

Monitoring CO₂ emissions from new passenger cars and vans in 2015

ISSN 1977-8449



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Luxembourg: Publications Office of the European Union, 2016

ISBN 978-92-9213-822-6
ISSN 1977-8449
doi:10.2800/85593

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Contents

| | |
|---|-----------|
| Abbreviations | 4 |
| Acknowledgements | 5 |
| Executive summary | 6 |
| 1 Introduction | 8 |
| 2 Overview of the monitoring system for passenger cars and vans | 9 |
| 2.1 Data quality | 9 |
| 2.2 Calculation of average specific emissions of CO ₂ | 10 |
| 3 Passenger cars | 18 |
| 3.1 Number of new registrations..... | 18 |
| 3.2 Average CO ₂ emissions from new passenger cars..... | 18 |
| 3.3 Vehicle technologies | 22 |
| 3.4 Other car characteristics: mass and engine capacity | 24 |
| 3.5 Average specific CO ₂ emissions per manufacturer in 2015 | 25 |
| 3.6 Distance to the 2015 target..... | 30 |
| 3.7 Effect of super-credits | 35 |
| 3.8 Distance to the 2021 targets..... | 36 |
| 3.9 Excess emission premiums | 37 |
| 4 Light commercial vehicles (vans) | 39 |
| 4.1 Number of new registrations | 39 |
| 4.2 EU statistics | 39 |
| 4.3 Member States comparison..... | 41 |
| 4.4 Average specific CO ₂ emissions per manufacturer in 2015 | 41 |
| 4.5 Distance to the 2015 target..... | 44 |
| 4.6 Distance to the 2017 targets..... | 45 |
| 4.7 Excess emission premiums | 48 |
| 5 Explanatory factors behind reducing emissions | 49 |
| 5.1 Methodology..... | 49 |
| 5.2 Results and discussion..... | 52 |
| References | 57 |
| Annex 1 | 58 |
| Annex 2 | 62 |

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 |
| TCMV | Technical Committee — Motor Vehicles |
| 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 in the field of air pollution and climate change mitigation. The ETC/ACM partner involved in the preparation of the chapter 5 of this report was EMISIA.

The authors were Cinzia Pastorello (EEA) and, for Chapter 5, Giorgos Mellios from the ETC/ACM. Diana Vedlugaite (EEA) is thanked for her assistance in the 2016 data compilation process, 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 CO₂ performance for each manufacturer and pool is confirmed by Commission Decision.

It is important to mention as well that, for both passenger cars and vans, the reported CO₂ 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 CO₂ emission levels of new passenger cars and vans in the European Union in 2015. The report is based on the data collected by the European Environment Agency (EEA) concerning the CO₂ 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 the average CO₂ emissions for new passenger cars at 130 g CO₂/km by 2015 while the regulation for light commercial vehicles sets the average CO₂ emissions for new light commercial vehicles at 175 g CO₂/km by 2017. Stricter targets will apply under these regulations from 2020 (vans) and 2021 (cars). 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 has been calculated 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 by Member States, as well as the progress of the manufacturers towards their targets. The EEA has collected and quality-checked data on CO₂ 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 2015 CO₂ emission targets.

The main findings are:

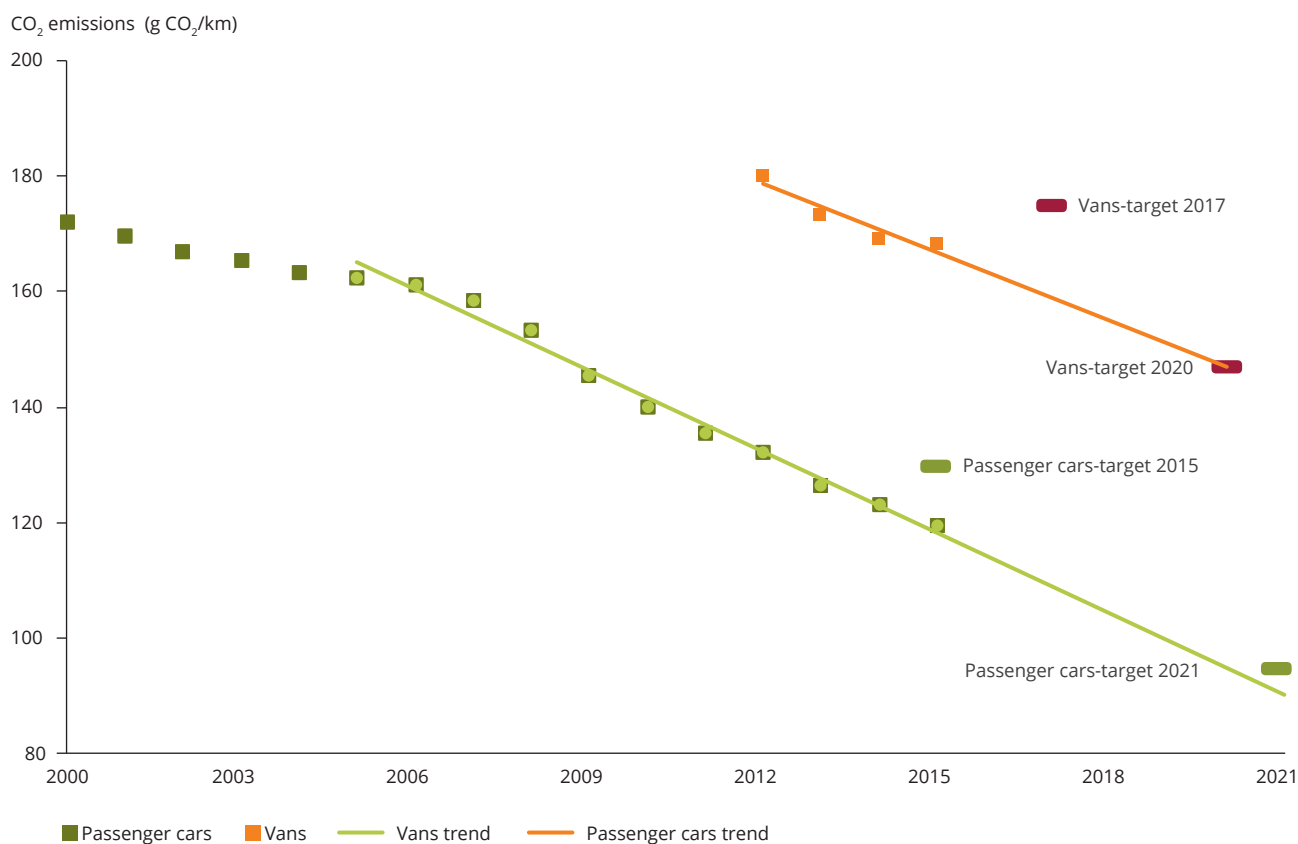
- New cars sold in the EU in 2015 had CO₂ average emissions ⁽³⁾ of 119.5 g CO₂/km, which was 8.0 % below the 2015 target, and 3.1 % lower than in 2014.
- The average emissions of new light commercial vehicles in 2015 were 168.3 g CO₂/km, below the 2017 target of 175 g CO₂/km and a reduction of 0.4 % compared with 2014.
- Average CO₂ emissions from new cars decreased by 27 % in the last 10 years, while the emissions of new vans decreased by more than 6.5 % in the last 4 years. In order to meet their EU 2020/21 targets, the average CO₂ 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 2015 by each of the Member States) and final average specific emission data (the emission data considering error notifications by manufacturers) was insignificant (< 0.1 g CO₂/km).
- As in 2014, conventional diesel and petrol cars accounted for the large majority of the fleet (97.2 % of new registrations), and diesel cars constituted the majority of the new registrations (51.8 %). The proportion of plug-in hybrid and battery electric vehicles increased from 0.8 % in 2014 to more than 1 % in 2015. Other alternative fuel vehicles such as liquefied petroleum gas (LPG) and compressed natural gas (NG-biomethane) vehicles covered the remaining registrations (1.6 %).
- As in 2014, the average diesel vehicle was more than 300 kg heavier than the average petrol vehicle.
- Diesel vehicles emitted on average 119.2 g CO₂/km, which is 3.3 g CO₂/km less than the average petrol vehicle, whereas in 2000 the emission difference between diesel and petrol vehicles was much larger (17.1 g CO₂/km).

