42.4 % in 2016). In 2010, the largest group emitted between 120 and 140 g CO_2/km. In 2016, around 20 % of newly registered vehicles emitted less than 100 g CO_2/km (0.5 % less than in 2015). While there was a big difference in terms of the emission performance of vehicles between 2005 and 2014, the mass distribution has changed little in the same period.

During 2012–2015, the progress made in the EU-13 was comparable to the progress made in the EU-15. Over this period, the average emissions in the EU-13

Table 3.1 Average CO_2 emissions (g CO_2/km) from new passenger cars by fuel (EU)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010 ([a])	2011 ([a])	2012 ([a])	2013 ([a])	2014 ([a])	2015 ([a])	2016 ([a])
All fuels	172.2	169.7	167.2	165.5	163.4	162.4	161.3	158.7	153.6	145.7	140.3	135.7	132.2	126.7	123.4	119.5	118.1
Petrol	177.4	175.3	173.5	171.7	170.0	168.1	164.9	161.6	156.6	147.6	142.5	137.6	133.7	128.5	125.6	122.5	121.7
Diesel	160.3	159.7	158.1	157.7	156.2	156.5	157.9	156.3	151.2	145.3	139.3	134.5	131.5	126.9	123.2	119.2	116.8
AFV ([b])	208.0	207.4	179.2	164.7	147.9	149.4	151.1	140.0	137.0	125.8	126.0	124.7	118.5	98.3	90.8	79.2	87.2

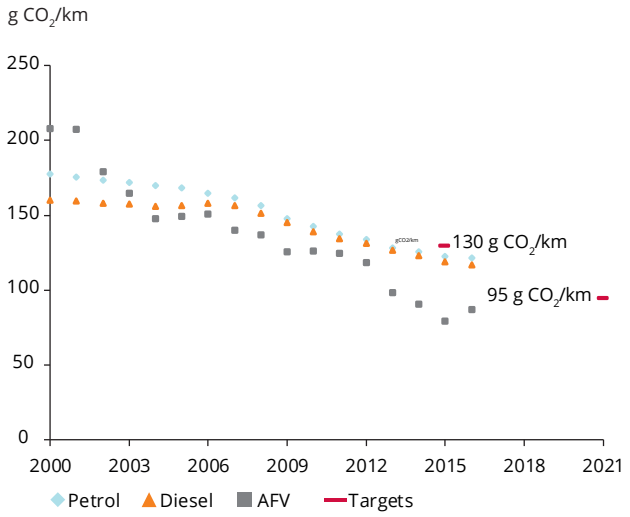
Note: ([a]) The calculation for the years 2010–2016 was done without considering out of scope vehicles.

([b]) For the calculation of the average CO_2 emissions of AFVs, pure electric, liquefied petroleum gas vehicles (LPGs), natural gas vehicles (NG), ethanol (E85), biodiesel, and plug-in hybrid vehicles are all included.

([c]) Fuel type is available for 95 % of the vehicle registrations in 2013.

The geographical scope of the data changes over time from EU-15 through EU-25 and EU-27 to EU-28; see Annex 1 for details.

Figure 3.2 Average CO_2 emissions (g CO_2/km) from new passenger cars by fuel (EU)



Notes: For the calculation of the average CO_2 emissions of alternative fuel vehicles, battery electric, liquefied petroleum gas, natural gas, E85, biodiesel and plug-in hybrid vehicles are all included.

The geographical scope of the data changes over time from EU-15 through EU-25 and EU-27 to EU-28; see Annex 1 for details.

decreased by 13.7 g CO_2/km, which is an average yearly reduction of 4.6 g CO_2/km. For the EU-15, the reduction in average CO_2 emissions over the same period was 12.7 g CO_2/km. In 2016, progress made in the EU-15 significantly slowed down to a 1.1 % reduction in emissions (3.1 % in 2015), while average emissions in the EU-13 continued to decrease at a similar pace as in 2015, i.e. 2.7 %.

In all EU Member States, except the Netherlands, the CO_2 emissions from newly registered passenger cars fell in 2016 compared with 2015. Figure 3.4 shows the absolute and percentage reductions by Member State between 2015 and 2016.

In 2016, only in Estonia were average CO_2 specific emissions from newly registered cars higher than the EU's 130 g CO_2/km target (Figure 3.5).

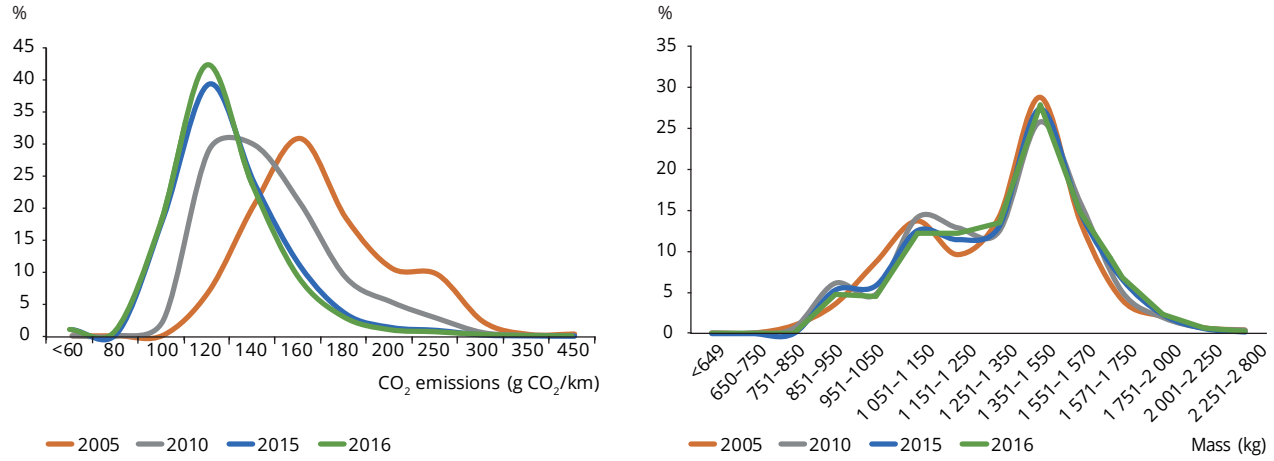
On average, the highest emitting cars were sold in Estonia and Latvia (133.9 and 128.9 g CO_2/km), followed by Germany (126.9 g CO_2/km). In 2016, Portugal (104.7 g CO_2/km) registered the lowest emitting new passenger car fleet. The Netherlands, Denmark and Greece followed, with average emissions of around 106 g CO_2/km.

In the Netherlands, the proportion of cars emitting less than 50 g CO_2/km (mainly battery electric, or BEVs, and plug-in hybrid electric vehicles, or PHEVs) is the highest in Europe (5.7 %). This has an important impact on the average emissions. Without the contribution of these low-emitting vehicles, the average CO_2 emissions in the Netherlands would be 110 g CO_2/km. In addition, the Netherlands has the lowest engine capacities in Europe, followed by Greece and Malta.

In Greece and Denmark, the low average emissions are mainly related to the registration of relatively small cars: the average mass of the new fleet of these countries is around 1 250 and 1 261 kg respectively. However, the lowest average mass is recorded in Malta (1 216 kg). In addition to this, the new fleet of Greece has the lowest average engine power in Europe.

The four best-performing Member States differed in the compositions of their new passenger car fleet: in the Netherlands and Denmark the majority of the new passenger car fleet is fuelled by petrol (75 % and 63 % respectively), while in Portugal and Greece diesel is the dominant fuel type (65 % and 55 % respectively). The percentage of diesel vehicles in the new passenger car fleet is even higher in Ireland (70 %). In contrast, less than 30 % of vehicles registered in the Netherlands and Estonia in 2016 were diesel vehicles.

Figure 3.3 Frequency distributions of (a) emissions and (b) mass of the vehicles registered in the EU-28 in 2005, 2010, and 2015–2016



Note: 2005 data: data based on Decision 1753/2000 (EU, 2000).

2014–2016 data: data based on Regulation (EC) No 443/2009.

Figure 3.4 Absolute reduction and relative reduction (%) in specific emissions by Member State between 2015 and 2016

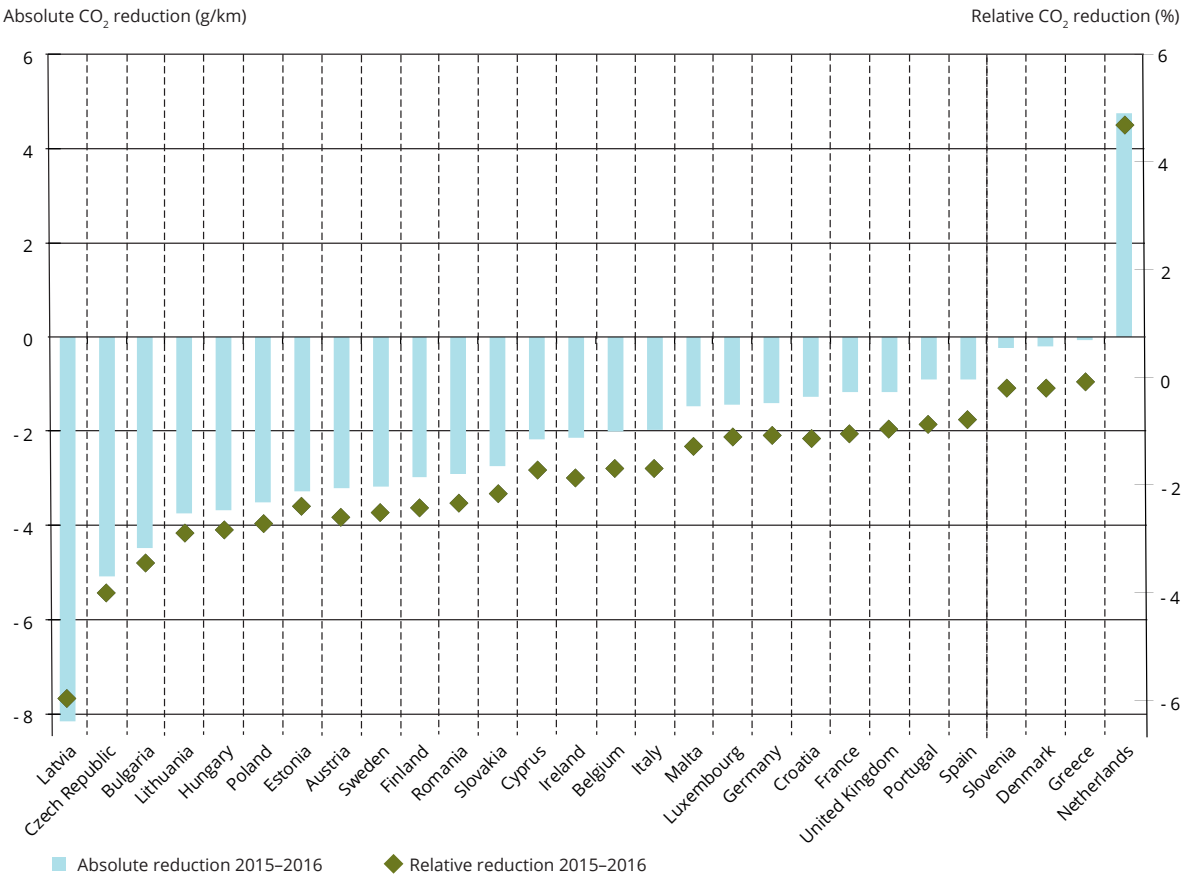
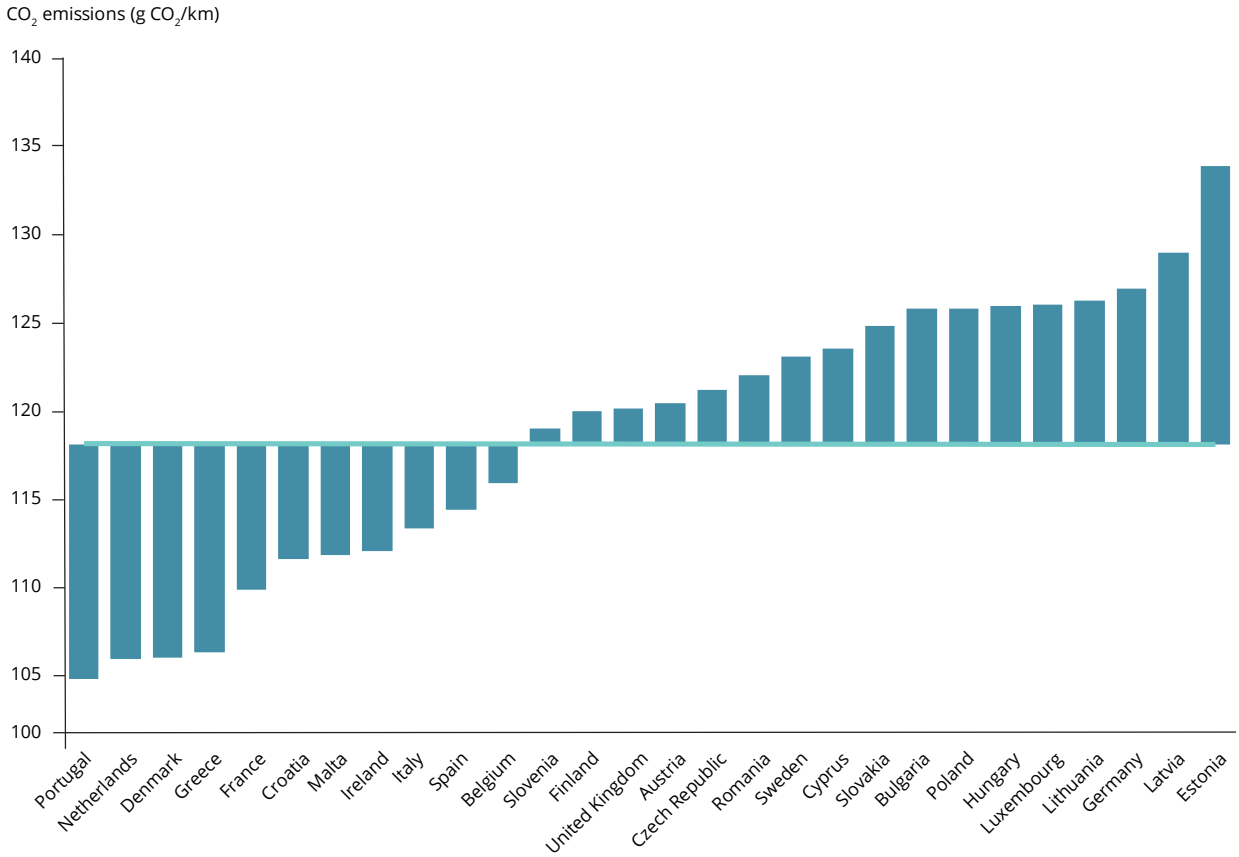


Figure 3.5 Average CO_2 emissions by EU Member State in 2016 compared with the EU average (119.5 g CO_2/km)



Latvia, the Czech Republic and Bulgaria recorded the largest relative reductions in CO_2 emissions compared with 2015, about 3.5–6 % on average.

Not surprisingly, the Member States with the highest numbers of vehicle registrations — France, Germany, Italy, Spain and the United Kingdom — are the major contributors to the absolute CO_2 emissions from newly registered passenger cars in the EU-28. Of these five, France, Italy and Spain have the lowest average CO_2 emissions. In Italy, for example, this is for a combination of reasons. Cars registered in Italy have on average the fifth lowest mass among the EU Member States and the second lowest engine power. In addition to this, Italy has a high proportion of small diesel cars (57 % of the vehicles are diesel cars and these have an average mass of 1 438 kg and average emissions of 111.8 g CO_2/km) and one of the highest proportions of alternative fuel vehicles (AFVs) (10 %). The latter are mainly liquefied petroleum gas (LPG) and natural gas (NG) cars (8 % of all new registrations) with average CO2 emissions of 117 and 99 g CO_2/km respectively.

In France, the large number of small diesel vehicles (average mass 1 430 kg) seems to be the main reason for the relatively low CO_2 emissions, as well as in Spain (1 464 kg). However, France has a relatively high proportion of BEVs (1.1 %) with zero emissions, which reduced the average emissions by more than 1 g CO_2/km.

At the other end of the scale, Germany has one of the highest average CO_2 emissions: its new passenger car fleet is significantly heavier, bigger and more powerful than the EU average (1 453 versus 1 385 kg, 1 717 versus 1 592 cm^3 and 109 versus 95 kW).

Table 3.2 Average CO_2 emissions (g CO_2/km) from new passenger cars in the EU-13 and EU-15

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
EU-13								157.8	156.8	154.2	148.2	144.1	140.9	135.8	131.0	127.2	123.7
EU-15	172.2	169.7	167.2	165.5	163.7	162.6	161.5	158.8	153.3	145.2	139.9	135.1	131.6	126.1	122.8	119.0	117.6
EU-28								158.7	153.6	145.7	140.3	135.7	132.2	126.7	123.4	119.5	118.1

3.3 Overview by vehicle fuel types

As in the previous 6 years, in 2016 more diesel vehicles were sold than petrol ones. Diesel vehicles represent 49.5 % of the newly registered vehicle fleet compared with 55.2 % in 2011, the year in which the percentage of diesel vehicles reached its maximum (Table 3.3). The percentage of AFVs has increased in the last 5 years, reaching 3.2 %. Hybrid electric vehicles have been available in Europe since 2000, but registration numbers for these types of vehicle are not available in the officially reported statistics. Such vehicles are reported by Member States as petrol or diesel vehicles.