⁽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⁾ CO₂ average emissions are calculated as simple averages, without taking into account any adjustments.

Figure ES.1 Average CO₂ emissions historical development and targets for new passenger cars and vans in the EU-28



- Significantly more efficient models were bought in the pre-2004 EU Member States than in the newer EU Member States. On average, the most efficient cars were bought in the Netherlands (101 g CO₂/km), Portugal, Denmark and Greece (106 g CO₂/km for the three Member States). For new vans, average emission levels were lowest among those sold in Portugal (142 g CO₂/km) and Cyprus (143 g CO₂/km).
- The majority of car and van manufacturers met their CO₂ specific emission⁽⁴⁾ targets in 2015, and some are well on their way to reaching the 2020/2021 target. While certain manufacturers would have exceeded their specific emission target, they met the specific emission target as part of pools or because of derogations. Two manufacturers, Aston Martin Lagonda and Ferrari,

exceeded their specific emission targets and therefore are required to pay excess emission premiums.

The downward trend in CO₂ emissions of new cars registered in the EU has been the result of the combined effect of technical and non-technical measures. On the technical side, fuel efficiency of new car models is steadily improving as a result of a number of relevant technologies, such as direct fuel injection, variable valve timing and lift, cylinder deactivation, turbocharging and start-stop systems. On the non-technical side, several policies and measures have been adopted by an increasing number of Member State to further reduce emissions at the vehicle fleet level. The effects of the different measures on the CO₂ emissions from new vehicles are analysed and discussed for a few Member States.

⁽⁴⁾ CO₂ specific emissions is, in relation to a manufacturer, the average of the specific emissions of CO₂ 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 CO₂ emissions in the road transport sector, the European Parliament and the Council adopted two regulations: Regulation (EC) No 443/2009, which introduced mandatory CO₂ emission performance standards for new passenger cars, and Regulation (EU) No 510/2011, which introduced mandatory CO₂ emission performance standards for new vans.

For new passenger cars, the regulation sets the average CO₂ specific emissions at 130 g CO₂/km by 2015, defined as the average value for the fleet of newly registered passenger cars in the EU. A target of 95 g CO₂/km has been set for 2021 (phase-in from 2020). The modalities for compliance with those targets are presented in the following chapter.

For new light commercial vehicles, Regulation (EU) No 510/2011 sets the average CO₂ emissions at 175 g CO₂/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 CO₂/km has been set for 2020.

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

The progress of manufacturers in meeting these targets is evaluated on an annual basis by calculating the following three parameters:

- CO₂ average specific emissions;
- the specific CO₂ emission target for that year;
- the difference between the average specific emissions and the specific emission target.

For both cars and vans, the Commission has to review the legislation and if appropriate make proposals for CO₂ emission targets for the period beyond 2020, including possibly setting a 2025 target. A public consultation on the revision of the regulations was opened on 20 July 2016 and is running until 28 October 2016.

The 2016 strategy for low-emission mobility (EU, 2016) announced speeding up analytical work on design options for standards for heavy-duty vehicles (HDVs) as well. The European Commission has launched a public consultation to collect the views of stakeholders and citizens with regard to the preparation of legislation on monitoring and reporting of HDV fuel consumption and CO₂ emissions. Furthermore, a further consultation will be launched in due time to discuss the details of options for standards.

2 Overview of the monitoring system for passenger cars and vans

Since 2010 the EEA has collected data about 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 time schedule applies for the data monitoring:

- Member States shall record information for each new passenger car and van registered in its 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.
- Only for vans, manufacturers submit the vehicle identification number for each new van sold in the EU-28 to the Commission by 28 February of each year. Data are submitted to the Business Data Repository (BDR ⁽⁶⁾), managed by the EEA.
- The EEA performs several quality checks in order to evaluate the accuracy and the quality of the data sets. On the basis of the 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 CO₂ 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 CO₂ 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 in order to evaluate the accuracy and the quality of the Member States' data. These checks cover various areas, listed in the bullet points below:

- The completeness rate. This comprises two main components. The first component concerns numerical data such as vehicle mass and emission values for each vehicle. The second component measures the extent to which more granular data — such as model type — are available for each vehicle that has been registered.
- Data plausibility and outliers ⁽⁷⁾.
- 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 manufacturer attribution.
- Data variability (for the same vehicle, an estimate of the variability of the mass, emissions and engine capacity was developed).
- Fuel type classification.
- Handling of unknown individual vehicle approvals (IVAs) and national small series (NSS) vehicles ⁽⁸⁾.

⁽⁵⁾ The CDR is like a bookshelf, with data reports on the environment as submitted by Member States (more information available at <http://cdr.eionet.europa.eu>).

⁽⁶⁾ The BDR is an electronic online reporting system specifically developed for the handling of confidential company-based information (more information available at <http://bdr.eionet.europa.eu>).

⁽⁷⁾ An outlier observation is well outside the expected range of values in a study or experiment, and is often discarded from the data set.

⁽⁸⁾ IVAs are made on vehicles imported from third countries 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.

- For vans, comparison between vehicle identification numbers (VINs)⁽⁹⁾ provided by Member States and by manufacturers. Whenever VINs are matching but data are missing in a Member State's submission, the manufacturer data⁽¹⁰⁾ will be used to complete the data set for the main parameters (emission- and mass-related entries).
- phase-in;
- super-credits;
- E85 extra credits;
- eco-innovations.

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 CO₂ emission targets. The performance is calculated as the difference between the CO₂ average 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 CO₂ emission data set. The notification must be submitted within 3 months from the notification of the provisional calculations.

As it does for Member States' data, the EEA performs several quality checks in order 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 CO₂ emission targets. The performance is calculated as the difference between the CO₂ average 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 provisional data are published on the EEA website.

2.2 Calculation of average specific emissions of CO₂

Average specific emissions of CO₂ are calculated as a weighted average of the manufacturer's fleet registered 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

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

For passenger cars:

- During the 2012–2014 period, 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 2015–2019 period, 100 % of the new cars of each manufacturer have to be taken into account.
- The 2021 specific emission targets are phased in from 2020 taking into account 95 % of the best-performing cars in that year. From 2021, 100 % of the new cars of each manufacturer will be taken into account (see also Table 2.2).

For vans:

- During the 2014–2016 period, only a certain percentage (70 % in 2014, 75 % in 2015, and 80 % in 2016) of the best-performing registered vans have to be taken into account in determining the performance of manufacturers. From 2017, 100 % of the new cars of 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 CO₂ emissions lower than 50 g CO₂/km. These vehicles are temporarily given a greater weight in calculating the average specific emissions, as they are considered to have the following equivalences:

⁽⁹⁾ 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.

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

- 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/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 2020–2022 period, the use of super-credits is subject to a cap of 7.5 g CO₂/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.

Passenger cars:

$$(1) \quad \text{Specific emissions of CO}_2 = 130 + a \times (M - M_0)$$

Vans:

$$(2) \quad \text{Specific emissions of CO}_2 = 175 + a \times (M - M_0)$$

where:

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

M_0 is the reference mass (initially 1 372.0 kg for passenger cars, 1 706.0 kg for vans);

a is 0.0457 for passenger cars and 0.093 for vans.

E85 extra credits

Additional reductions of average specific emissions are assigned for vehicles capable of running on a mixture of petrol with 85 % ethanol (E85). The last year in which the emissions of these vehicles were counted as being 5 % less than their actual emissions in recognition of their ability to reduce emissions when running on biofuels was 2015. This reduction could be applied 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. In 2015, as in the previous years, this applied only to Sweden.

This means that, for example, if the average mass of a manufacturer's car fleet in a given year is 1 372 kg, the target for that manufacturer is 130.0 g CO₂/km. If the average mass of the car fleet is 1 472 kg, the target for that manufacturer is 134.4 g CO₂/km. If the average mass of the car fleet is 1 272 kg, the target will be 125.43 g CO₂/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 as described above) are lower than the target.

Eco-innovations

Certain innovative technologies cannot demonstrate their CO₂-reducing effects under the current type-approval test procedure. In order 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 with an approved eco-innovation, the average emissions of that manufacturer may be reduced by a maximum of 7 g CO₂/km on account of emission savings from eco-innovations.

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 will be 1 392.35 kg as from 2016 (data to be reported in 2017). Since the average mass of the new fleet in the 2011–2013 period increased by almost 20 kg compared with the M_0 in formula (1), the target of a manufacturer that produces a fleet with average mass of 1 392.35 kg will become 130 g CO₂/km from 2016, while the target for that manufacturer was 130.9 g CO₂/km in 2015.

For vans, M_0 will be amended in 2016 and will be 1 766.35 kg as from 2018. Since the average mass of the new fleet in the 2013–2015 period increased by 60 kg compared with the M_0 in formula (2), the target of a manufacturer that produces a fleet with an average mass of 1 760.35 kg will become 175.0 g CO₂/km from 2018 on, while the target for that manufacturer was 180.6 g CO₂/km in 2015.

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' ⁽¹⁾ of the registered cars/vans. The following formulae apply to passenger cars (1) and vans (2) till 2020:

⁽¹⁾ 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 CO₂ emissions from new passenger cars. The 95 g CO₂/km target, set in the previous regulation, was confirmed and the following formula applies to passenger cars from 2020:

$$(3) \quad \text{Specific emissions of CO}_2 = 95 + a \times (M - M_0)$$

where:

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

*M*₀ is the reference mass (see above);

a is 0.0333.

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 CO₂ emissions from new vans. The target of 147 g CO₂/km, set in the previous regulation, was confirmed and the following formula applies from 2020:

$$(4) \quad \text{Specific emissions of CO}_2 = 147 + a \times (M - M_0)$$

where:

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

*M*₀ is the reference mass (see above);

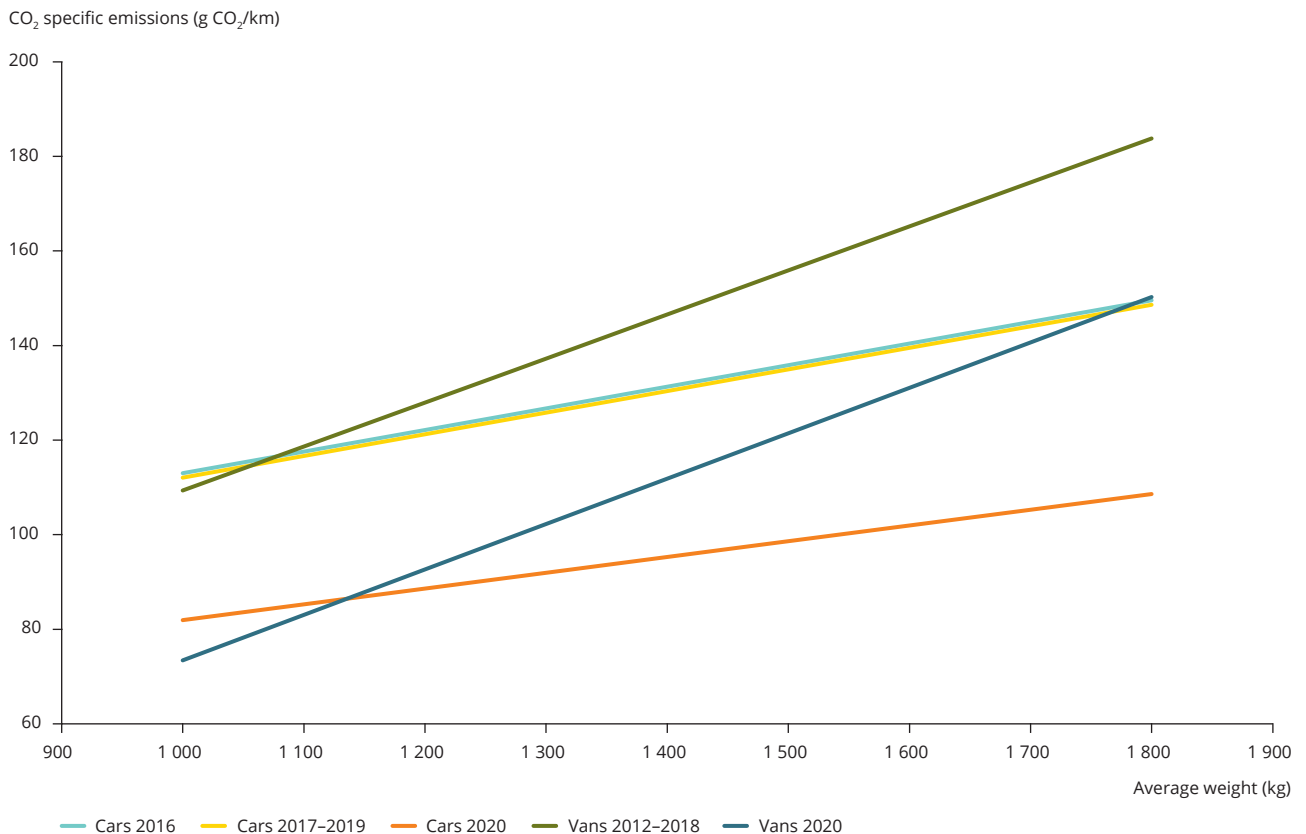
a is 0.096.