The registration of AFVs has been increasing substantially in recent years (Figure 3.6). This category accounted for only a few vehicles in 2000, but it exceeded half a million new vehicle registrations in 2009, before dropping to slightly below half a million in 2010. The registration of AFVs increased considerably in the last 3 years, by more than 70 %, after a significant drop between 2010 and 2011 (when registrations fell by 62 %).

On the basis of the monitoring data, it is possible to report CO_2 emissions for different fuel types used by AFVs (Table 3.4). It is noteworthy that the mix of vehicles in this category has changed over the years (NG, LPG, biodiesel, E85, BEVs and PHEVs are included in this category). This helps explain the high variability in the trend of emissions and other characteristics of the newly registered AFV fleet (Figure 3.2). In the early 2000s, AFVs were dominated by dual-fuel vehicles, i.e. vehicles mostly able to operate on petrol and ethanol blends. This trend gradually changed because of the introduction of LPG vehicles and NG vehicles, which have greatly outnumbered E85 cars.

Table 3.3 Share of fuel type in new passenger cars (EU-28)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010 ([a])	2011 ([a])	2012 ([a])	2013 ([a])	2014 ([a])	2015 ([a])	2016 ([a])
Petrol	68.9	64.0	59.2	55.5	51.9	50.7	49.4	47.3	47.4	51.1	45.3	43.4	43.0	45.1	44.3	45.4	47.3
Diesel	31.0	35.9	40.7	44.4	47.9	49.1	50.3	51.9	51.3	45.1	51.3	55.2	54.9	52.5	53.0	51.8	49.5
AFV	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.7	1.3	3.8	3.5	1.4	2.2	2.4	2.7	2.8	3.2

Note: ([a]) The calculation for the 2010–2015 period was done considering vehicles in the scope of the regulation.

The geographical scope of the data changes over time from EU-15 through EU-25 and EU-27 to EU-28. See Annex 1 for details.

Table 3.4 AFV data: number of registrations, CO_2 emissions, mass and engine capacity

	Registration	Average CO_2 emissions (g CO_2/km)	Average mass (kg)	Average engine capacity (cm^3)
E85	1 877	134.9	1 408	1 693
Electric	64 316	0.0	1 607	-
LPG	252 979 ([c])	121.2	1 222	1 343
NG-biomethane	57 257	100.4	1 285	1 209
Petrol-electric	87 335	45.9	1 861	1 786
Diesel-electric	6 372	48.9	2 255	2 678

Note: ([a]) Electric vehicles are vehicles for which tail-pipe emissions are 0 g CO_2/km.

([b]) Some countries reported hybrids as plug-in hybrids. The overestimate is around 10 %.

Only exhaust emissions are considered. For electric monofuel vehicles the emission is null. For E85, only the petrol CO_2 emissions are reported; for LPG and NG-biomethane the respective LPG and compressed NG CO_2 emissions are reported.

Figure 3.6 Trends in total registrations of AFVs, 2000–2016

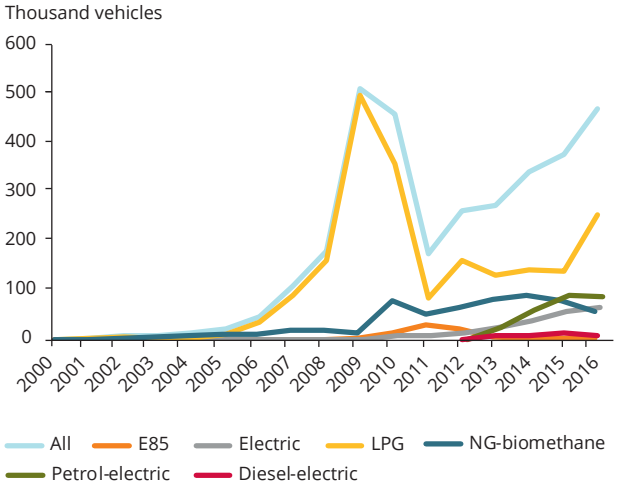
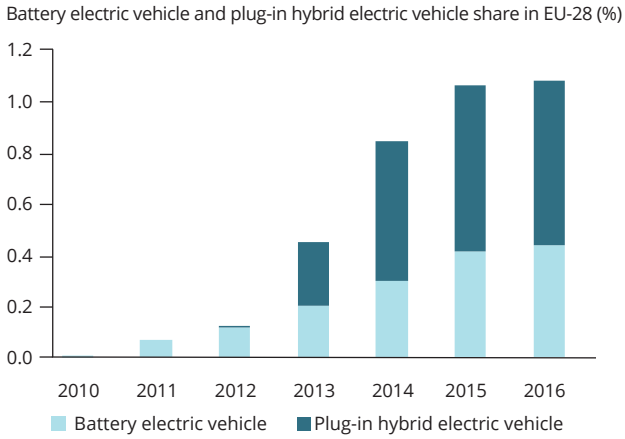


Figure 3.7 Percentages of BEV and PHEV registrations in the EU-28



The significant reduction in average CO_2 emissions from AFVs over the past few years (Figure 3.2) is not mainly the result of shifts in fuel composition and in engine type. In recent years, the increase in the number of BEVs and PHEVs has slightly contributed to the declining emission levels (Figure 3.7). BEVs are propelled by electric motors, using electrical energy stored in batteries or another energy storage device. The tail-pipe emissions of this kind of vehicle are considered to be 0 g CO_2/km.

In 2016, there were almost 7 600 more registrations of BEVs than in 2015, representing 0.44 % of the new passenger car fleet. PHEVs are also identified in the database. The average emissions of PHEVs are in general below 70 g CO_2/km. Registrations of PHEVs have increased greatly until 2015, however in 2016 remained broadly similar - approximately 90 000 ([14]) PHEVs were registered in Europe. Together with BEVs, they represent just 1.1 % of the new passenger car fleet.

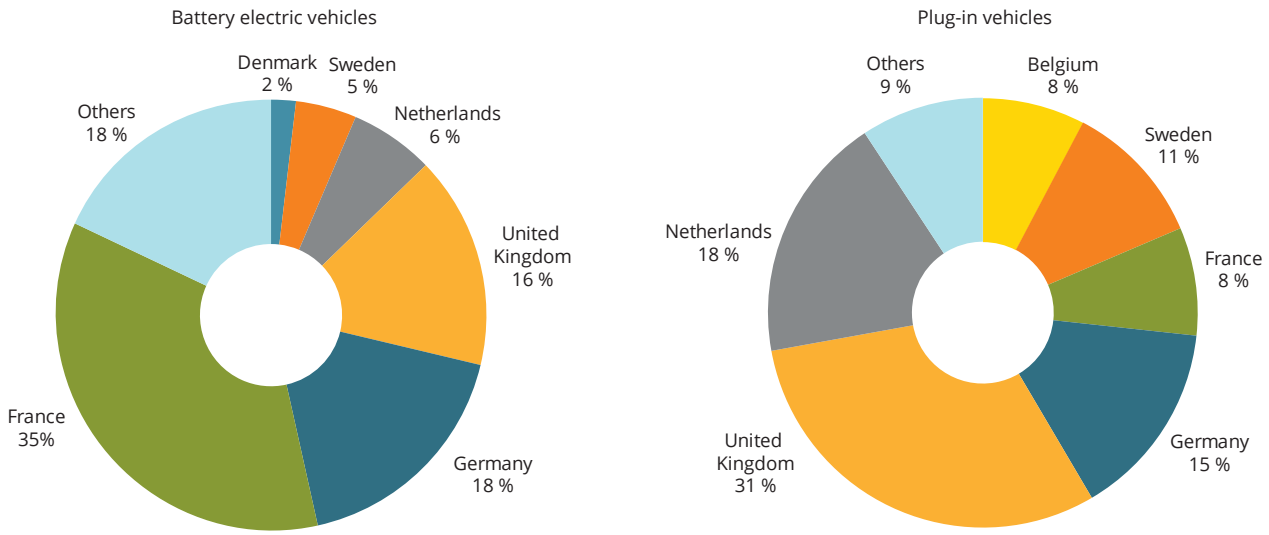
Registrations of BEVs in the EU-28 have increased in the last 6 years from around 700 in 2010 to around 65 000 in 2016. France (more than 22 700 vehicles), Germany (around 11 400 vehicles) and the United Kingdom (almost 10 200 vehicles) are the countries in which the increase in absolute numbers has been the highest in recent years (Figure 3.8). An increase in registrations of BEVs in 2016 was mainly due to sales in France and Austria. It is notable that Austria recently introduced various initiatives to support the use of electric cars, including tax reductions and exemptions. In 2016, the proportion of BEVs in the Austrian fleet doubled in comparison with 2015, and Austria became the country with the highest proportion of BEVs in the new passenger car fleet (1.2 %) in the EU-28.

The number of PHEVs has considerably increased in the United Kingdom: by around 9 300 vehicles to almost 28 700 vehicles registered in 2016. Significant increases in PHEVs have also been noted in Belgium and Sweden (around 4 700 and 4 400 vehicles respectively). Even with the decrease in PHEV registrations, the largest proportion of PHEVs still remains in the Netherlands (4.6 % of the new passenger car fleet).

Of the other types of AFVs, CO_2 emissions of LPG and NG vehicles (121 and 100 g CO_2/km respectively) have not been improving much, if compared with previous years. Ethanol-fuelled (E85) vehicles have the highest specific emissions (134.9 g CO_2/km). The change in these technologies is marginal compared with the previous year and the other technologies: in 2015, LPG and NG vehicles emitted respectively 120 and 99 g CO_2/km. Emissions from LPG cars are, on average,

([14]) This figure includes only vehicles correctly reported as PHEVs.

Figure 3.8 BEVs (left) and plug-in vehicles (right) by Member States (% of EU-28 total)



higher than those from diesel vehicles, even though their mass is significantly lower (1 222 kg for LPG cars, 1 532 kg for diesel cars).

3.4 Other car characteristics: mass and engine capacity

The average mass of new passenger cars registered in the EU-28 has slightly increased since 2015 (Table 3.5). In 2016, the mass of petrol vehicles increased by 1.3 %, while the mass of diesel vehicles remained almost stable (0.5 % increase). Since 2012, the difference in mass between petrol and diesel vehicles has been decreasing. The mass of AFVs varies over the years in relation to the composition of the new passenger car fleet.

The new car fleets of Sweden and Luxembourg were the heaviest, at 1 515 and 1 497 kg respectively (Annex 1). The lightest new cars were sold in Malta, Greece and Denmark (1 216, 1 250 and 1 261 kg respectively). Among the five largest Member States, Germany has the heaviest new passenger car fleet (1 453 kg) and Italy the lightest (1 307 kg).

Since 2004, the average mass has been quite stable, while CO_2 emissions have decreased significantly (45.4 g CO_2/km). Figure 3.9 shows the relation between average emissions and average mass changes according to fuel type. The average mass of petrol vehicles overall decreased, together with emissions, whereas the average mass of diesel vehicles increased while emissions decreased over the same period. The

Table 3.5 Average mass (kg) of new passenger cars sold in 2016 by fuel

	2004	2005	2006	2007	2008	2009	2010	2011	2012 ([a])	2013 ([a])	2014 ([a])	2015 ([a])	2016 ([a])
All fuels	1 347	1 356	1 372	1 379	1 373	1 337	1 364	1 388	1 402	1 390	1 375	1 380	1 385
Petrol	1 237	1 235	1 238	1 235	1 228	1 206	1 214	1 220	1 224	1 218	1 207	1 214	1 229
Diesel	1 463	1 479	1 501	1 510	1 508	1 498	1 507	1 523	1 547	1 539	1 518	1 524	1 532
AFV	1 415	1 404	1 392	1 271	1 237	1 169	1 202	1 270	1 247	1 294	1 343	1 428	1 416

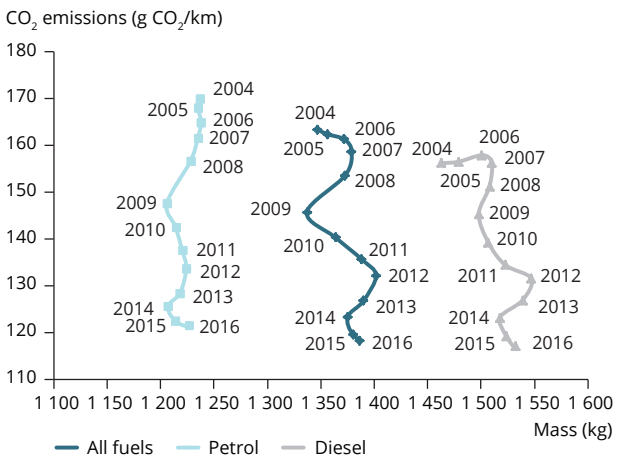
Note: ([a]) For the calculation of the average mass of AFVs, battery electric, LPGs, NG, E85, biodiesel and plug-in hybrid vehicles are all included. Data before 2004 are not shown because the data set is incomplete.

average mass of the new passenger car fleet increased for all fuel types between 2009 and 2012 (more for diesel cars than for petrol cars), followed by a slight decrease to 2014, and in 2016 increasing for the second year in a row.

There has been a slight decrease in average engine capacity in the last 5 years: the average engine capacity of new passenger cars in 2016 was 49 cm^3 less than in 2011. The difference between new diesel and petrol vehicles is around 439 cm^3, whereas in 2011 it was 372 cm^3. In the same period, engine power has increased from 86 to 95 kW.

For both petrol and diesel vehicles, an increase in engine power has been observed: in 2016, diesel vehicles had an average engine power of almost 104 kW, while for petrol vehicles it was around 87 kW. This means that manufacturers are producing more powerful cars (higher engine power in terms of kilowatts) even if they are using smaller engine capacities.

Figure 3.9 CO_2 emissions versus vehicles' mass in the EU-28



3.5 Average specific CO_2 emissions per manufacturer in 2016

Table 3.6 presents data (number of registrations, average mass and average emissions) for 2016 for all large manufacturers ([15]) individually, i.e. those that registered more than 100 000 vehicles in 2016. Manufacturers are ranked according to their 2016 average specific emissions (low to high). In total, these manufacturers sold 14 million new cars in the EU-28 in 2016, equivalent to 95 % of the total new registrations. The average emissions of each of those manufacturers in previous years (2010–2015) are also included in the table.

The proportion taken by the main brands has remained quite stable over the years. As in 2015, the most popular brand is Volkswagen, with 12 % of the cars registered in the EU, followed by Renault (8 %), and Ford, Adam Opel and BMW (7 % each).

The average CO_2 emissions of the large manufacturers were 117.1 g CO_2/km, i.e. 1.0 g CO_2/km lower than the average of the total new registrations.

For the last 2 years in a row, 20 large manufacturers had average emissions below 130 g CO_2/km, whereas in 2014 only 16 manufacturers were below this value. Thirteen of these 20 manufacturers had average emissions below 120 g CO_2/km and four of them had average emissions below 110 g CO_2/km. The average emissions of these large manufacturers varied from 101.7 g to 149.8 g CO_2/km.

Automobiles Peugeot and Automobiles Citroën remain the lowest emitters among large passenger car manufacturers. In 2016, they improved their performance by 2 and 2.5 g CO_2/km respectively. One of the reasons for the improvement is a decrease in the registrations of high-emitting passenger cars: in 2015, 5 % of the Automobiles Peugeot and 7 % of the Automobiles Citroën new passenger car fleet were emitting more than 130 g CO_2/km, whereas, in 2016, it was only 1.9 and 2.3 % respectively.

The average mass of the new passenger car fleet of these manufacturers also decreased, as a result of the increased proportion of lighter petrol-fuelled vehicles. Despite this, diesel vehicles remain dominant, and the proportion of petrol-fuelled vehicles increased from 39 % to 45 % for Automobiles Peugeot and from 40 % to 48 % for Automobiles Citroën. In 2016, Automobiles Peugeot had the lowest emitting diesel vehicles among all car manufacturers (99 g CO_2/km on average).

Jaguar Land Rover Limited and Chrysler (FCA US LLC) significantly improved their performance compared with 2015; however, they are the manufacturers with the highest average CO_2 emissions among these 20 large manufacturers. This is mainly related to the improved performances of the conventional vehicles. The percentages of vehicles emitting less than 130 g CO_2/km were 13 % and 23 % in 2015, and

([15]) In this report large manufacturers are those that are responsible for more than 100 000 registrations a year, while in Regulation (EC) No 443/2009 large manufacturers are those responsible for more than 300 000 registrations a year.

Table 3.6 Main statistics for large car manufacturers (more than 100 000 vehicle registrations per year)

Manufacturer	Registrations 2016 ([a])	Average mass (kg) 2016	Average CO^2 emissions (g CO^2/km)						
			2010	2011	2012	2013	2014	2015	2016
Automobiles Peugeot	889 060	1 247	131	128	121	115	110	104	102
Automobiles Citröen	614 699	1 235	131	126	123	113	111	106	103
Renault SAS	1 128 509	1 288	134	129	121	110	108	106	105
Toyota Motor Europe NV SA	616 226	1 323	129	126	122	116	113	108	105
Hyundai Assan Otomotiv Sanayi ve ([b])	164 974	1 081	-	-	-	112	113	114	112
Nissan International SA	550 095	1 379	147	142	137	131	115	115	117
Skoda Auto AS	627 539	1 281	139	135	132	125	121	116	112
Fiat Group Automobiles SPA	768 863	1 161	125	118	117	116	116	116	116
Seat SA	340 156	1 260	131	125	127	119	117	117	116
Ford-Werke GmbH	1 010 775	1 363	137	132	129	122	121	118	118
Volkswagen AG	1 651 375	1 397	140	135	133	127	124	119	119
Magyar Suzuki Corporation Ltd	137 789	1 186	137	128	128	126	123	120	121
Kia Motors Corporation ([c])	250 717	1 342	143	137	129	128	125	122	120
Volvo Car Corporation	270 867	1 734	157	151	142	131	126	122	121
Automobile Dacia SA	414 892	1 200	145	143	137	127	125	123	117
Daimler AG	910 390	1 581	160	153	143	137	131	125	125
Bayerische Motoren Werke AG	973 617	1 570	146	144	138	134	131	126	122
Mazda Motor Corporation	219 859	1 324	149	147	142	134	128	127	127
Adam Opel AG	968 429	1 341	140	134	133	132	130	127	123
Audi AG	784 147	1 583	152	145	138	133	131	127	125
FCA US LLC	104 390	1 664	215	192	193	195	182	159	147
Hyundai Motor Manufacturing Czech SRO ([b])	245 617	1 479	-	-	-	138	140	135	131
Kia Motors Slovakia SRO ([c])	171 007	1 453	-	-	-	140	141	138	132
Jaguar Land Rover Limited ([d])	225 227	1 953	-	-	-	182	178	164	150

Note: ([a]) These are total number of registrations in the EU-28, not the registrations used for the calculation of the target and of the average emissions (see Annex 1).