Figure 2.1 shows the four target lines: for passenger cars till 2016, for the 2017–2019 period and after 2020, and for vans till 2020.

Pools

Manufacturers may form a pool with other manufacturers in order to have a common target. In this case, the binding target will be the pool target (calculated on the basis of the whole fleet of the pool registered that year). In 2015, 13 pools for passenger cars (Table 2.3) and 8 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 CO₂ emissions can be granted. In 2015, 32 manufacturers benefited from a small-volume derogation target (Table 2.5).

Niche derogations are provided for manufacturers responsible for between 10 000 and 300 000 new vehicle 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 2012–2019 period and a 45 % reduction from the 2007 level as of 2020. In 2015, four niche derogations were granted for passenger cars (Table 2.6).

For vans, five manufacturers benefited from a derogation target (Table 2.7)

De minimis exemptions

A manufacturer which, 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 2015, 33 manufacturers, responsible for a total of around 5 500 registrations, benefited from an exemption (24 for passenger cars and 9 for vans).

Table 2.1 Summary of the modalities applying to the calculation of manufacturer performance from 2015 to 2019

| Modality | Vehicles | 2015 | 2016 | 2017 | 2018–2019 |
|--|---------------------|-------|-------|-------|-----------|
| Phase-in | Passenger cars | 100 % | 100 % | 100 % | 100 % |
| | Vans | 75 % | 80 % | 100 % | 100 % |
| Super-credit for vehicle emitting less than 50 g CO ₂ /km | Passenger cars | 1.5 | 1.0 | 1.0 | 1.0 |
| | Vans | 3.5 | 2.5 | 1.5 | 1.0 |
| Emission reduction for E85 vehicles ^(*) | Passenger cars/vans | 5 % | 0 % | 0 % | 0 % |

Note: ^(*) 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

| Modality | 2020 | 2021 | 2022 | 2023 |
|--|------|-------|-------|------|
| Phase-in | 95 % | 100 % | 100 % | 10 % |
| Super-credit for vehicle emitting less than 50 g CO ₂ /km | 2.0 | 1.67 | 1.33 | 1.0 |

Overview of the monitoring system for passenger cars and vans

Table 2.3 Manufacturers' pools in 2015 (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 |
| | Ford-Werke GmbH |
| General Motors | Chevrolet Italia SPA |
| | General Motors Company |
| | 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 |
| 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 |
| | Lada France SAS |
| | 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-Daihatsu Group | Daihatsu Motor Co Ltd |
| | Toyota Motor Europe NV SA |
| VW Group Pc | Audi AG |
| | Audi Hungaria Motor KFT |
| | Bugatti Automobiles SAS |
| | Dr Ing HCF Porsche AG |
| | Quattro GmbH |
| | Seat SA |
| | Skoda Auto AS |
| | Volkswagen AG |

Table 2.4 Manufacturers' pools in 2015 (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 |
| General Motors | Ford-Werke GmbH |
| | Chevrolet Italia SPA |
| | General Motors Company |
| | GM Korea Company |
| Kia | Adam Opel AG |
| | Kia Motors Corporation |
| Mitsubishi Motors | Kia Motors Slovakia SRO |
| | Mitsubishi Motors Corporation MMC |
| | Mitsubishi Motors Europe BV MME |
| Renault | Mitsubishi Motors Thailand Co Ltd MMTH |
| | Avtovaz JSC |
| | Automobile Dacia SA |
| | Lada France SAS |
| Volkswagen Group LCV | Renault SAS |
| | Audi AG |
| | Audi Hungaria Motor KFT |
| | Bentley Motors Ltd |
| | Bugatti Automobiles SAS |
| | Automobili Lamborghini SPA |
| | Dr Ing HCF Porsche AG |
| | Quattro GmbH |
| | Seat SA |
| | Skoda Auto AS |
| Volkswagen AG | |

Table 2.5 Manufacturers with low volume derogations granted for 2015 (passenger cars)

| Manufacturer | Specific emissions targets in g CO ₂ /km |
|--|---|
| Alpina Burkard Bovensiepen GmbH e Co KG | 225.00 |
| Artega Automobil GmbH e Co KG | 286.00 |
| Aston Martin Lagonda Ltd | 310.00 |
| Automobili Lamborghini SPA | 325.00 |
| Bentley Motors Ltd | 298.00 |
| Caterham Cars Limited | 210.00 |
| Donkervoort Automobielen BV | 178.00 |
| DR Motor Company SRL | 135.00 |
| Ferrari SPA | 295.00 |
| Great Wall Motor Company Limited | 188.00 |
| Koenigsegg Automotive AB | 275.00 |
| KTM-Sportmotorcycle AG | 190.00 |
| Litex Motors AD | 156.00 |
| Lotus Cars Limited | 280.00 |
| Mahindra & Mahindra Ltd | 162.00 |
| Marussia Motors LLC | 270.00 |
| Maserati SPA | 255.00 |
| Mclaren Automotive Limited | 275.00 |
| MG Motor UK Limited | 146.00 |
| Morgan Technologies Ltd | 170.00 |
| Noble Automotive Ltd | 360.00 |
| Pagani Automobili SPA | 340.00 |
| PGO Automobiles | 175.00 |
| Potenza Sports Cars | 205.00 |
| Perusahaan Otomobil Nasional SDN BHD | 176.00 |
| Radical Motosport Ltd | 200.00 |
| Secma SAS | 131.00 |
| Spyker Automobielen BV | 380.00 |
| Ssangyong Motor Company | 180.00 |
| Wiesmann GmbH | 274.00 |
| Zhejiang Zoyte Automobile Manufacturing Co Ltd | 162.00 |

Note: This table includes all manufacturers that benefitted from a small volume derogation target even if they did not sell any vehicles in 2015.

Table 2.6 Niche derogations granted for 2015 (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 |

Table 2.7 Manufacturers with derogations granted for 2015 (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 |

Note: This table includes all manufacturers that benefitted from a small volume derogation target even if they did not sell any vehicles in 2015.

Box 2.1 New legislative driving cycle

In June 2016, the European Commission proposed to adopt the World Harmonised Light Vehicle Test Procedure (WLTP), a globally harmonised test procedure developed within the United Nations Economic Commission for Europe (UNECE). The Technical Committee — Motor Vehicles (TCMV) has approved the draft legislative proposal, and the draft implementing act was sent to the European Parliament and the Council for regulatory scrutiny. If the current text is endorsed, the new WLTP test will be mandatory for all new vehicle types from September 2017 and for all new vehicles from September 2018. The WLTP will provide stricter test conditions and more realistic CO₂/fuel consumption values, to the benefit of consumers and regulators at both EU and national levels. As the existing EU CO₂ 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 CO₂ figures, it will be necessary to determine NEDC-based CO₂ emission figures for some time after the WLTP has been introduced. Therefore, a specific computer simulation programme called CO₂MPAS⁽¹²⁾ has been developed to calculate NEDC-based CO₂ emission figures.