([b]) In previous years Hyundai appeared as a single manufacturer.

([c]) In previous years Kia appeared as a single manufacturer (Kia Motors Corporation).

([d]) In previous years Jaguar and Land Rover appeared as two separate manufacturers.

they increased to 25 % and 33 % in 2016 for Jaguar Land Rover Limited and Chrysler respectively. The new passenger car fleets of both manufacturers are strongly led by heavier diesel vehicles that represent around 93 % and 81 % of their new passenger car fleets. However, these two manufacturers decreased the average mass of their passenger cars by 43 kg and 113 kg respectively, which also contributed to the lower emissions. Since 2010, Chrysler has been the manufacturer with the most significant reduction in average CO_2 emissions (by 68 g CO_2/km — from 215 g CO_2/km in 2010 to 146.7 g CO_2/km in 2016).

Over the last 4 years, Renault's average emissions decreased by almost 16 g CO_2/km. In 2016, 94 % of Renault vehicles emitted less than 130 g CO_2/km, and 31 % of those vehicles emitted less than 95 g CO_2/km (see Figure 3.12). Almost 2 % of the Renault new passenger car fleet was BEVs; they contributed to reducing the average CO_2 emissions by 2 g CO_2/km. Diesel vehicles were around 56 % of the Renault new passenger car fleet (slight decrease from the previous year), with average emissions of 99.7 g CO_2/km, one of the lowest among all car manufacturers.

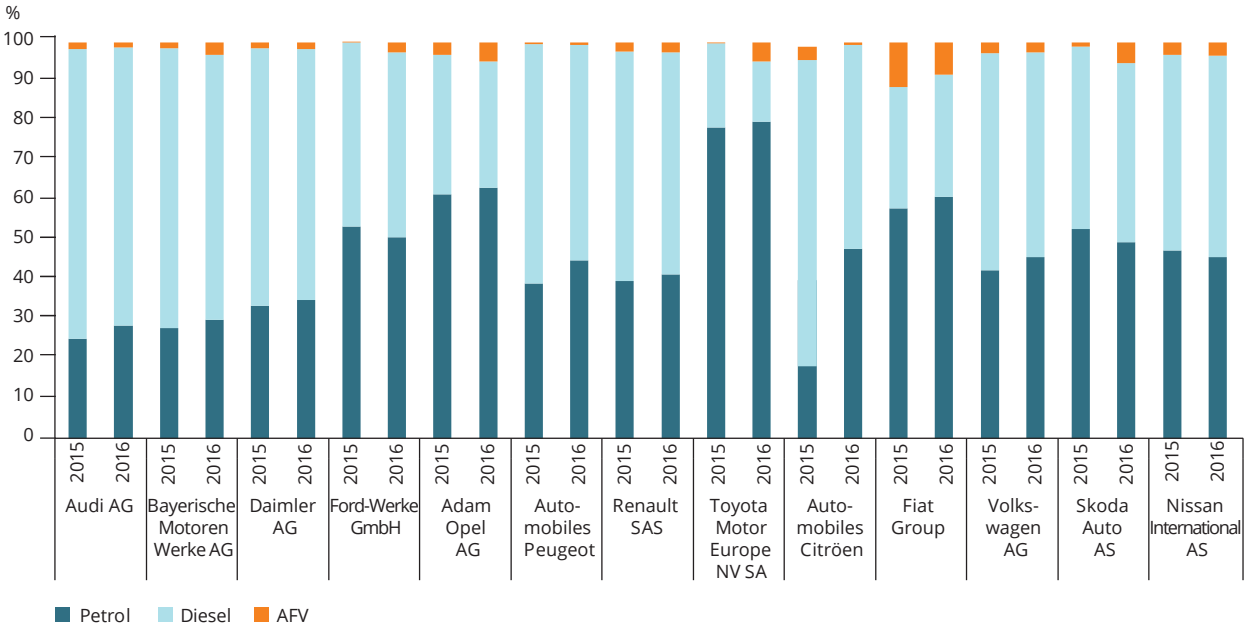
Toyota Motor Europe continued to increase its production of low-emitting vehicles in the new car fleet, as around 44 % of its new passenger car fleet had emissions below 95 g CO_2/km. The Toyota Motor Europe fleet of new passenger cars comprised 75 % petrol vehicles, with the lowest average emissions (103.4 g CO_2/km) of the large manufacturers. This was mainly related to the high proportion of hybrid vehicles emitting between 75 and 100 g CO_2/km.

For both Skoda and Hyundai Assan, average CO_2 emissions were 116 g CO_2/km. In 2016, Skoda reduced its emissions by 3.6 g CO_2/km, while the average mass remained quite stable. Skoda has kept increasing its proportion of vehicles emitting less than 130 g CO_2/km from 84 % to 90 %. Hyundai Assan decreased its average CO_2 emissions by 1.5 g CO_2/km and, after a slight increase in average CO_2 emissions in the last 2 years, it returned to its 2013 level. As in the last 2 years, Hyundai Assan had the lowest mass among the group (1 081 kg) and the highest percentage of petrol vehicles (88 %). In addition, Hyundai Assan diesel vehicles are the smallest and one of the lowest emitting among all car manufacturers.

For both Seat and Fiat, the average emissions were 116 g CO_2/km and they improved slightly by less than 1 g CO_2/km in 2016. The average mass of cars from both manufacturers remained almost stable: as in previous years, in 2016, Fiat had one of the lowest average masses among the large manufacturers (1 161 kg) and Seat slightly increased its average mass by 12 kg to 1 260 kg. The fleets of new passenger cars from Seat and Fiat remained petrol dominated, and the proportions of petrol-fuelled vehicles increased from 57 % to 62 % and from 58 % to 61 % respectively. The proportion of AFVs in Fiat's fleet of new passenger cars is 8 %, but it is mainly composed of those vehicles that run on LPG and NG. On average, NG vehicles emitted 98 g CO_2/km while LPG vehicles emitted 115 g CO_2/km, around 5.7 g CO_2/km less than petrol vehicles and 6.5 g CO_2/km more than diesel vehicles (108.5 g CO_2/km). Fiat's performance did not significantly improve in 2016: its vehicles emitted on average 116 g CO_2/km, the same emission level since 2013 and only 1 g CO_2/km less than in 2012.

After significant improvements in 2013 and 2014, and stabilisation of its emission levels in 2015, Nissan increased its average CO_2 emissions. Registration of vehicles emitting more than 130 g CO_2/km increased from 18 % to 25 %, and it caused an increase in average CO_2 emissions of 1.6 g CO_2/km to 117 g CO_2/km in 2016. The average mass of Nissan cars also fluctuated: from a peak in 2013 (1 399 kg), it decreased to 1 351 kg in 2014 and has kept increasing since to 1 379 kg in 2016. This might be the result of a change in the proportion of heavier diesel vehicles in the new passenger car fleet: it increased from 49 % in 2015 to 51 % in 2016.

Figure 3.10 Fuel type for the largest manufacturers (more than 500 000 vehicle registrations per year)



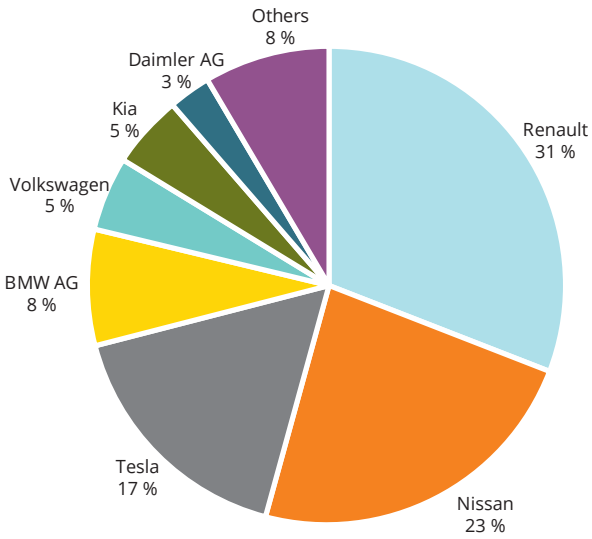
The majority of large manufacturers reduced their average emission levels in 2016. The largest reductions were achieved by Jaguar Land Rover Limited (14.2 g CO_2/km) and Chrysler (12.1 g CO_2/km). They were followed by Dacia with a decrease of 5.3 g CO_2/km. Dacia, accompanied by Kia, crossed the threshold of 120 g CO_2/km and reached 117 and 119.7 g CO_2/km respectively. Since 2009, when the car emission legislation came into force, the greatest decreases among the largest manufacturers have been recorded for Volvo, Daimler AG and Nissan (51.8 g, 41.8 g and 37.6 g CO_2/km respectively). The difference between the highest and lowest emitting car manufacturers has decreased significantly in recent years: from 90.2 g CO_2/km in 2010 to 48 g CO_2/km in 2016.

As a general observation, diesel vehicles continue to dominate in the total new passenger car fleet ([16]) in 2016. For only 5 out of the 13 large manufacturers, the proportion of diesel vehicles in 2016 was lower than 50 %: Ford Werke (46.7 %), Dacia (45.4 %), Skoda (45.1 %), Opel (31.9 %), Fiat (30.7 %) and Toyota (14.4 %). However, Automobiles Citroën, Automobiles Peugeot and Toyota were the manufacturers that most significantly reduced the proportion of diesel vehicles in the new passenger car fleet last year (by 6-7 %).

Despite the increasing trend, the proportion of AFVs remains low in absolute terms, and hence it has not significantly contributed to the observed reductions in emissions. However, in 2016, the contribution of AFVs became important for some manufacturers, accounting for more than 5 % of registrations for Fiat, Dacia and Kia (Figure 3.11). The majority of electric vehicles registered in the EU are produced by Renault (around 19 800), Nissan (almost 15 000), 31 % and 23 % of BEVs registered in 2016 respectively (Figure 3.11).

([16]) Diesel vehicles generally emit more air pollutants per kilometre than their conventional petrol equivalents. This is particularly true for emissions of black carbon, which has impacts on health and the climate, but also for particulate matter (PM) and nitrogen oxides (NO_X). See the EMEP/EEA air pollutant emission inventory guidebook 2016 (http://www.eea.europa.eu/publications/emep-eea-guidebook-2016).

Figure 3.11 Registrations of alternative fuel vehicles (AFVs)



The distribution of registrations over different emission classes (Figure 3.12) shows that for some manufacturers (i.e. Volvo, Nissan, Renault and BMW AG) the market for cars emitting less than 50 g CO_2/km is increasing. However, for each of those manufacturers, the percentage of electric vehicles is lower than 3.2 %. For Toyota and Renault, the percentage of vehicles emitting less than 95 g CO_2/km are relatively high at 44 % and 32 % respectively. Vehicles with emissions below 130 g CO_2/km account for the largest proportion of registrations for all the large manufacturers (74 % on average). For only a few manufacturers in this group (Jaguar Land Rover Limited, Chrysler, Kia and Motors Slovakia SRO), the large majority of the vehicles sold emit more than 130 g CO_2/km.

3.6 Distance to the 2016 targets

The distance of manufacturers from their specific emission targets is calculated by considering the average emissions of their entire new car fleet (no phase-in since 2015), while taking into account the modalities listed in Chapter 2 (super-credits and eco-innovations), as well as applicable derogations.

Some manufacturers fall within the scope of the de minimis threshold, according to which, manufacturers with fewer than 1 000 registrations are exempt from achieving a specific emission target. In total, 26 manufacturers with fewer than 4 430 vehicles registered in 2016, i.e. fewer than 0.03 % of all registrations, benefited from the de minimis exemption. The data are available in Annex 2.

Based on their average CO_2 emissions in 2016, the other 66 manufacturers out of all 92 achieved their targets.

Figure 3.13 shows the distance to target for the manufacturers that registered more than 100 000 vehicles in 2016. Some manufacturers that would have missed their specific emission targets as individual manufacturer have met their obligations as members of a pool. This was the case, for example, for Audi Hungaria (VW Group PC pool) and Chrysler (FCA Italy SPA pool). In addition, the Suzuki pool and the Tata and Jaguar Land Rover pool benefited from niche derogations (see Chapter 2).

The distance to the target varies between 4.3 g CO_2/km above target for Chrysler and 28.2 g CO_2/km below target for Jaguar Land Rover Limited (Figure 3.13). All relevant data are included in Annex 1.

As explained in Chapter 2, the limit value curve implies that heavier cars are allowed higher emissions than lighter cars. As a result, the specific CO_2 emission targets range from 116 to 178 g CO_2/km.

The distance to target for pools of manufacturers is presented in Table 3.7. In 2016, all the pools achieved their specific emission targets. However, the distributions of emissions are different in the different pools.

Figure 3.12 Percentage of registrations in different specific emission classes

3.7 Excess emission premiums

If a manufacturer's or a pool's average specific CO_2 emissions exceed the specific emission target, Regulation (EC) No 443/2009 requires the payment of an excess emission premium. This premium is calculated by multiplying the following three elements:

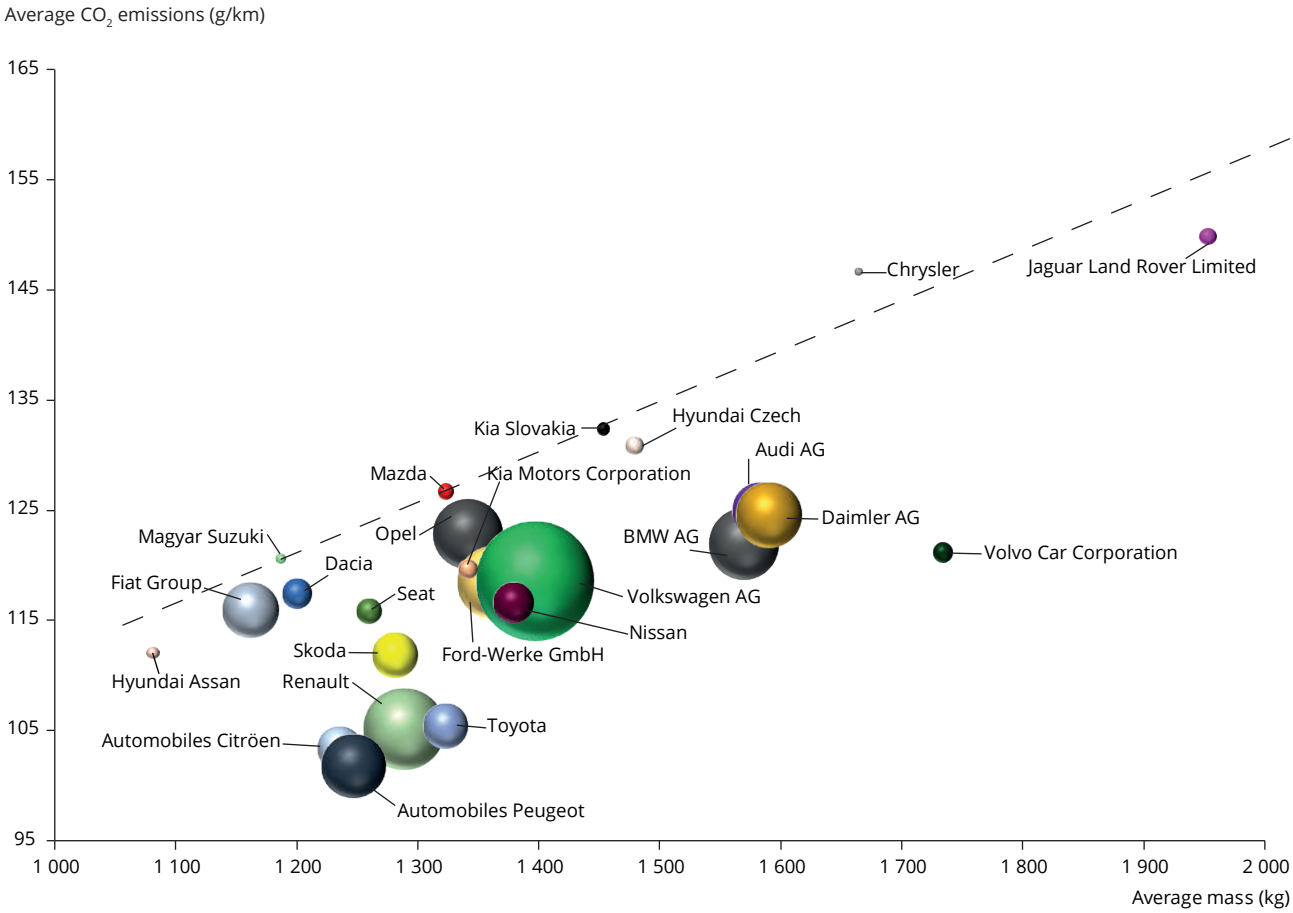
- the distance to the emission target in a given year (in g CO_2/km), i.e. the excess emissions;
- the number of vehicles registered by the manufacturer during that year;
- the premium level included in Table 3.8.

The premium amounts to EUR 5 for the first gram of CO_2/km of exceedance, EUR 15 for the second, EUR 25 for the third and EUR 95 for each subsequent gram. A greater distance to the target therefore implies a higher excess premium per gram of CO_2/km emitted.

For example, if a manufacturer registers 100 000 vehicles in the EU, the formula to be used for calculating the excess emission premium varies depending on the distance to the target as follows:

- if the distance to the target is 0.5 g CO_2/km, the first formula in Table 3.8 applies, and the excess emission premium = 0.5 * 5 * 100 000 = EUR 250 000;

Figure 3.13 Distance to 2016 target by individual manufacturers registering more than 100 000 vehicles per year

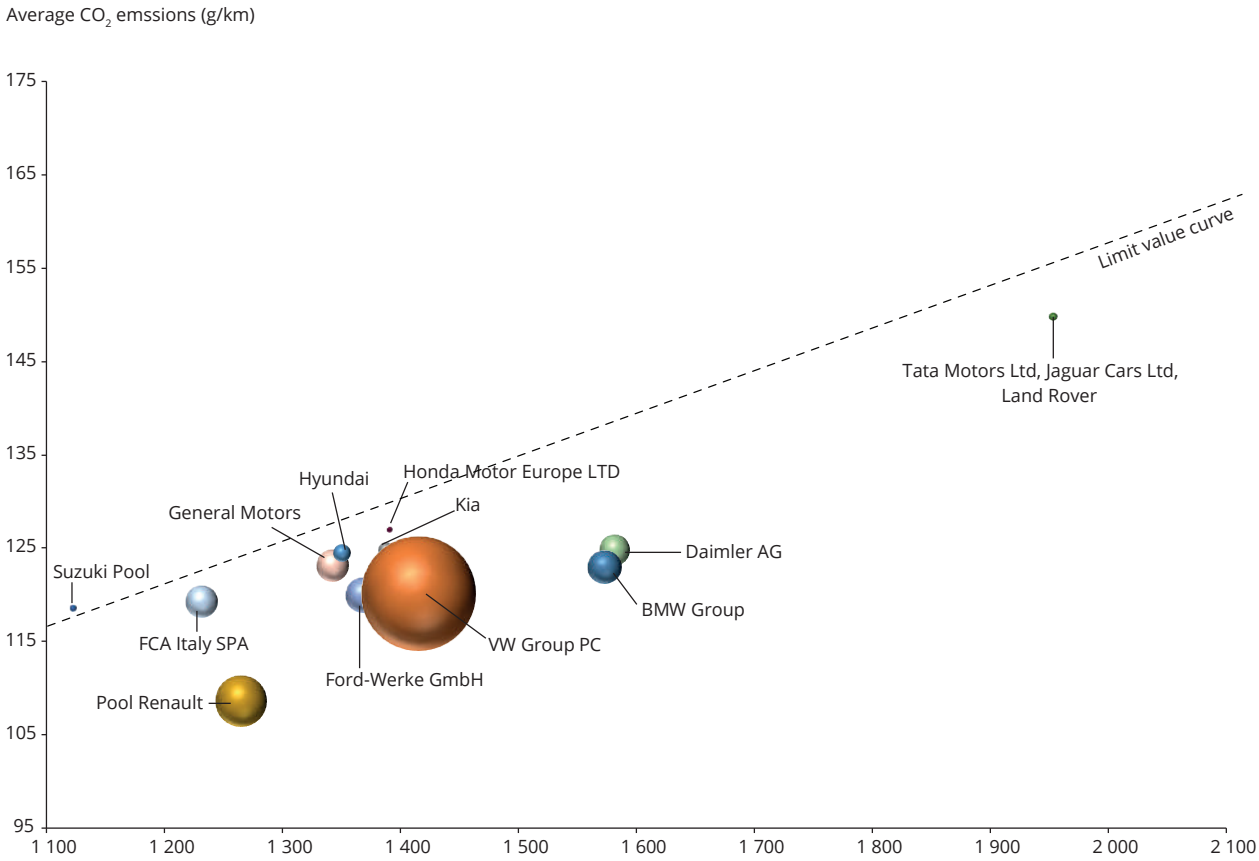


Note: The size of the bubble is proportional to the number of vehicles registered in the EU-28.

- if the distance to the target is 1.5 g CO_2/km, the second formula in Table 3.8 applies and the excess emission premium = (1 * 5 + (1.5 – 1) * 15) * 100 000 = EUR 1 250 000;
- if the distance to the target is 2.5 g CO_2/km, the third formula in Table 3.8 applies and the excess emission premium = (1 * 5 + 1 * 15 + (2.5 – 2) * 25) * 100 000 = EUR 3 250 000;
- if the distance to the target is 3.5 g CO_2/km, the fourth formula in Table 3.8 applies and the excess emission premium = (1 * 5 + 1 * 15 + 1 * 25 + (3.5 – 3) * 95) * 100 000 = EUR 9 250 000.

In 2016, no manufacturers will be required to pay the excess emission premium (see Annex 2).

Figure 3.14 Distance to 2016 target by pools



Note: The size of the bubble is proportional to the number of vehicles registered in the EU-28.

Table 3.7 Distance to target for the pools in 2016

Pool	Manufacturer	Average emissions (g CO_2/km)	Target (g CO_2/km)	Distance to target (g CO_2/km)
	Bayerische Motoren Werke AG	122	138	– 16
	BMW M GmbH	176	144	32
	Rolls-Royce Motor Cars Ltd	334	183	151
BMW Group		123	138	– 15
	Daimler AG	125	139	– 14
	Mercedes-AMG GmbH	220	141	79
Daimler AG		125	139	– 14
	Alfa Romeo SPA	115	128	– 13
	FCA US LLC	147	142	4
	FCA Italy SPA	116	119	– 3
FCA Italy SPA		119	123	– 3
	CNG-Technik GmbH	163	138	25
	Ford-Werke GmbH	118	129	– 10
	Ford Motor Company	217	149	68
	Ford Motor Company of Australia Ltd	206	174	32
	Ford India Private Limited	114	115	– 1
Ford-Werke GmbH		120	129	– 9
	Mitshubishi Motors Corporation MMC	125	140	– 15
	Mitshubishi Motors Thailand Co Ltd MMTH	96	109	– 12
Mitshubishi Motors		118	132	– 14

Table 3.7 Distance to target for the pools in 2016 (cont.)

Pool	Manufacturer	Average emissions (g CO_2/km)	Target (g CO_2/km)	Distance to target (g CO_2/km)
	General Motors Company	266	151	114
	General Motors Holdings LLC	267	152	115
	GM Korea Company	122	124	– 3
	Chevrolet Italia SPA	116	120	– 4
	Adam Opel AG	123	128	– 5
General Motors		123	128	– 5
	Honda Automobile China Co Ltd	129	119	10
	Honda Motor Co Ltd	117	123	– 6
	Honda of the UK Manufacturing Ltd	135	135	– 1
	Honda Turkiye AS	155	125	29
Honda Motor Europe Ltd		127	130	– 3
	Hyundai Motor Manufacturing Czech SRO	131	134	– 3
	Hyundai Assan Otomotiv Sanayi ve Ticaret AS	112	116	– 4
	Hyundai Motor Company	131	136	– 4
	Hyundai Motor India Ltd	115	118	– 4
	Hyundai Motor Europe GmbH	109	117	– 8
Hyundai		125	128	– 4
	Kia Motors Corporation	120	128	– 8
	Kia Motors Slovakia SRO	132	133	0
Kia		125	130	– 5
	Avtovaz JSC	180	120	60
	Automobile Dacia SA	117	121	– 4
	Renault SAS	105	125	– 20
Renault		109	124	– 16
	Magyar Suzuki Corporation Ltd	121	123	– 3
	Maruti Suzuki India Ltd	100	123	– 23
	Suzuki Motor Corporation	156	123	33
	Suzuki Motor Thailand Co Ltd	97	123	– 26
Suzuki		119	123	– 5
	Jaguar Land Rover Limited	150	178	– 28
	Tata Motors Limited	150	178	– 28
Tata Motors Ltd, Jaguar Cars Ltd , Land Rover		150	178	– 28
	Audi AG	125	139	– 14
	Audi Hungaria Motor KFT	145	130	15
	Bugatti Automobiles SAS	568	157	411
	Dr Ing HCF Porsche AG	185	153	32
	Quattro GmbH	215	147	67
	Seat SA	116	124	– 8
	Skoda Auto AS	112	125	– 13
	Volkswagen AG	119	130	– 12
VW Group PC		120	131	– 11

Table 3.8 Coefficients to be used in the formula for calculating excess emissions premium

Excess emissions (g CO_2/km)	Fine (EUR)				Number of vehicles	Formula for calculating excess emission premium (EUR)
	5	15	25	95		
0–1	(EE)	-	-	-	NV	((EE) * 5)*NV
1–2	1	(EE — 1)	-	-	NV	(1*5 + (EE-1)*15)*NV
2–3	1	1	(EE — 2)	-	NV	(1*5 + 1*15 + (EE-2)*25)*NV
> 3	1	1	1	(EE — 3)	NV	(1*5 + 1*15 + 1*25 + (EE-3)*95)*NV

Note: EE, distance to target or excess emission; NV, number of vehicles registered.

4 Light commercial vehicles (vans)

4.1 Number of new registrations

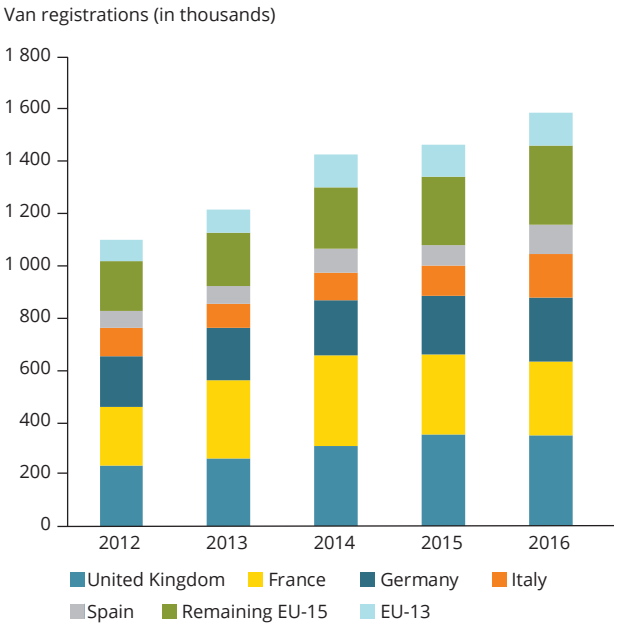
In 2016, there were around 1.6 million new light commercial vehicle registrations in the EU-28 (around 10 % of the total light-duty vehicles ([17]). This includes around 6 600 IVAs ([18]), 8 400 vehicles approved under NSS rules, 2 800 unknown vehicles ([19]) and 1 600 unidentified vehicles ([20]).

It should be noted that there are uncertainties in both the 2012 and 2013 data sets, mainly due to the difficulty experienced by Member States in the monitoring of multi-stage vans ([21]). These uncertainties were reduced by the new monitoring system, based on VINs, in place from 2015 with effect from the 2014 data collection.

For almost all Member States, the number of registrations increased in 2016, except for Latvia (- 24 %), the Czech Republic (- 22 %), France (- 8 %) and Bulgaria (- 4 %). The biggest increases in new vehicle registrations were observed in Italy (+ 46 %), Spain (+ 41 %), the Netherlands and Malta (+ 30 % each).

The largest markets in Europe with regard to the new registrations of vans are the United Kingdom (22 %), France (18 %) and Germany (15 %) (Figure 4.1). The EU-15 still accounts for the vast majority of registrations of new light commercial vehicles in the EU, with 92 % of the total registrations. Compared with 2015, the number of vehicles registered in the EU-15 has increased by 9 %, while the number of newly registered vehicles in the EU-13 has increased by 4 %.

Figure 4.1 Number of light commercial vehicles registered in the EU-28 between 2012 and 2016



Note: In 2012, France did not provide information on its entire fleet of vans because of an update of the registration system.

4.2 EU statistics

The average CO_2 emissions from the new light commercial vehicle fleet in the EU-28 in 2016 were 163.7 g CO_2/km, a reduction of 4.7 g CO_2/km from the previous year (168.3 g CO_2/km in 2015).

([17]) Light-duty vehicles include cars and vans.
([18]) IVAs are applicable to vehicles imported from non-Member States or own-build vehicles that have to be individually approved. NSS vehicles are those that are approved nationally in very small numbers, typically because they are made by smaller manufacturers.
([19]) Unknown vehicles are those for which the entries for the manufacturer's name are missing in the database. Those vehicles cannot be attributed to a manufacturer and are therefore not included in the provisional calculation of targets.
([20]) Unidentified vehicles are those for which the entries for the mass in running order or the CO_2 emissions are missing in the database. Unidentified vehicles were not considered in the calculation of the average specific emissions or the specific emission targets for manufacturers.
([21]) Multi-stage vans are vehicles built in two or more stages. An incomplete vehicle, such as a chassis-cab or a cut-away chassis, built by one manufacturer, is completed by another manufacturer, which adds work-performing or cargo-carrying components to the vehicle (e.g. box truck, dump truck).

In 2016, the average new light commercial vehicle in the EU-15 emitted 4.8 g CO_2/km less than the average newly registered vehicle in the EU-13, the same difference as in 2015. In fact, while the average new light commercial vehicle in the EU-15 emitted 0.4 g CO_2/km less than the average newly registered vehicle in 2016 (Table 4.1), in the EU-13 it emitted 4.4 g CO_2/km more.

Diesel vehicles accounted for more than 96 % of the total new van registrations in 2016 (Table 4.2). The average CO_2 emissions of diesel vehicles decreased by 4.5 g CO_2/km, while the average emissions of petrol vehicles decreased by only 0.5 g CO_2/km, compared with 2015 (Figure 4.2).

In 2016, the average diesel vehicle emitted 165.3 g CO_2/km, about 13.6 g CO_2/km more than the average petrol vehicle (in 2015 the difference between diesel and petrol vehicles was 17.6 g CO_2/km) (Table 4.3). It should be noted that this difference in the average CO_2 emissions between diesel and petrol vehicles is due to the difference in their average mass. Diesel vehicles are generally bigger, and hence heavier (1 824 kg on average), than petrol vehicles (1 404 kg on average). There are also differences in terms of engine capacity and engine power: 1 920 cm^3 and 88 kWh for diesel, 1 629 cm^3 and 87 kWh for petrol vehicles. It should also be noted that the proportion of petrol vehicles is particularly small: less than 2 %.

There were 9 930 newly registered electric vehicles in 2016, compared with 7 850 registered in 2015. Of the other types of AFVs, LPG and NG were the vehicles most sold (9 229 and 9 594 vehicles registered respectively).

Table 4.1 Average CO_2 emissions (g CO_2/km) from light commercial vehicles by region

	2012	2013	2014	2015	2016
EU-28	180.2	173.3	169.1	168.3	163.7
EU-15	180.0	172.9	168.8	167.9	163.3
EU-13	182.5	178.5	172.2	172.8	168.0

Note: Croatia provided data from 2014, whereas for 2012 and 2013, data for Croatia were not included in the calculations.

Table 4.2 Percentage of fuel type in light commercial vehicles (EU)

	2012	2013	2014	2015	2016
Diesel	96.5	96.5	96.8	96.7	96.2
Petrol	1.8	2.0	2.0	1.8	1.9
AFV	1.7	1.5	1.2	1.5	1.8

Note: The geographical scope of the data changes over time from EU-27 to EU-28; see Annex 1 for details.

Figure 4.2 Evolution of CO_2 emissions from light commercial vehicles by fuel type in the EU-28

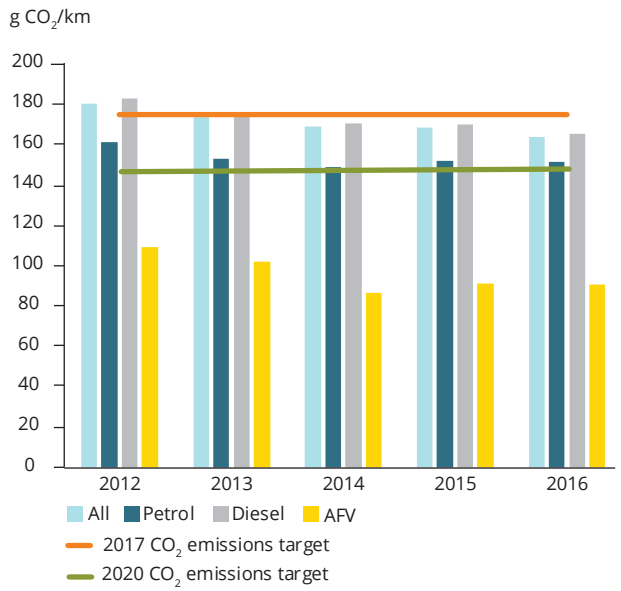


Table 4.3 Average CO_2 emissions (g CO_2/km) from light commercial vehicles by fuel (EU)

	2012	2013	2014	2015	2016
All fuels	180.2	173.3	169.1	168.3	163.7
Petrol	161.3	153.0	149.0	152.2	151.7
Diesel	182.7	175.2	170.5	169.8	165.3
AFV	109.4	101.8	86.8	91.4	90.9

Note: ([a]) For the calculation of the average CO_2 emissions of AFVs, battery electric, LPG, NG, E85, biodiesel and plug-in vehicles are included.