⁽¹²⁾ <https://co2mpas.io>.

3 Passenger cars

3.1 Number of new registrations

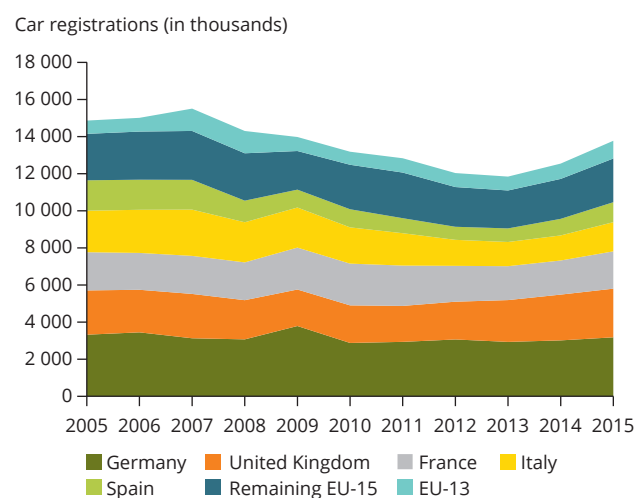
Since 2007, when 15.5 million passenger cars were registered in the EU-27 (see Figure 3.1 and Table A1.1), the number of new registrations continuously decreased till 2013 (11.9 million). In 2015, for the second year in a row, the number of new passenger car registrations again increased, reaching 13.8 million, which is 1.2 million more than in 2014. This trend seems to continue in 2016. According to ACEA statistics (ACEA, 2016), over the first half of 2016, new passenger car registrations increased by 9.4 % in the EU compared with the same period in 2015. The number of registrations increased in 26 out of the 28 Member States, with the biggest increases observed in Ireland (+ 28 %), the Czech Republic (+ 27 %) and Portugal (+ 26 %). The largest decrease was seen in Luxembourg (- 6 %).

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 2015, followed by the United Kingdom (19 %) and France (15 %). Together these countries represent almost 60 % of the EU fleet. Italy and Spain registered 11 % and 8 % respectively of the EU fleet in 2015. In these countries, the number of new car registrations has fallen by 37 % and 33 % since 2007, but vehicle sales have been sharply rising again in the last few years: in 2015 registrations in Spain and in Italy were about 20 % and 16 % above 2014 levels.

3.2 Average CO₂ emissions from new passenger cars

The final data presented here confirm the provisional data published by the EEA earlier in 2016. The average CO₂ emissions from the new passenger car fleet in

Figure 3.1 Number of vehicles registered in EU-28 between 2005 and 2015



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

the EU in 2015 were 119.5 g CO₂/km (Table 3.1), which is 3.8 g CO₂/km lower than in 2014 (3.1 %). Since the entry into force of the legislation, in 2009, the average CO₂ emissions have decreased by 26.2 g CO₂/km, i.e. by an average of 4.4 g CO₂/km per year.

The average CO₂ emissions have dropped for all engine technologies. Compared with 2014, the emissions decreased by 4.0 g and 3.1 g CO₂/km respectively for diesel and petrol vehicles. Whereas the efficiency gap between diesel and petrol fleet had remained stable for a few years, in 2015 it increased to 3.3 g/km, the same level as in 2010 (Table 3.1 and Figure 3.2).

Table 3.1 Average CO₂ emissions (g CO₂/km) from new passenger cars by fuel (EU)

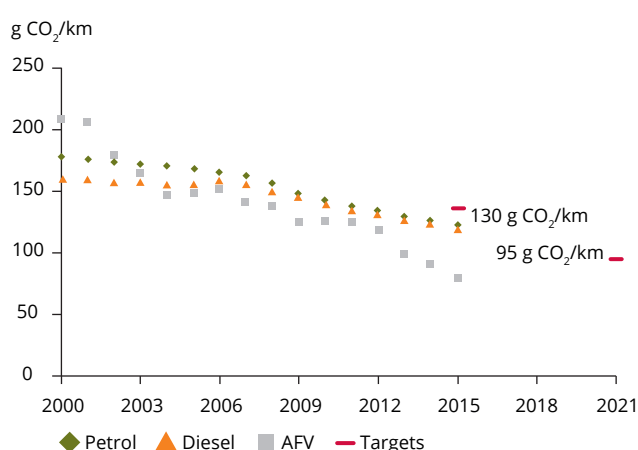
| g CO ₂ /km | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 ^(a) | 2011 ^(a) | 2012 ^(a) | 2013 ^(a) | 2014 ^(a) | 2015 ^(a) |
|-----------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| 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 |
| 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 |
| 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 |
| 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 |

Note: ^(a) The calculation for the years 2010–2014 was done without considering out of scope vehicles.

^(b) For the calculation of the average CO₂ 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 CO₂ emissions (g CO₂/km) from new passenger cars by fuel (EU)


Notes: For the calculation of the average CO₂ 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.

The distribution of emissions and mass across the fleet in five selected years (2005, 2010 and 2013–2015) are shown in Figure 3.3. The emission distribution of newly registered cars did not change significantly in the last 2 years. In this period, the largest group of cars emitted between 100 and 120 g CO₂/km (38.4 % in 2014 and 39.3 % in 2015). In 2010, the largest group emitted between 120 and 140 g CO₂/km. In 2015, more than 20 % of newly registered vehicles emitted less than 100 g CO₂/km (2.5 % more than in 2014). While there has been a big difference in terms of emission performance of vehicles between 2005 and 2014, the mass distribution has changed little in the same period.

As in 2014, the average new passenger car in the EU-15 emitted 8.2 g CO₂/km less than the average newly registered vehicle in the EU-13 (Table 3.2). In the 2007–2009 period the emissions in the EU-13 dropped by only 3.6 g CO₂/km while in the EU-15 the reduction observed was more than 13.6 g CO₂/km. The last 3 years (2012–2015) were the first years in which 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 decreased by 13.7 g CO₂/km, which is an average yearly reduction of 4.6 g CO₂/km. For the EU-15, the reduction in average CO₂ emissions over the same period was 12.7 g CO₂/km.