The geographical scope of the data changes over time from EU-27 to EU-28; see Annex 1 for details.

4.3 Comparison between Member States

With the exception of France, Cyprus, Denmark and the Czech Republic, in which the average CO_2 emissions in 2016 increased from 2015, in all other countries CO_2 emissions from light commercial vehicles fell in 2016 (Figure 4.3). Average CO_2 specific emissions from newly registered vans were already below the 175 g CO_2/km EU target set for 2017 in twenty-five Member States (twenty in 2015) ([23]) (Figure 4.4). Thirteen of these had emission values below 160 g CO_2/km, compared with ten in 2015. There is a clear correlation by Member State between the average emissions and the average mass: higher average mass values correspond to higher average emissions. For some Member States (Portugal and Bulgaria), the low average emissions are mainly related to the registration of relatively small vehicles: the average mass of the new fleet of these countries was 1 615 and 1 553 kg respectively. For the second year in a row, Portugal registered vans with the lowest average engine capacity in Europe and one of the lowest average engine powers (third position). Spain had the lowest average engine power, followed by Malta, Portugal, Cyprus and Croatia. There were only two Member States with average CO_2 emissions higher than 180 g CO_2/km: the Czech Republic and Slovakia. Their new fleets also had the highest average mass (> 1 950 kg), engine size (> 2 050 cm^3) and power (> 94 kW).

For light commercial vehicles, the percentage of diesel vehicles is very high. In some Member States, more than 99.5 % of the new fleet is fuelled by diesel: Ireland, Portugal and the United Kingdom. For the majority of Member States (exceptions are Bulgaria, Estonia and Poland), the proportion of diesel vehicles is above 90 %.

Because of their market size, the Member States with higher numbers of vehicle registrations — France, Germany, Italy, Spain and the United Kingdom — are the major contributors to the total reductions in EU-28 CO_2 emissions from light commercial vehicles. Of these five, Italy, Spain and France have the lowest average CO_2 emissions. In Italy, this was for a combination of reasons. Italy, similarly to Portugal, had one of the lowest average engine capacity values (1 721 cm^3, the second lowest among the EU Member States) and low average mass (1 631 kg, the fourth lowest). In addition to this, AFVs comprised 6 % of the Italian new van fleet. The latter are mainly NG vehicles (65 % of all AFV registrations in Italy) with an average value of 132.4 g CO_2/km and LPG vehicles (29 % of all AFV France, it seems that the new small diesel fleet (149 g CO_2/km with an average mass of 1 687 kg and 161 g CO_2/km with an average mass of 1 768 kg) was the main reason for their low CO_2 emissions. In addition, as in the previous year, France had a relatively high percentage of battery electric vans (1.5 % of vehicles registered in France), with zero emissions.

4.4 Average specific CO_2 emissions per manufacturer in 2016

Table 4.4 presents data (number of registrations, average mass and average emissions) for large van manufacturers that registered more than 10 000 vehicles in 2016. In total they account for 97.4 % of the new van fleet. The same table also presents the average emissions of those manufacturers for the 2012–2016 period.

In 2016, the most popular brand was Ford-Werke GmbH, with 16 % of the vans registered in the EU-28. Renault and Volkswagen AG followed with 14 % and 12 % each.

Nine manufacturers, representing more than 80 % of the European new van fleet, had average emissions lower than 175 g CO_2/km: Automobile Dacia SA, Automobiles Citroën, Automobiles Peugeot, Renault, Nissan International SA, FCA Italy SPA, Adam Opel AG, Volkswagen AG and Ford-Werke GmbH. The first three of these manufacturers also had the lowest average mass in the group. The average emissions for all large manufacturers are in the range of 124–216 g CO_2/km. Average mass values are in the range of 1 281–2 323 kg.

For the fourth year in a row, Automobile Dacia SA achieved the lowest average CO_2 emissions (124 g CO_2/km), and like the previous year it had the lowest average mass (1 281 kg). From the previous year, Automobile Dacia SA decreased their average CO_2 emissions by 8 g to 124 g CO_2/km.

The next three best-performing manufacturers had similar emission levels, around 150 g CO_2/km. Among them, Automobiles Citroën and Automobiles Peugeot decreased their emissions by 3.9 and 3.3 g CO_2/km in 2016 respectively, while for Renault an increase in emissions of 4.1 g CO_2/km was observed in the same period. For all of them a slight increase in average mass was observed in 2016.

([23]) Regulation (EU) No 510/2011 sets an average emission target of 175 g CO_2/km by 2017 for new light commercial vehicles registered in the EU as a whole.

Figure 4.3 Absolute reduction and relative reduction in specific emissions by Member State between 2014 and 2016

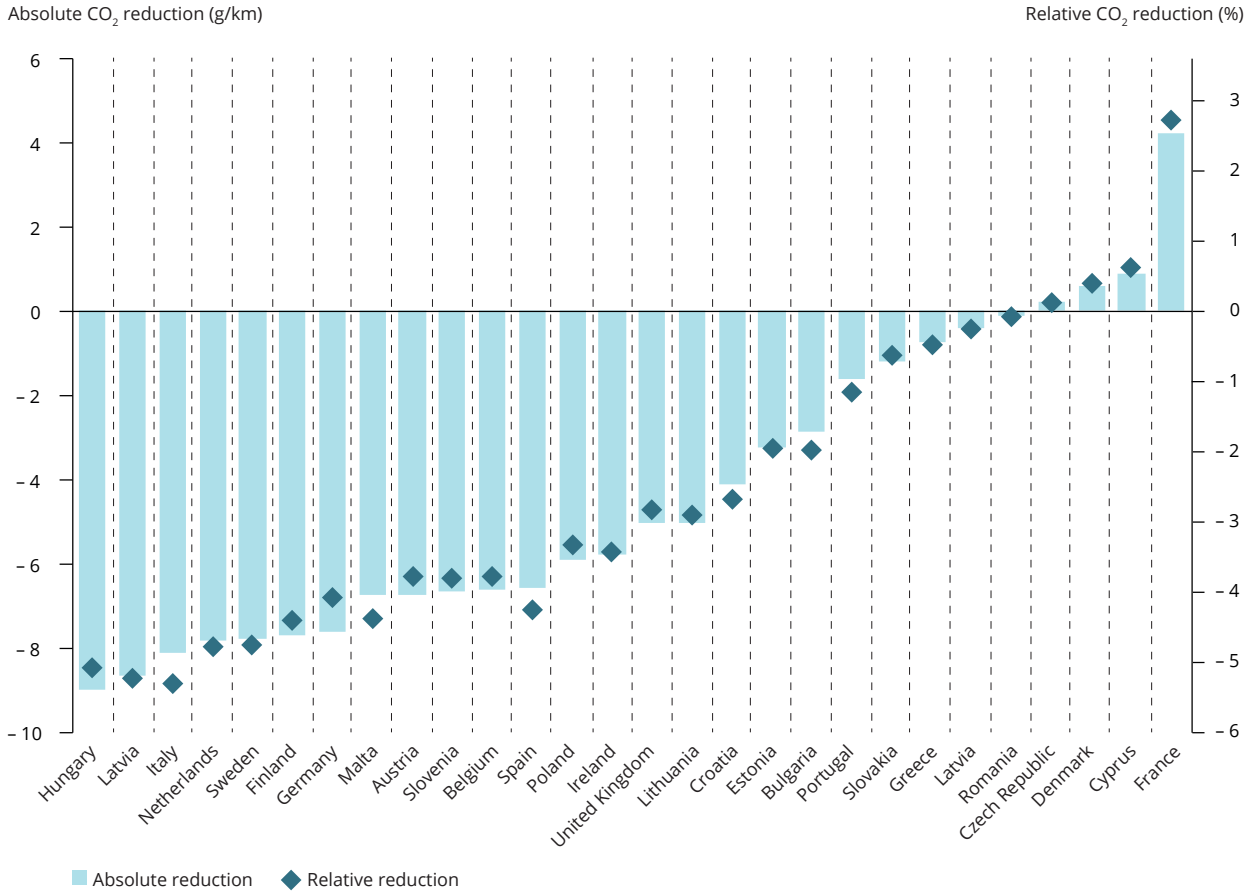
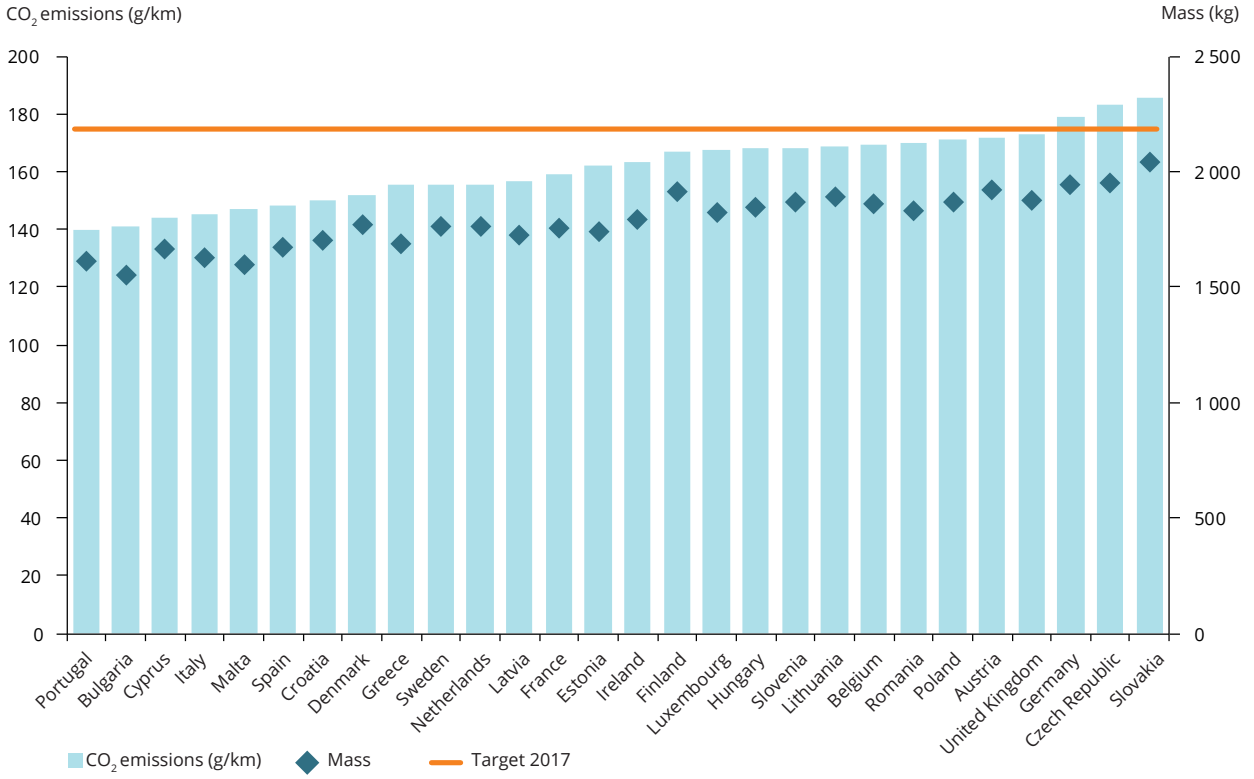


Figure 4.4 Average CO_2 emissions and average mass by EU Member State in 2016



Note: 2017 target is the target for the EU as a whole.

registrations) with an average value of 126.5 g CO_2/km. In Spain and

Over the last 5 years, Nissan International SA has improved its performance the most: average emissions decreased by 34 g CO_2/km from 2012 to 164 g CO_2/km in 2016 (by 12 g CO_2/km since 2015). Nissan International SA has significantly reduced the amount of vehicles with very high emissions (i.e. more than 250 g CO_2/km). This might also be explained by the high proportion of BEVs it produces (5 % in 2016).

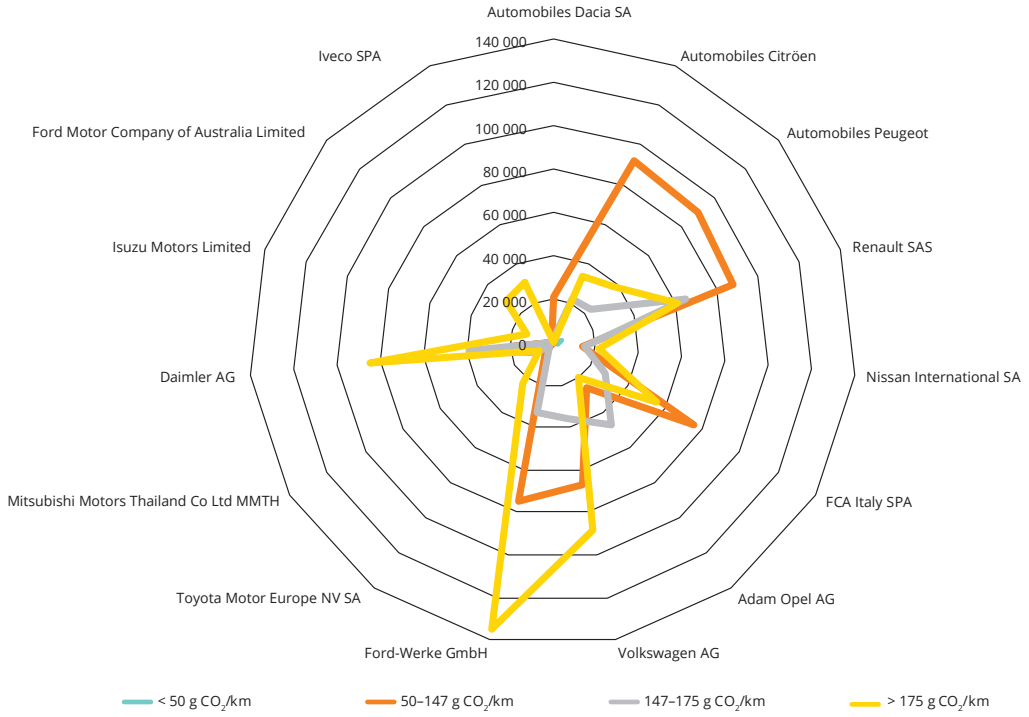
Thirteen out of 15 manufacturers in this group reduced their average emission levels in 2016 compared with 2015. The largest reductions in average emissions were achieved by Ford Motor Australia (– 22.7 g CO_2/km), Mitsubishi Motors Thailand and Volkswagen AG (– 15.3 g CO_2/km each). Since 2012, in addition to Nissan International SA, Daimler AG, Mitsubishi Motors Thailand and Toyota also recorded average decreases in emissions of 31.0 g, 30.4 g and 22.6 g CO_2/km respectively. These are the greatest decreases among the largest manufacturers.

The distribution of registrations over the emission classes (Figure 4.5) shows that the new fleet composition is very different among manufacturers. Low-emitting vehicles (< 50 g CO_2/km) represent a very small percentage for the large majority of the manufacturers: only for Nissan and Renault are the proportions of these vehicles around 5 % and 2 % respectively. For three manufacturers (Automobile Dacia SA, Automobiles Peugeot and Automobiles Citroën), the percentage of vehicles emitting less than 147 g CO_2/km is around or higher than 60 %. For Renault SAS and Fiat Group, the most frequent class is 50-147 g CO_2/km. For Adam Opel and Mitsubishi Motors Thailand, vehicles emitting between 147 and 175 g CO_2/km are the most registered. For all the other manufacturers, the majority of vehicles emit more than 175 g CO_2/km.

Table 4.4 Main statistics for large van manufacturers (more than 10 000 vehicle registrations per year)

Manufacturer	Registrations 2016	Average mass (kg) 2016	Average CO_2 emissions (g CO_2/km)				
			2012	2013	2014	2015	2016
Automobile Dacia SA	23 928	1 281	145	132	132	133	124
Automobiles Citröen	147 478	1 630	158	153	148	150	146
Automobiles Peugeot	152 454	1 655	159	154	147	151	148
Renault SAS	216 516	1 713	171	152	149	148	152
Nissan International SA	53 075	1 879	199	192	184	176	164
FCA Italy SPA	158 560	1 675	157	157	158	158	153
Adam Opel AG	92 843	1 755	178	178	173	161	161
Volkswagen AG	191 448	1 792	185	180	180	181	166
Ford-Werke GmbH	243 337	1 893	188	189	175	171	169
Toyota Motor Europe NV SA	30 766	1 949	202	191	193	188	179
Mitsubishi Motors Thailand Co Ltd MMTH	16 429	1 935	210	207	207	195	179
Daimler AG	141 853	2 142	219	205	200	189	188
Isuzu Motors Limited	12 658	2 072	212	203	200	201	204
Ford Motor Company of Australia Limited	31 598	2 202	228	227	228	236	213
Iveco SPA	30 999	2 323	230	224	228	219	216

Figure 4.5 Number of registrations over different specific emission classes



4.5 Distance to the 2016 target

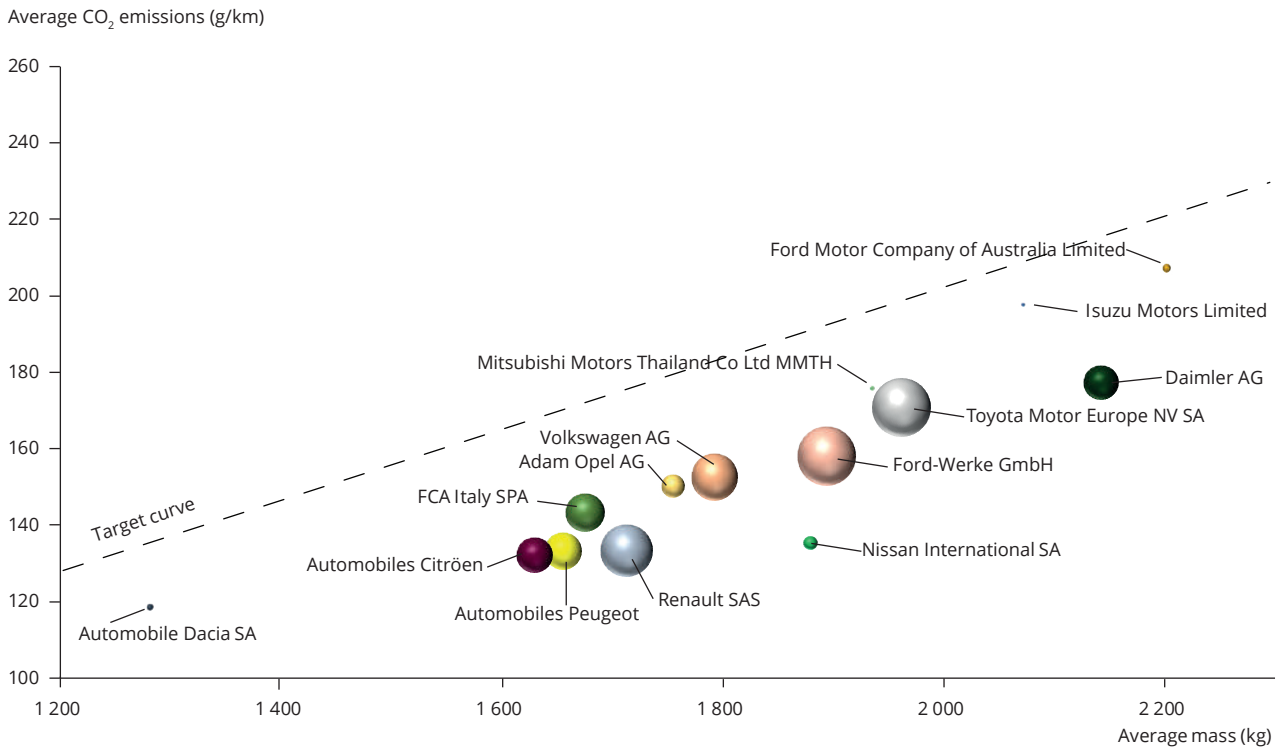
The distance of the manufacturers from their specific emission targets is calculated by taking into account the modalities listed in Chapter 2 (i.e. phase-in, super-credits and eco-innovations).

Based on their average CO2 emissions in 2016, all 15 larger manufacturers, representing about 97 % of the total registrations in the EU, achieved their specific emission targets for 2016. All granted derogation targets were met.

Individual manufacturers exceeding their target were members of their pools. Manufacturers with fewer than 1 000 registrations are exempt from achieving a specific emission target. In total, 22 manufacturers with fewer than 4 180 vehicles registered in 2016 benefited from the de minimis exemption. The data are available in Annex 2. Figure 4.6 graphically illustrates the distance to target for the 15 manufacturers with more than 10 000 new registered vehicles in 2016.

The distance to target for the eight pools of manufacturers is presented in Table 4.5. In 2016, all the pools of manufacturers achieved their specific emission targets. A derogation target has been granted for Mitsubishi Motors.

Figure 4.6 Distance to 2016 target by individual manufacturers (only manufacturers registering > 10 000 vehicles per year in Europe)



Note: The size of the bubble is proportional to the number of vehicles registered in EU-28.

4.6 Distance to the 2017 targets

The distance of the largest manufacturers (i.e. manufacturers registering more than 10 000 vehicles per year) from their 2017 targets is calculated based on the 2016 CO_2 emission data.

Progress towards the target for 2017 is calculated on the basis of the modalities summarised in Chapter 2. A different set of modalities is applied as follows: for 2017, the calculation includes 100 % of the new vehicle fleet, and manufacturers receive super-credits of 1.5 for vehicles emitting less than 50 g CO_2/km. Manufacturers have one more year to further reduce CO_2 emissions and ensure compliance with their targets in 2017. In 2016, among the 15 large manufacturers, all of them already complied with their 2017 targets.

4.7 Excess emission premiums

Similarly to Regulation (EC) No 433/2009, if a manufacturer's or a pool's average specific CO_2 emissions exceed the specific average target, Regulation (EU) No 510/2011 requires the payment of an excess emission premium. The formulae for calculating the excess emission premium for failing to meet the specific CO_2 emission target is equivalent to the ones used for passenger cars (see Section 3.8).

The first year in which the target was binding for vans was 2015. Neither in 2015 nor in 2016 did manufacturers exceed their target.

Table 4.5 Distance to target for the pools in 2016

Pool	Manufacturer	Average CO_2 emissions (g CO_2/km)	Target (g CO_2/km)	Distance to target (g CO_2/km)
	Daimler AG	177	212	– 34
	Mitsubishi Fuso Truck & Bus Corporation	236	265	– 29
	Mitsubishi Fuso Truck Europe SA	0	276	– 276
	MFTBC	236	264	– 29
Daimler		178	216	– 38
	FCA US LLC	202	207	– 5
	FCA Italy SPA	144	174	– 30
FCA Italy SPA		144	172	– 29
	CNG-Technik GmbH	108	155	– 47
	Ford Motor Company of Australia Limited	207	222	– 14
	Ford Motor Company	203	216	– 13
	Ford-Werke GmbH	158	191	– 33
Ford-Werke GmbH		162	196	– 33
	General Motors Company	270	257	13
	Adam Opel AG	150	179	– 29
General Motors		150	180	– 29
	Hyundai Motor Company	208	211	– 4
	Hyundai Assan Otomotiv Sanyi VE	100	111	– 12
	Hyundai Motor Manufacturing Czech SRO	154	161	– 6
Hyundai		201	220	– 19
	Kia Motors Corporation	116	142	– 26
	Kia Motors Slovakia SRO	125	152	– 27
Kia		119	152	– 33
	Mitsubishi Motors Corporation MMC	166	210	– 44
	Mitsubishi Motors Thailand Co Ltd MMTH	176	210	– 34
Mitsubishi Motors		175	195	– 20
	Avtovaz JSC	216	137	79
	Automobile Dacia SA	119	135	– 17
	Renault SAS	133	171	– 38
Renault		131	172	– 41
	Audi AG	137	178	– 40
	Dr Ing HCF Porsche AG	180	216	– 35
	Quattro GmbH	189	205	– 16
	Seat SA	103	127	– 24
	Skoda Auto AS	103	133	– 30
	Volkswagen AG	153	189	– 36
Volkswagen Group LCV		150	181	– 31

5 Distance to the 2020/2021 targets

Regulation (EU) No 333/2014 defines the modalities for reaching the 95 g CO_2/km target for passenger cars. Taking into account those modalities, it is possible to make an estimate of the emission reduction that manufacturers would have to achieve from 2017 onwards to reach their respective targets in 2021 (phasing in for 95 % of vehicles in 2020).

The calculation of the distance to target for manufacturers in 2021 is based on the average 2016 vehicle mass values. It also accounts for other modalities, such as 1.67 cars as super-credit being considered for each vehicle emitting less than 50 g CO_2/km.

Some manufacturers, such as Automobiles Peugeot and Renault SAS are already very close to their 2021 targets: they need to reduce their average emissions by less than 12 g CO2/km or less in the next 5 years (Figure 5.1).

Other manufacturers still have to make considerable progress to achieve their 2021 targets.

Figure 5.2 presents the progress of the manufacturers responsible for more than 500 000 vehicles a year in terms of annual percentage changes for three periods: 2000–2009, 2009–2016 and 2016–2021. These rates include the expected reductions for respecting the 2021 target set by the regulation.

For large manufacturers, the rate of progress required from now until 2021 is in general higher than the rate that has been achieved in the years since Regulation (EU) No 443/2009 came into force. There are only four manufacturers (Automobiles Peugeot, Automobiles Citroën, Renault SAS, Toyota Motor Europe NV SA) for which the progress rates required in the period 2016-2021 are lower than in the previous years.

Moreover, there is only one manufacturer (Toyota Motor Europe NV SA) that needs a progress rate lower than it was in 2000–2009. The figure also shows that in the majority of cases the greatest improvements will be required over the coming years.

Regarding vans, Regulation (EU) No 253/2014 defines the modalities for reaching the 2020 target to reduce CO_2 emissions from new light commercial vehicles.

As for passenger cars, the calculation of the 2020 targets for manufacturers is based on the latest average 2016 vehicle mass values. However, there are no super-credits anticipated for that year and phase-in is 100 %.

Five large manufacturers (Daimler AG, Nissan International SA, Ford-Werke GmbH, Renault SAS and Automobiles Peugeot) are already very close to their 2020 targets: they need to reduce their average emissions by less than 12 g CO_2/km in the next 4 years. Other manufacturers still have to make significant progress to achieve their 2020 targets (Figure 5.3).

Figure 5.4 presents the manufacturers' progress in terms of annual percentage changes for two periods: 2012–2016 and 2016–2020. These rates include the expected reductions towards meeting the 2020 target set by the regulation.

For eight manufacturers, the rate of progress required from 2016 to 2020 is lower than or comparable to the rate that has been achieved in the years since Regulation (EU) No 510/2011 came into force. There are seven manufacturers for which the progress rates in the period 2016–2020 are greater than in the previous years. The figure also shows that the greatest improvements were achieved over the period 2012-2016.

Figure 5.1 Comparison of past and future progress towards meeting the 2021 target

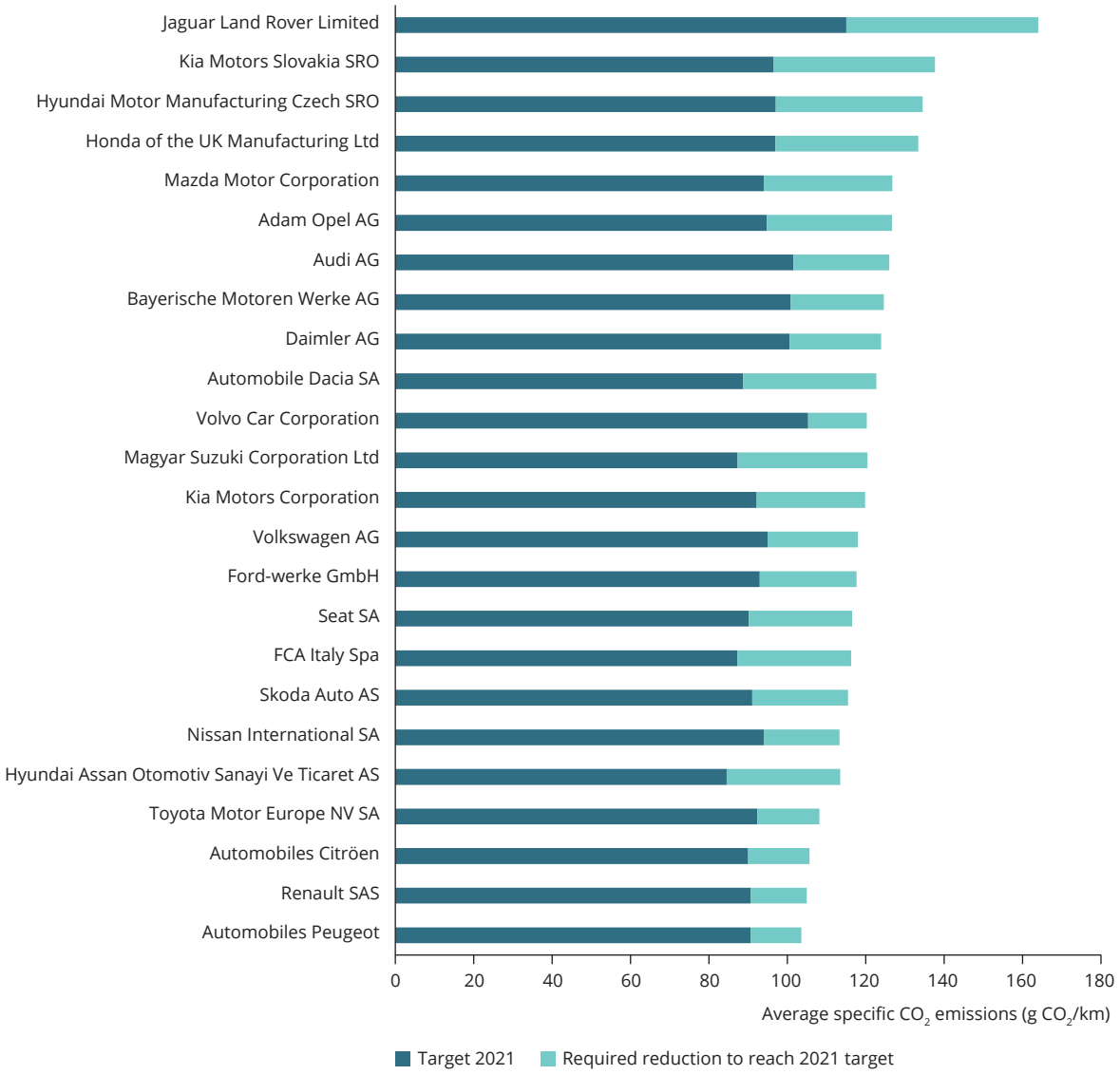


Figure 5.2 Comparison of past and future progress towards meeting the 2021 target