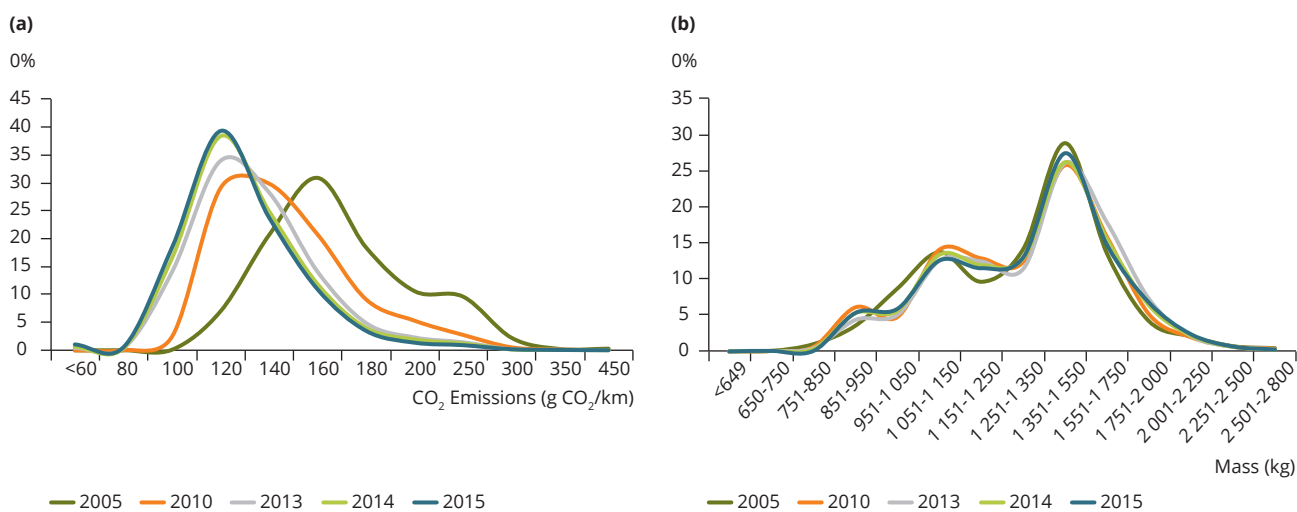
In all EU Member States, the CO₂ emissions from newly registered passenger cars fell in 2015 compared with 2014. Figure 3.4 shows the absolute and percentage reductions by Member State between 2014 and 2015.

In 24 Member States, the 2015 average CO₂ specific emissions from newly registered cars were below the EU's 130 g CO₂/km target (Figure 3.5).

On average, the highest-emitting cars were sold in Estonia and Latvia (137 g CO₂/km), followed by Bulgaria (130 g CO₂/km). As in 2014, the Netherlands (101 g CO₂/km) registered the lowest-emitting fleet. Denmark, Greece and Portugal follow, with average emissions of around 106 g CO₂/km.

In the Netherlands, the proportion of cars emitting less than 50 g CO₂/km (mainly battery electric and plug-in hybrid vehicles) is the highest in Europe (9 %). This has an important impact on the average emissions. Without the contribution of these low-emitting vehicles the average CO₂ emissions in the Netherlands would be 107.5 g CO₂/km.

Figure 3.3 Frequency distributions of (a) emissions and (b) mass of the vehicles registered in the EU-28 in 2005, 2010, and 2013–2015



Note: 2005 data: data based on Decision 1753/2000 (EU, 2000).
2013–2015 data: data based on Regulation (EC) No 443/2009.

Table 3.2 Average CO₂ emissions (g CO₂/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 |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| EU-13 | | | | | | | | 157.8 | 156.8 | 154.2 | 148.2 | 144.1 | 140.9 | 135.8 | 131.0 | 127.2 |
| 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 |
| EU-28 | | | | | | | | 158.7 | 153.6 | 145.7 | 140.3 | 135.7 | 132.2 | 126.7 | 123.4 | 119.5 |

Figure 3.4 Absolute reduction and relative reduction (%) in specific emissions by Member State between 2014 and 2015

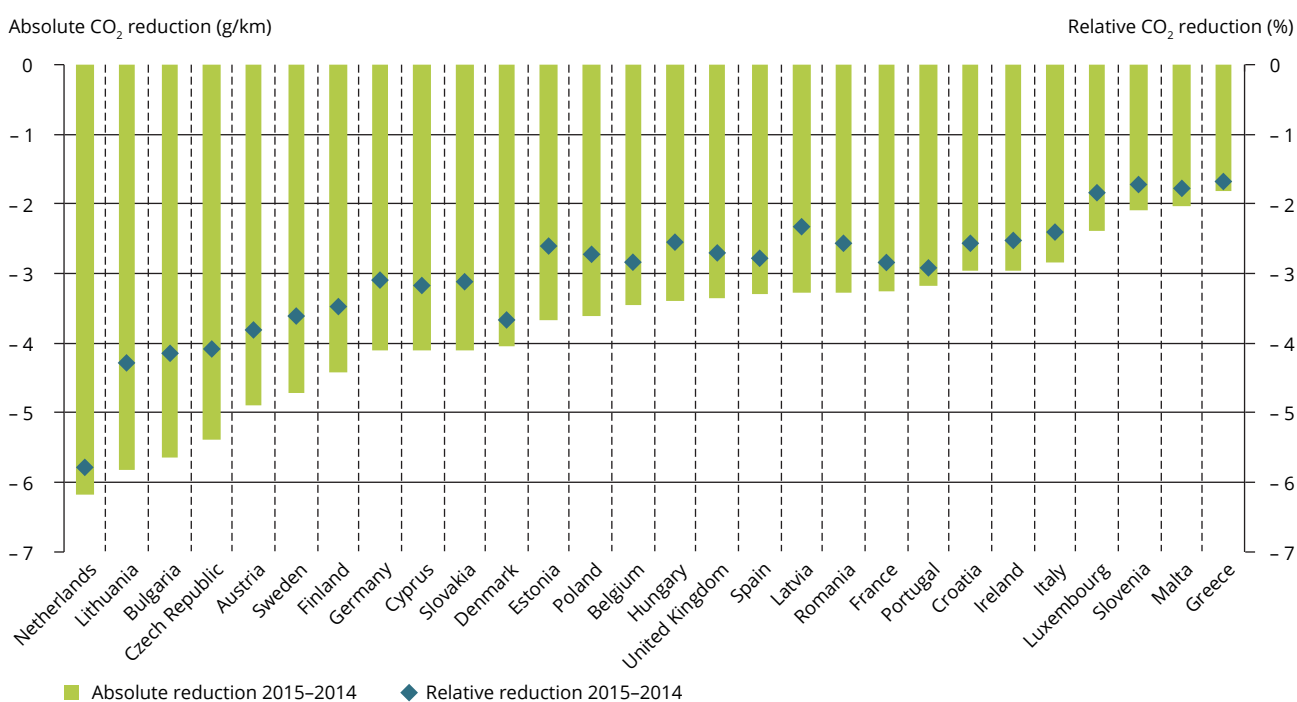
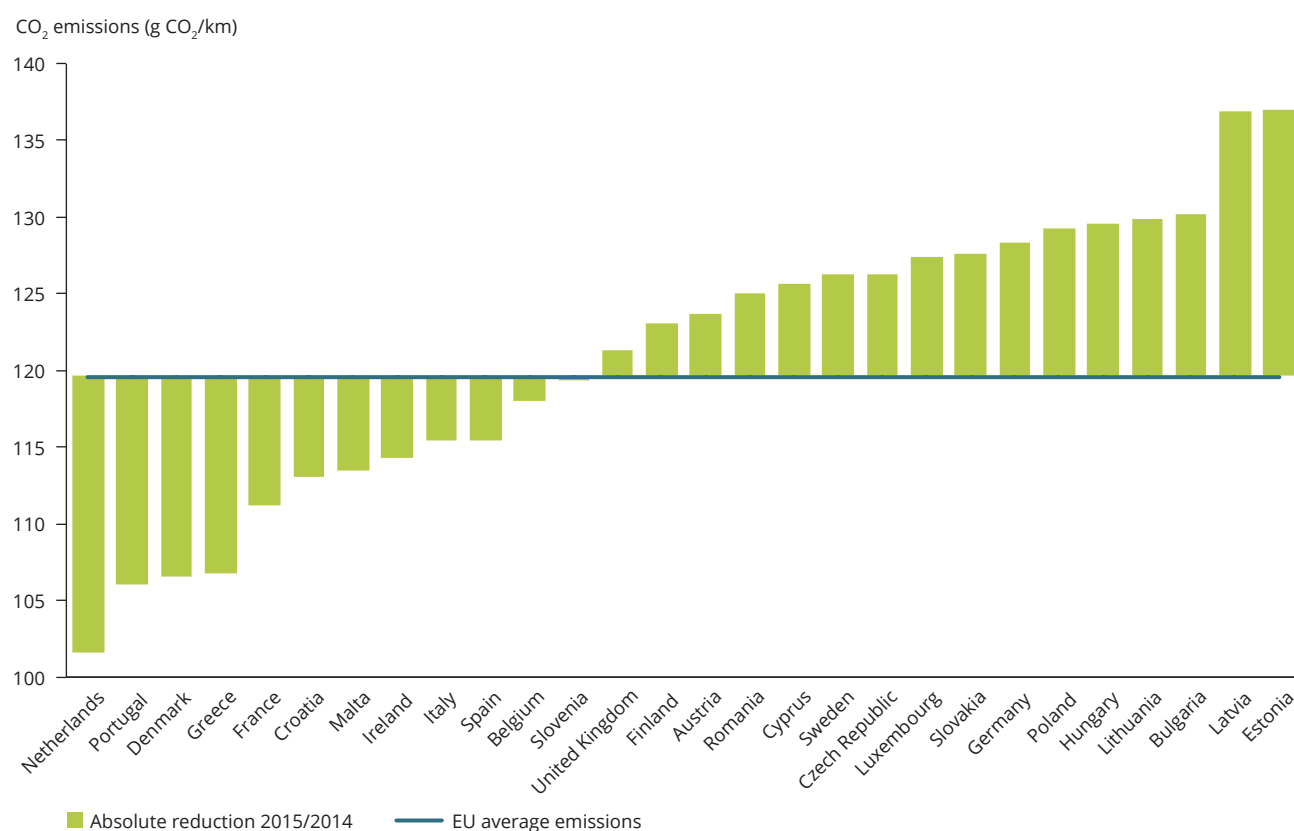