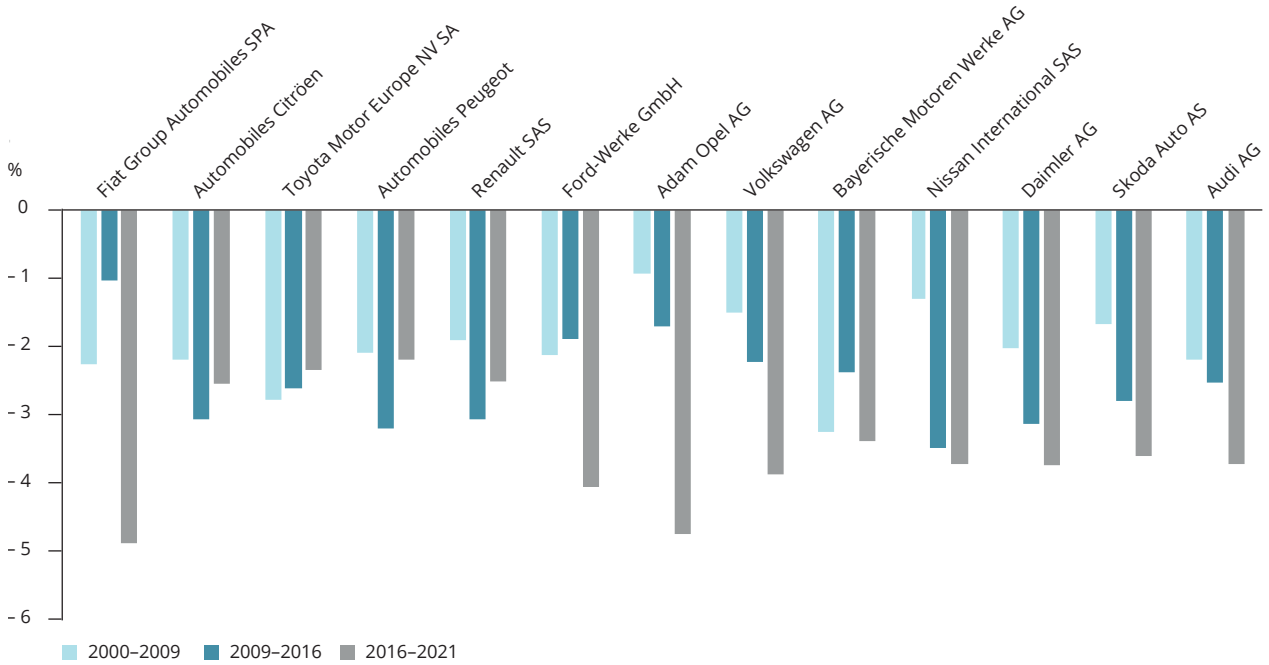


Figure 5.3 Van manufacturers' progress towards meeting the 2020 target

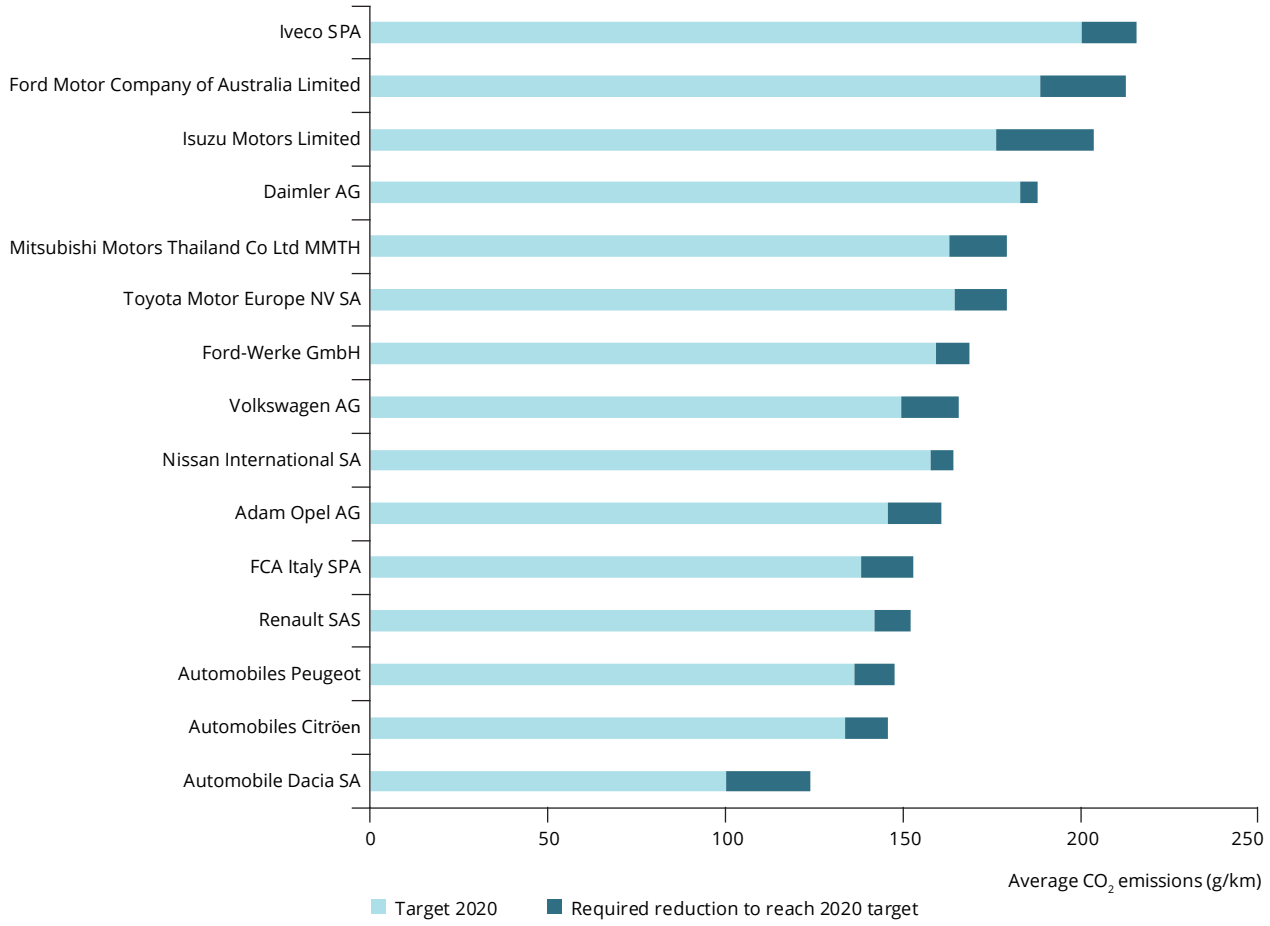
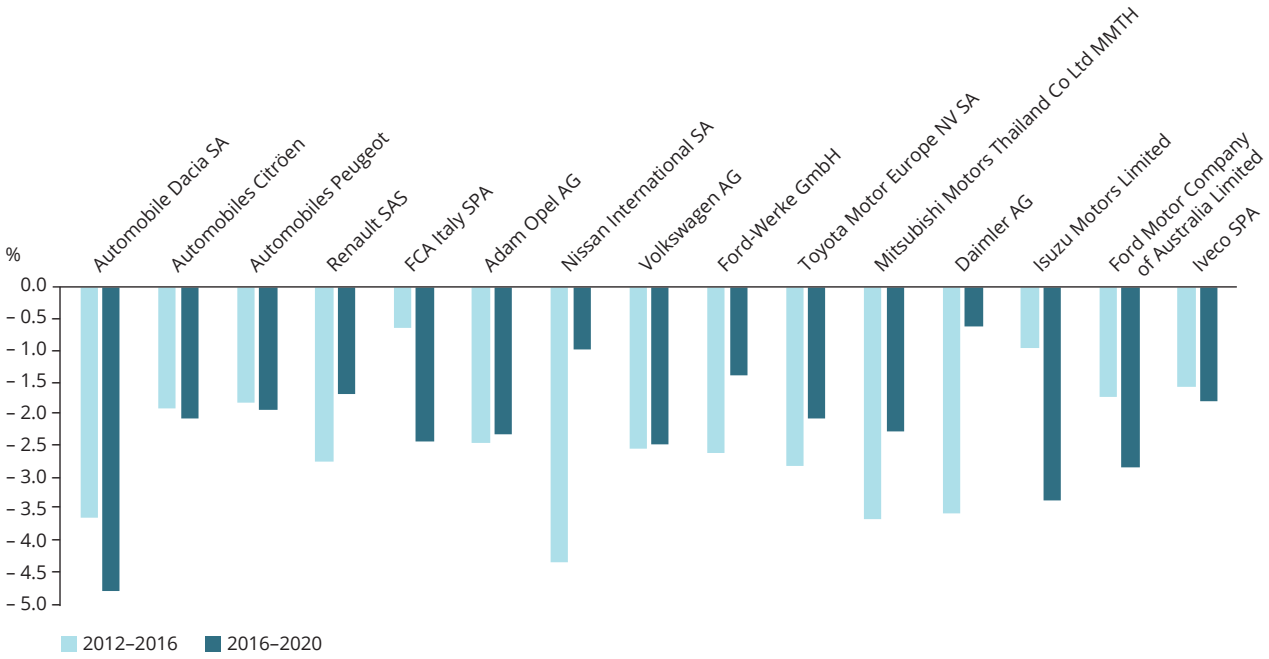


Figure 5.4 Comparison of past and future progress towards meeting the 2020 target



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Annex 1

Table A1.1 Registration of new passenger cars by Member State (in thousands)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Austria	295	280	300	311	308	309	298	294	319	328	356	335	319	303	308	329
Belgium	497	468	459	485	480	526	525	536	475	551	577	490	490	485	503	541
Bulgaria	-	-	-	-	-	-	86	91	21	14	14	14	15	16	17	20
Croatia	-	-	-	-	-	-	-	-	-	-	-	-	28	35	36	45
Cyprus	-	-	-	20	18	20	25	24	16	15	15	11	7	8	9	12
Czech Republic	-	-	-	115	105	107	126	134	159	165	169	170	162	179	227	214
Denmark	97	113	102	124	147	154	160	148	111	151	170	171	184	188	204	221
Estonia	-	-	-	17	20	25	31	24	10	10	17	19	20	21	21	23
Finland	106	113	145	141	146	143	123	137	89	109	122	107	100	103	106	115
France	2 228	2 120	1 988	1 996	2 059	1 986	2 050	2 037	2 259	2 250	2 174	1 932	1 827	1 838	2 011	2 167
Germany	3 342	3 122	3 237	3 267	3 319	3 445	3 126	3 067	3 786	2 873	2 933	3 062	2 930	3 012	3 177	3 316
Greece	245	242	203	264	274	279	294	279	221	140	97	57	58	71	76	79
Hungary	-	-	-	230	199	193	167	163	66	43	47	52	55	68	77	95
Ireland	117	152	146	154	171	177	186	151	56	89	90	73	74	96	123	146
Italy	2 430	2 278	2 244	264	2 237	2 325	2 494	2 163	2 160	1 954	1 745	1 402	1 304	1 351	1 573	1 823
Latvia	-	-	-	11	16	25	31	19	5	6	10	10	10	12	14	15
Lithuania	-	-	-	9	11	15	21	22	7	7	12	12	12	14	17	20
Luxembourg	22	44	44	48	49	51	51	52	47	50	50	49	46	49	46	49
Malta	-	-	-	4	7	6	6	5	6	4	6	6	6	6	7	7
Netherlands	526	507	487	479	452	478	494	493	396	480	554	500	416	384	438	378
Poland	-	-	-	297	230	223	264	305	221	219	275	274	288	304	354	417
Portugal		232	194	202	208	199	204	215	159	223	154	96	105	142	179	207
Romania	-	-	-	-	-	-	313	286	115	94	82	66	57	70	81	95
Slovakia	-	-	-	-	45	65	65	57	70	65	69	70	66	74	78	89
Slovenia	-	-	-	37	64	62	69	72	60	60	55	50	51	54	53	53
Spain	400	969	1 319	1 606	1 640	1 622	1 606	1 165	964	976	810	704	732	895	1 076	1 185
Sweden	223	249	257	260	269	278	300	248	209	277	289	263	252	297	338	364
United Kingdom	2 232	2 611	2 558	2 512	2 386	2 295	2 390	2 112	1 968	2 026	1 937	2 036	2 254	2 467	2 623	2 687

Table A1.2 Average mass of new passenger cars by Member State (kg)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Austria	1 314	1 335	1 426	1 432	1 435	1 449	1 445	1 431	1 385	1 409	1 442	1 453	1 448	1 446	1 459	1 467
Belgium	1 288	1 319	1 361	1 375	1 396	1 407	1 423	1 425	1 406	1 406	1 416	1 439	1 421	1 415	1 418	1 413
Bulgaria	-	-	-	-	-	-	-	-	-	1 454	1 462	1 485	1 475	1 424	1 408	1 402
Croatia	-	-	-	-	-	-	-	-	-	-	-	-	1 309	1 307	1 326	1 336
Cyprus	-	-	-	1 205	1 277	1 316	1 354	1 372	1 367	1 388	1 377	1 370	1 367	1 391	1 395	1 408
Czech Republic	-	-	-	1 704	1 242	1 247	1 261	1 275	1 335	1 380	1 368	1 368	1 370	1 364	1 374	1 352
Denmark	-	1 306	1 325	1 327	1 324	1 328	1 370	1 320	1 313	1 335	1 312	1 248	1 227	1 216	1 227	1 261
Estonia	-	-	-	1 349	1 408	1 433	1 465	1 456	1 471	1 473	1 502	1 514	1 508	1 474	1 456	1 463
Finland	1 752	1 759	1 336	1 355	1 381	1 401	1 437	1 442	1 447	1 426	1 452	1 455	1 445	1 440	1 421	1 422
France	1 254	1 280	1 305	1 327	1 341	1 349	1 375	1 387	1 326	1 326	1 343	1 385	1 350	1 310	1 315	1 322
Germany	1 332	1 352	1 381	1 408	1 412	1 424	1 433	1 425	1 347	1 433	1 460	1 466	1 448	1 443	1 447	1 453
Greece	1 172	1 223	1 262	1 277	1 287	1 304	1 314	1 311	1 423	1 252	1 231	1 242	1 243	1 240	1 250	1 250
Hungary	-	-	-	1 182	1 203	1 237	1 264	1 288	1 330	1 370	1 396	1 390	1 401	1 398	1 394	1 369
Ireland	1 248	1 276	1 265	1 314	1 341	1 372	1 441	1 440	1 440	1 380	1 378	1 420	1 397	1 410	1 393	1 385
Italy	1 604	1 632	1 649	1 259	1 277	1 294	1 287	1 285	1 255	1 269	1 306	1 311	1 314	1 307	1 305	1 307
Latvia	-	-	-	1 452	1 445	1 468	1 502	1 498	1 535	1 522	1 543	1 563	1 552	1 519	1 491	1 438
Lithuania	-	-	-	1 433	1 448	1 483	1 481	1 467	1 486	1 481	1 498	1 497	1 486	1 435	1 423	1 412
Luxembourg	1 834	1 851	1 442	1 471	1 487	1 504	1 498	1 490	1 462	1 473	1 519	1 528	1 505	1 488	1 495	1 497
Malta	-	-	-	-	-	-	-	1 317	1 182	1 200	1 216	1 465	1 212	1 199	1 206	1 216
Netherlands	1 260	1 264	1 301	1 314	1 337	1 332	1 350	1 324	1 295	1 254	1 249	1 266	1 288	1 285	1 323	1 300
Poland	-	-	-	1 181	1 242	1 271	1 304	1 260	1 261	1 317	1 378	1 383	1 376	1 356	1 383	1 393
Portugal	-	1 229	1 254	1 295	1 329	1 352	1 365	1 352	1 344	1 333	1 354	1 361	1 350	1 345	1 343	1 339
Romania	-	-	-	-	-	-	1 268	1 286	1 291	1 281	1 325	1 381	1 365	1 347	1 333	1 341
Slovakia	-	-	-	-	1 174	-	-	-	-	1 386	1 418	1 421	1 410	1 410	1 420	1 426
Slovenia	-	-	-	1 246	1 305	1 316	1 340	1 350	1 346	1 332	1 355	1 358	1 344	1 333	1 335	1 361
Spain	1 266	1 725	1 317	1 335	1 374	1 395	1 416	1 400	1 394	1 399	1 413	1 410	1 396	1 355	1 357	1 363
Sweden	1 448	1 454	1 472	1 467	1 470	1 488	1 503	1 488	1 490	1 497	1 510	1 522	1 520	1 513	1 526	1 515
United Kingdom	1 347	1 356	1 392	1 387	1 374	1 390	1 394	1 380	1 358	1 384	1 410	1 398	1 394	1 381	1 393	1 411

Table A1.3 Average CO_2 emissions from new passenger cars by Member State (g CO_2/km)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Austria	165.6	164.4	163.8	161.9	162.1	163.7	162.9	158.1	150.2	144.0	138.7	135.7	131.6	128.5	123.7	120.4
Belgium	163.7	161.1	158.1	156.5	155.2	153.9	152.8	147.8	142.1	133.4	127.2	128.0	124.0	121.3	117.9	115.9
Bulgaria	-	-	-	-	-	-	171.6	171.5	172.1	158.9	151.4	149.2	141.7	135.9	130.3	125.8
Croatia	-	-	-	-	-	-	-	-	-	-	-	-	127.1	115.8	112.8	111.5
Cyprus	-	-	-	173.4	173.0	170.1	170.3	165.6	160.7	155.8	149.9	144.3	139.2	129.8	125.7	123.5
Czech Republic	-	-	-	154.0	155.3	154.2	154.2	154.4	155.5	148.9	144.5	140.8	134.6	131.6	126.3	121.2
Denmark	172.9	170.0	169.0	165.9	163.7	162.5	159.8	146.4	139.1	126.6	125.0	117.0	112.7	110.2	106.2	106.0
Estonia	-	-	-	179.0	183.7	182.7	181.6	177.4	170.3	162.0	156.9	150.3	147.0	140.9	137.2	133.9
Finland	178.1	177.2	178.3	179.8	179.5	179.2	177.3	162.9	157.0	149.0	144.0	139.1	131.8	127.4	123.0	120.0
France	159.8	156.8	155.0	153.1	152.3	149.9	149.4	140.1	133.5	130.5	127.7	124.4	117.4	114.2	111.0	109.8
Germany	179.5	177.4	175.9	174.9	173.4	172.5	169.5	164.8	154.0	151.1	145.6	141.6	136.1	132.5	128.3	126.9
Greece	166.5	167.8	168.9	168.8	167.4	166.5	165.3	160.8	157.4	143.7	132.7	121.1	111.9	108.2	106.4	106.3
Hungary	-	-	-	158.5	156.3	154.6	155.0	153.4	153.4	147.4	141.6	140.8	134.4	133.0	129.6	125.9
Ireland	166.6	164.3	166.7	167.6	166.8	166.3	161.6	156.8	144.4	133.2	128.3	125.1	120.7	117.1	114.1	112.0
Italy	158.3	156.6	152.9	150.0	149.5	149.2	146.5	144.7	136.3	132.7	129.6	126.2	121.1	118.1	115.2	113.3
Latvia	-	-	-	192.4	187.2	183.1	183.5	180.6	176.9	162.0	154.4	152.0	147.1	140.4	137.1	128.9
Lithuania	-	-	-	187.5	186.3	163.4	176.5	170.1	166.0	150.9	144.4	144.2	139.8	135.8	130.0	126.2
Luxembourg	177.0	173.8	173.5	169.7	168.6	168.2	165.8	159.5	152.5	146.0	142.2	137.0	133.4	129.9	127.5	126.1
Malta	-	-	-	148.8	150.5	145.9	147.8	146.9	135.7	131.2	124.7	121.5	118.7	115.3	113.3	111.8
Netherlands	174.0	172.4	173.5	171.0	169.9	166.7	164.8	156.7	146.9	135.8	126.1	118.6	109.1	107.3	101.2	105.9
Poland	-	-	-	154.1	155.2	155.9	153.7	153.1	151.6	146.2	144.5	141.3	138.1	132.9	129.3	125.8
Portugal	-	154.0	149.9	147.1	144.9	145.0	144.2	138.2	133.8	127.2	122.8	117.6	112.2	108.8	105.7	104.7
Romania	-	-	-	-	-	-	154.8	156.0	157.0	148.5	140.7	139.0	132.1	128.2	125.0	122.0
Slovakia	-	-	-	-	157.4	152.0	152.7	150.4	146.6	149.0	144.9	141.0	135.1	131.7	127.6	124.8
Slovenia	-	-	-	152.7	157.2	155.3	156.3	155.9	152.0	144.4	139.7	133.4	125.6	121.3	119.2	119.0
Spain	156.8	156.4	157.0	155.3	155.3	155.6	153.2	148.2	142.2	137.9	133.8	128.7	122.4	118.6	115.3	114.4
Sweden	200.2	198.2	198.5	197.2	193.8	188.6	181.4	173.9	164.5	151.3	141.8	135.9	133.2	131.0	126.3	123.1
United Kingdom	177.9	174.8	172.7	171.4	169.7	167.7	164.7	158.2	149.7	144.2	138.0	132.9	128.3	124.6	121.3	120.1

Table A1.4 New vans by Member State: registrations, mass and average emissions (g CO_2/km)

	Registrations					Mass					Average emissions				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Austria	26	27	30	31	34	1 856	1 860	1 900	1 905	1 928	186.6	185.8	183.6	178.3	171.6
Belgium	53	51	52	59	65	1 842	1 861	1 883	1 875	1 861	185.8	182.8	179.4	175.8	169.2
Bulgaria	8	7	8	9	9	1 578	1 592	1 545	1 526	1 553	160.8	156.3	149.2	144.0	141.1
Croatia			4	6	7			1 668	1 646	1 708			158.8	154.3	150.1
Cyprus	1	1	1	1	2	1 605	1 734	1 674	1 661	1 665	151.5	170.6	158.1	143.2	144.1
Czech Republic	10	10	12	13	11	1 827	1 835	1 942	1 890	1 959	196.0	189.1	191.2	183.0	183.2
Denmark	11	17	25	29	34	1 854	1 793	1 736	1 731	1 777	178.1	166.8	155.0	151.1	151.7
Estonia	2	3	3	4	4	1 821	1 831	1 831	1 724	1 741	184.4	182.0	178.1	165.1	161.9
Finland	10	10	10	10	12	1 922	1 910	1 936	1 952	1 917	193.5	182.0	179.7	174.7	167.0
France	227	300	348	309	283	1 804	1 601	1 625	1 674	1 761	170.2	152.8	151.6	154.7	158.9
Germany	195	199	212	224	245	2 034	1 911	1 913	1 908	1 946	195.5	192.9	190.1	186.3	178.7
Greece	2	3	5	5	6	1 634	1 624	1 598	1 602	1 690	170.3	161.3	157.0	156.0	155.2
Hungary	8	10	15	15	19	1 828	1 845	1 843	1 884	1 850	184.0	181.9	177.7	177.0	168.0
Ireland	6	10	16	22	26	1 762	1 785	1 778	1 820	1 799	175.6	177.2	168.7	169.3	163.5
Italy	106	92	107	117	167	1 713	1 707	1 674	1 626	1 631	168.2	163.5	157.0	153.2	145.0
Latvia	2	2	2	2	2	1 770	1 750	1 728	1 747	1 728	176.9	171.6	167.4	165.3	156.6
Lithuania	1	2	2	2	3	1 891	1 856	1 830	1 814	1 896	190.8	180.3	176.3	169.2	168.8
Luxembourg	3	3	3	3	4	1 902	1 857	1 845	1 817	1 830	188.3	179.2	178.8	172.8	167.8
Malta	0	0	0	1	1	1 507	1 518	1 520	1 602	1 598	147.5	150.5	145.4	153.6	146.9
Netherlands	47	49	46	49	63	1 777	1 774	1 778	1 785	1 763	177.5	173.4	167.4	163.3	155.5
Poland	30	34	61	47	47	1 778	1 796	1 779	1 834	1 872	179.6	176.4	168.5	177.2	171.3
Portugal	13	17	24	27	29	1 579	1 583	1 581	1 570	1 615	154.2	150.9	144.8	141.7	140.1
Romania	8	6	8	9	10	1 806	1 766	1 781	1 791	1 832	183.1	171.8	171.9	170.3	170.1
Slovakia	5	5	5	7	7	1 986	1 995	2 026	2 006	2 045	200.8	196.3	193.2	186.8	185.6
Slovenia	5	6	5	6	7	1 860	1 849	1 877	1 853	1 873	191.2	188.0	185.1	174.9	168.2
Spain	65	70	90	76	113	1 764	1 734	1 672	1 659	1 680	167.4	162.9	156.1	154.6	148.0
Sweden	21	20	26	28	30	1 724	1 760	1 811	1 775	1 763	165.8	167.1	170.4	163.0	155.2
United Kingdom	232	262	307	351	350	1 815	1 827	1 838	1 848	1 879	186.3	185.2	181.0	177.9	172.9

Annex 2

Table A2.1 Data used in calculating the CO_2 emission performance of car manufacturers in 2016

Manufacturer	Pools and derogations	Number of registrations	Average CO_2 (75 %) corrected	Specific emission target	Distance to target
Adidor Voitures SAS	DMD	16	179		
Alfa Romeo SPA	P3	63 120	115.042	128.478	– 13.436
Alpina Burkard Bovensiepen GmbH E CO KG	DMD	773	172.604		
Anhui Jianghuai Automobile	DMD	52	232.692		
Aston Martin Lagonda LTD	D	1 367	308.661	309	– 0.339
Audi AG	P14	783 896	124.968	138.723	– 13.755
Audi Hungaria Motor KFT	P14	9 950	144.517	130	14.517
Automobiles Citröen		614 686	103.312	122.81	– 19.498
Automobiles Peugeot		889 051	101.748	123.348	– 21.6
Avtovaz JSC	P10	2 676	180.06	120.367	59.693
Bentley Motors LTD	D	3 260	285.502	294	– 8.498
Bluecar SAS		1 466	0	128.873	– 128.873
Bluecar Italy SRL		8	0	133.089	– 133.089
Bayerische Motoren Werke AG	P1	973 555	121.947	138.104	– 16.157
BMW M GMBH	P1	15 780	175.968	144.25	31.718
Bugatti Automobiles SAS	P14	7	568.143	157.376	410.767
BYD Auto Industry Company Limited	DMD	32	0		
Caterham Cars Limited	DMD	130	150.438		
Chevrolet Italia SPA	P5	1	116	120.293	– 4.293
FCA US LLC	P3	104 390	146.673	142.421	4.252
CNG–Technik GmbH	P4	567	162.695	137.799	24.896
Automobile Dacia SA	P10	414 892	117.432	121.203	– 3.771
Daimler AG	P2	910 189	124.543	138.64	– 14.097
Donkervoort Automobielen BV	DMD	5	178		
DR Motor Company SRL	DMD	490	147.808		
Ferrari SPA	D	2482	281.007	290	– 8.993
FCA Italy SPA	P3	768 863	115.961	119.443	– 3.482
Ford India Private Limited	P4	7 363	113.646	114.583	– 0.937
Ford Motor Company of Australia Limited	P4	1	206	173.762	32.238
Ford Motor Company	P4	16 184	216.871	149.108	67.763
Ford-Werke GmbH	P4	1 010 774	118.435	128.663	– 10.228
Fuji Heavy Industries LTD	ND	30 249	158.756	164.616	– 5.86
General Motors Company	P5	1 138	265.656	151.235	114.421
General Motors Holdings LLC	P5	642	267.399	152.108	115.291

Table A2.1 Data used in calculating the CO_2 emission performance of car manufacturers in 2016 (cont.)

Manufacturer	Pools and derogations	Number of registrations	Average CO_2 (75 %) corrected	Specific emission target	Distance to target
GM Korea Company	P5	378	121.569	124.182	– 2.613
Great Wall Motor Company Limited	DMD	167	184.964		
Honda Automobile China CO LTD	P6	5	128.8	118.657	10.143
Honda Motor CO LTD	P6	66 732	116.989	123.4	– 6.411
Honda Turkiye AS	P6	1 081	154.871	125.445	29.426
Honda of the UK Manufacturing LTD	P6	83 283	134.565	135.144	– 0.579
Hyundai Motor Company	P7	78 881	131.212	135.58	– 4.368
Hyundai Assan Otomotiv Sanayi VE Ticaret AS	P7	164 974	112.035	115.761	– 3.726
Hyundai Motor Manufacturing Czech SRO	P7	245 611	130.815	133.97	– 3.155
Hyundai Motor Europe GmgH	P7	840	109.012	116.796	– 7.784
Hyundai Motor India Ltd	P7	15	114.533	118.194	– 3.661
Isuzu Motors Ltd	DMD	9	198.556		
Jaguar Land Rover Limited	P12/ND	225 192	149.841	178.025	– 28.184
Kia Motors Corporation	P8	250 700	119.687	127.681	– 7.994
Kia Motors Slovakia SRO	P8	171 005	132.348	132.789	– 0.441
Koenigsegg Automotive AB	DMD	4	377.75		
KTM-Sportmotorcycle AG	DMD	30	189.967		
Lada Automobiel GmbH	DMD	889	215.847		
Automobili Lamborghini SPA	D	856	315.729	318	– 2.271
Litex Motors AD	DMD	51	181.902		
Lotus Cars Limited	DMD	784	207.352		
Magyar Suzuki Corporation Ltd	P11/ND	137 789	120.61	123.114	– 2.504
Mahindra & Mahindra Ltd	DMD	396	172.326		
Maruti Suzuki India Ltd	P11/ND	14 234	100.181	123.114	– 22.933
Maserati SPA	D	7 111	197.005	245	– 47.995
Mazda Motor Corporation	ND	219 859	126.74	129.426	– 2.686
McLaren Automotive Limited	D	739	262.188	275	– 12.812
Mercedes– AMG GmbH	P2	2 194	220.39	141.17	79.22
MG Motor UK Limited	D	4 159	126.445	146	– 19.555
Mitsubishi Motors Corporation MMC	P9	78 199	125.408	140.027	– 14.619
Mitsubishi Motors Thailand Co Ltd MMTH	P9	26 176	96.226	108.56	– 12.334
Morgan Technologies Ltd	DMD	473	187.977		
National Electric Vehicle Sweden	DMD	1	161		
Nissan International SA		550 090	116.666	129.402	– 12.736
Noble Automotive Ltd	DMD	2	333		
Adam Opel AG	P5	968 401	122.854	127.667	– 4.813
Pagani Automobili SPA	DMD	1	343		
PGO Automobiles	DMD	26	172.423		
DR Ing HCF Porsche AG	P14	67 643	185.019	152.535	32.484
Quattro GmbH	P14	9 275	214.612	147.126	67.486
Radical Motorsport Ltd	DMD	5	319.8		
Renault SAS	P10	1 128 508	105.185	125.246	– 20.061
Renault Trucks	DMD	49	172.184		

Table A2.1 Data used in calculating the CO_2 emission performance of car manufacturers in 2016 (cont.)

Manufacturer	Pools and derogations	Number of registrations	Average CO_2 (75 %) corrected	Specific emission target	Distance to target
Rolls-Royce Motor Cars Ltd	P1	756	334.075	183.226	150.849
Seat SA	P14	340 155	115.849	123.936	– 8.087
Secma SAS	DMD	39	132.846		
Shanghai Maple Automobile Co Ltd	DMD	1	256		
Skoda Auto AS	P14	627 533	111.894	124.918	– 13.024
Ssangyong Motor Company	D	18 228	153.254	167.573	– 14.319
Suzuki Motor Corporation	P11/ND	14 893	156.047	123.114	32.933
Suzuki Motor Thailand Co Ltd	P11/ND	26 427	96.76	123.114	– 26.354
Taiqi Electric Vehicle Co. Limited	DMD	1	0		
Tata Motors Limited	P12/ND	5	149.80	178.025	- 28 225
Tazzari GL SPA	DMD	2	0		
Tesla Motors		10 826	0	169 018	- 169.020
Toyota Motor Europe NV SA		616 164	105 447	126 835	- 21 388
Volkswagen AG	P14	1 651 339	118 551	130 216	- 11 665
Volvo Car Corporation		270 854	121 166	145.620	- 24 454

Notes: The number of registrations represents the number of vehicles having both a mass and an emission value. The parameters used in calculating manufacturer performance for 2016 are set out in Table 2.1.

The Commission implementing decision confirming the 2016 CO_2 emissions assigns some manufacturers an uncertainty adjustment for 2016 data, which modifies the distance to their targets. Here the uncertainty is not reported. A detailed description of the uncertainty calculation is presented with the Commission implementing decision.

'D' indicates that a derogation for small-volume manufacturers has been granted in accordance with the Commission implementing decision.

'DMD' means that a *de minimis* derogation applies, i.e. a manufacturer which together with all its connected undertakings was responsible for fewer than 1 000 new registered vehicles in 2016. According to the Regulation (EU) No 333/2014, they do not have to meet a specific emission target. However the targets are reported in the above table for information purposes only.

'ND' indicates that a derogation for niche manufacturers has been granted in accordance with the Commission implementing decision.

'P' indicates that the manufacturer is member of a pool in accordance with Article 7 of Regulation (EC) No 443/2009.

Table A2.2 Data used in calculating the CO_2 emission performance of light commercial vehicle manufacturers in 2015

Manufacturer	Pools and derogations	Number of registrations	Average CO_2 (75 %) corrected	Specific emission target	Disatnce to target
Alfa Romeo SPA		9	111.833	147.482	– 35.649
Audi AG	P8	940	128.279	177.884	– 49.605
Automobiles Citröen		145 739	133.123	164.595	– 31.472
Automobiles Peugeot		147 199	133.424	165.947	– 32.523
Avtovaz JSC	P7	23	209.471	136.757	72.714
Bluecar SAS		236	0	137.697	– 137.697
Bayerische Motoren Werke AG		537	125.376	173.786	– 48.41
BMW M GmbH		348	133.253	185.755	– 52.502
FCA US LLC	P2	943	197.222	207.485	– 10.263
CNG-Technik GmbH	P3	659	118.526	155.176	– 36.65
Comarth Engineering SL		3	0	92.509	– 92.509
Automobile Dacia SA	P7	23 348	120.846	135.495	– 14.649
Daimler AG	P1	132 571	177.569	211.675	– 34.106
DFSK Motor Co Ltd	DMD	287	162.572	123.335	39.237
Esagono Energia SRL		14	0	133.987	– 133.987
FCA Italy SPA	P2	130 731	145.481	173.839	– 28.358
Ford Motor Company of Australia Limited	P3	23 786	224.791	221.618	3.173
Ford Motor Company	P3	48	186.639	215.917	– 29.278
Ford-Werke GmbH	P3	199 794	157.473	191.136	– 33.663
Fuji Heavy Industries Ltd		62	152.783	169.848	– 17.065
Mitsubishi Fuso Truck & Bus Corporation	P1	500	235.821	265.154	– 29.333
Mitsubishi Fuso Truck Europe SA	P1	3	235	276.432	– 41.432
LLC Automobile Plant Gaz	DMD	13	285	222.623	62.377
General Motors Company	P4	10	280	256.933	23.067
Gonow Auto Co Ltd	D	65	157.333	175	– 17.667
Great Wall Motor Company Limited	DMD	217	197.179	188.552	8.627
Honda Motor Co Ltd		4	145.333	161.376	– 16.043
Honda of the UK Manufacturing Ltd		97	120.722	166.185	– 45.463
Hyundai Motor Company		1 375	189.669	211.403	– 21.734
Hyundai Assan Otomotiv Sanayi ve Ticaret AS		118	109.693	111.275	– 1.582
Hyundai Motor Manufacturing Czech SRO		232	119.494	160.712	– 41.218
Isuzu Motors Limited		12 765	194.373	209.025	– 14.652
Iveco SPA		31 685	211.664	229.635	– 17.971
Jaguar Land Rover Limited	D	18 460	258.906	276.93	– 18.024
Kia Motors Corporation	P5	460	110.509	141.711	– 31.202
Kia Motors Slovakia SRO	P5	327	117.331	151.588	– 34.257
Lada Automobile GmbH	DMD	55	216	130.96	85.04
Magyar Suzuki Corporation Ltd		72	116.37	133.814	– 17.444
Mahindra & Mahindra Ltd	DMD	215	204.311	203.862	0.449
Mazda Motor Corporation	DMD	323	149.533	183.53	– 33.997
MFTBC	P1	33	236	264.418	– 28.418
Mitsubishi Motors Corporation MMC	P6	940	162.221	210	– 47.779
Mitsubishi Motors Thailand Co Ltd MMTH	P6	15 226	189.604	210	– 20.396
Nissan International SA		38 535	127.71	187.288	– 59.578

Table A2.2 Data used in calculating the CO_2 emission performance of light commercial vehicle manufacturers in 2015 (cont.)

Manufacturer	Pools and derogations	Number of registrations	Average CO_2 (75 %) corrected	Specific emission target	Disatnce to target
Adam Opel AG	P4	91 895	149.226	178.934	– 29.708
Piaggio & C SPA	D	2621	117.812	155	– 37.188
Dr Ing HCF Porsche AG	P8	115	181.209	215.896	– 34.687
Quattro GmbH	P8	5	223	204.667	18.333
Renault SAS	P7	214 368	121.899	171.206	– 49.307
Renault Trucks		7 334	198.444	226.246	– 27.802
Saic Motor Commercial Vehicle Co Ltd	DMD	63	250	219.259	30.741
Seat SA	P8	1 264	99.069	126.76	– 27.691
Skoda Auto AS	P8	5 458	110.886	133.291	– 22.405
Ssangyong Motor Company	D	711	196.533	210	– 13.467
Streetscooter GmbH		237	0	147.216	– 147.216
Suzuki Motor Corporation	DMD	337	136.849	128.108	8.741
Tata Motors Limited		53	196	202.176	– 6.176
Toyota Motor Europe NV SA		32 764	178.014	193.955	– 15.941
Toyota Caetano Portugal SA	DMD	42	245.839	190.267	55.572
Volkswagen AG	P8	168 339	167.921	188.905	– 20.984
Volvo Car Corporation		751	116.297	169.633	– 53.336

Notes: The number of registrations represents the number of vehicles having both a mass and an emission value. The parameters used in calculating manufacturer performance for 2015 are set out in Table 2.1.

The Commission implementing decision confirming the 2015 CO_2 emissions assigns some manufacturers an uncertainty adjustment for 2015 data, which modifies the distance to their targets. Here the uncertainty is not reported. A detailed description of the uncertainty calculation is presented with the Commission implementing decision.

'D' indicates that a derogation for small-volume manufacturers has been granted in accordance with the Commission implementing decision.

'DMD' means that a *de minimis* derogation applies, i.e. a manufacturer which together with all its connected undertakings was responsible for fewer than 1 000 new registered vehicles in 2015. According to the Regulation (EU) No 253/2014, they do not have to meet a specific emission target. However the targets are reported in the above table for information purposes only.

'ND' indicates that a derogation for niche manufacturers has been granted in accordance with the Commission implementing decision.

'P' indicates that the manufacturer is member of a pool in accordance with Article 7 of Regulation (EC) No 510/2011.

European Environment Agency

Monitoring CO_2 emissions from passenger cars and vans in 2016

2017 — 58 pp. — 21 x 29.7 cm

ISBN 978-92-9213-925-4
doi: 10.2800/987976

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TH-AL-17-019-EN-N
doi:10.2800/987976

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