Figure 3.5 Average CO₂ emissions by EU Member State in 2015 compared with the EU average (119.5 g CO₂/km)



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 below 1 250 kg. In addition to this, the new fleets of Denmark and Greece have the lowest engine capacities and powers in Europe.

The four best-performing Member States had different fleet compositions: in the Netherlands and Denmark the majority of the fleet is fuelled with petrol (61 % and 64 % respectively) while in Greece and Portugal it is diesel based (63 % and 69 % respectively). The percentage of diesel vehicles in the fleet is even higher (more than 70 %) in Ireland and Luxembourg. On the opposite side, fewer than 30 % of vehicles registered in the Netherlands and Denmark in 2015 were diesel vehicles.

The Netherlands, Lithuania, Bulgaria and the Czech Republic recorded the largest relative CO₂ emission reductions compared with 2014, about 4–6 % on average.

Logically, 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 reductions of CO₂ emissions from newly registered passenger cars in EU-28. Of these

five, France, Italy and Spain have the lowest average CO₂ specific emissions. In Italy, for example, this is for a combination of reasons. Cars registered in Italy have on average the fourth 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 (56 % of the vehicles are diesel cars and these have an average mass of 1 441 kg and average emissions of 115.5 g CO₂/km) and the highest proportion of alternative fuel vehicles (AFVs) (12 %). The latter are mainly LPG cars (8 % of all new registrations) with average CO₂ emissions of 119.0 g CO₂/km, and NG cars (4 % of all new registrations) with average CO₂ emissions of 98.4 g CO₂/km.

In France, the large number of small diesel vehicles (average mass 1 420 kg) seems to be the main reason for the relatively low CO₂ emissions. France also has a relatively high proportion of battery electric cars (0.9 %) with zero emissions, which reduced the average emissions by less than 1 g CO₂/km. On the other side of the scale, Germany has one of the highest average CO₂ emissions: its fleet is significantly heavier, bigger and more powerful than the EU average (1 447 versus 1 380 kg, 1 716 versus 1 596 cm³ and 106 versus 93 kW).

3.3 Vehicle technologies

As in the previous 5 years, in 2015 more diesel vehicles were sold than petrol ones. Diesel vehicles represent almost 51.8 % of the newly registered vehicle fleet as against 55.2 % in 2011, the year in which the percentage of diesel vehicle reached the maximum (Table 3.3). The percentage of AFVs has increased in the last 4 years, reaching 2.8 %. 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. According to the ICCT (2015), in 2014 the market share of hybrid vehicles in the EU was 1.4 % of all new car sales.

The registration of AFVs has been increasing substantially in recent years (Figure 3.11). This category was 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 2 years, by 36.4 %, 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 CO₂ 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 (natural gas (NG), liquefied petroleum gas (LPG), biodiesel, E85, battery electric and plug-in hybrid vehicles are included in this category). This helps explain the high variability in the trend of emissions and other characteristics of the 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 ethanol cars.

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

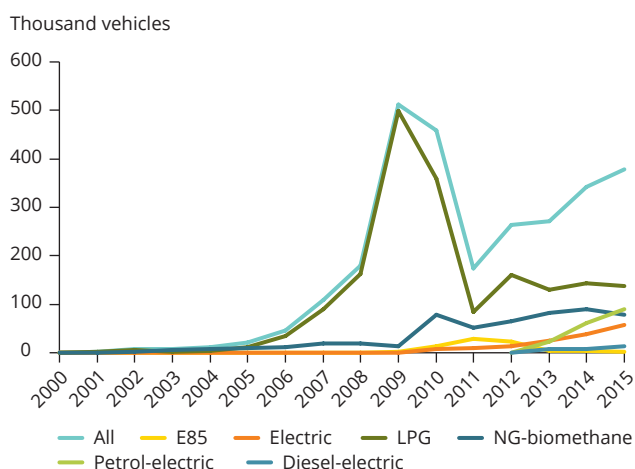
| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 ^(a) | 2011 ^(a) | 2012 ^(a) | 2013 ^(a) | 2014 ^(a) | 2015 ^(a) |
|--------|------|------|------|------|------|------|------|------|------|------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| 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 |
| 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 |
| 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 |

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, CO₂ emissions, mass and engine capacity

| | Registration | Average CO ₂ emissions (g CO ₂ /km) | Average mass (kg) | Average engine capacity (cm ³) |
|-----------------|-----------------------|---|-------------------|--|
| E85 | 1 704 | 142.7 | 1 480 | 1 794 |
| Electric | 56 756 | 0.0 | 1 588 | - |
| LPG | 138 065 | 120.0 | 1 220 | 1 329 |
| NG-biomethane | 78 278 | 98.9 | 1 287 | 1 183 |
| Petrol-electric | 89 364 ^(b) | 48.7 | 1 743 | 1 709 |
| Diesel-electric | 14 189 ^(b) | 74.8 | 1 605 | 1 966 |

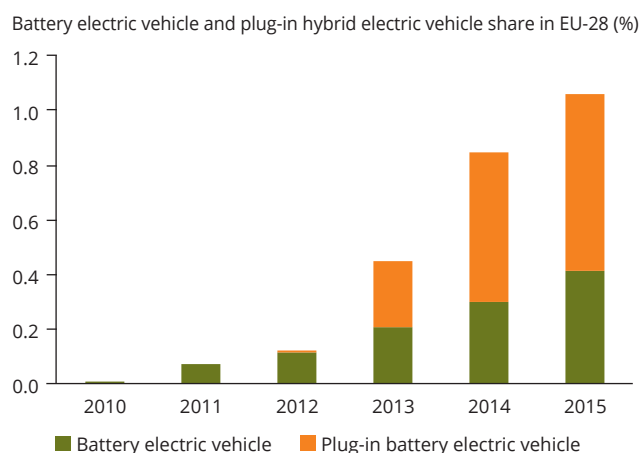
Note: ^(a) Electric vehicles are vehicles for which tail-pipe emissions are 0 g CO₂/km. ^(b) Some countries reported hybrids as plug-in hybrids. The overestimate is around 10 %. Only exhaust emissions are considered. For electric monofuel vehicles the emission is null. For E85, only the petrol CO₂ emissions are reported; for LPG and NG-biomethane the respective LPG and compressed NG CO₂ emissions are reported.

Figure 3.6 Trends in total registrations of AFVs, 2000–2015


The significant reduction in average CO₂ 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 battery electric vehicles (BEVs) and plug-in hybrid vehicles (PHEVs) 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 CO₂/km. It is important to mention that only tail-pipe emissions⁽¹³⁾ are included in the data set.

In 2015, there were almost 19 000 more registrations of BEVs than in 2014, representing 0.41 % of the fleet. PHEVs are also identified in the database. The average emissions of PHEVs are in general below 70 g CO₂/km. Registrations of PHEVs have increased greatly in recent years: in 2015 approximately 90 000⁽¹⁴⁾ PHEVs were registered in Europe. Together with battery electric vehicles, they represent 1.1 % of the fleet.

Registrations of BEVs in the EU-28 have increased in the last 6 years from around 700 in 2010 to around 57 000 in 2015. France (more than 17 600 vehicles), Germany (around 12 400 vehicles) and the United Kingdom (almost 10 000 vehicles) are the countries in which the increase in absolute numbers has been the highest

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


over the last years (Figure 3.8). The registration of BEVs in Scandinavia is growing as well and those countries contributed 4–5 % of the total registrations of BEVs in the EU-28. Denmark has the highest proportion of BEVs, at 1.2 % of the fleet. It is important to notice that Denmark has put in place a taxation system to favour the uptake of BEVs in the last years: electric cars are exempted from the 150 % car registration tax applied to new vehicle purchases⁽¹⁵⁾ (EEA, 2016a).

The number of PHEVs has considerably increased in the Netherlands, where they represent almost 9 % of the fleet. Significant numbers of PHEVs have been registered in the United Kingdom (around 19 400 vehicles) and Germany (around 11 200 vehicles) as well.

In 2015, 10 % of vehicles in the Netherlands were electric. The underlying reason for this relatively high proportions is the Netherlands' CO₂-based vehicle taxation scheme, which focuses mainly on stimulating zero-emission vehicles and plug-in vehicles (EAFO, 2016; EEA, 2016a).

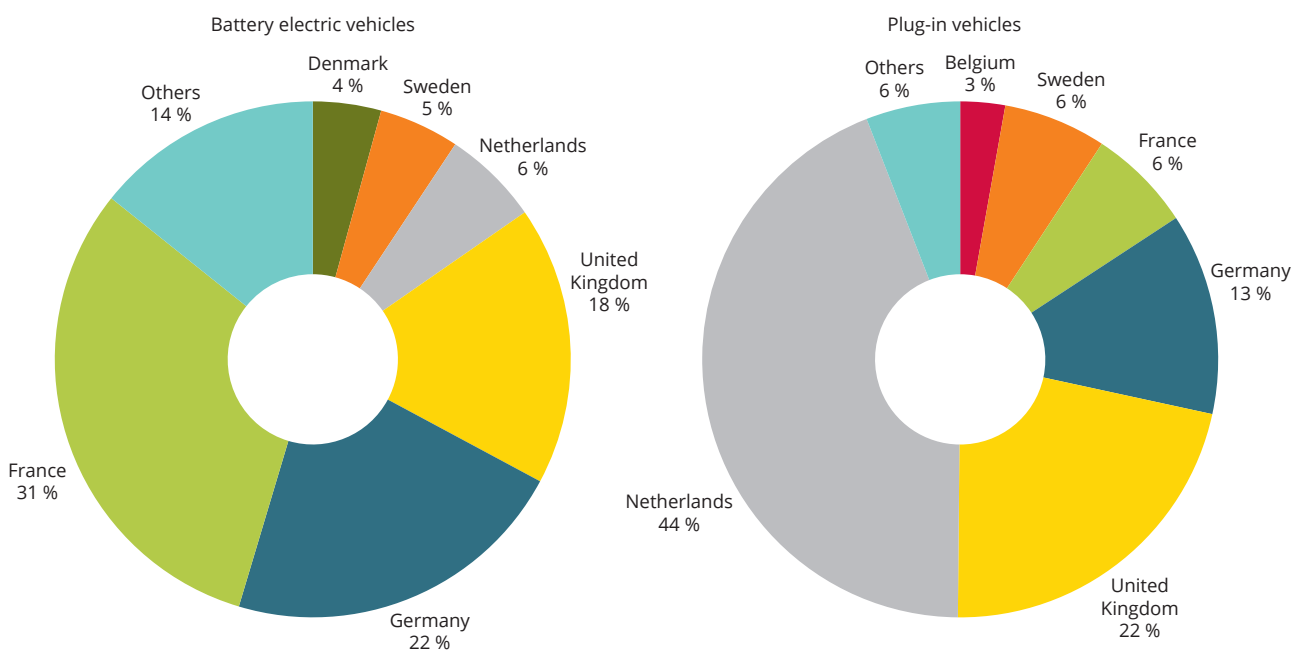
Of the other types of AFVs, NG and LPG vehicles have the lowest CO₂ emissions (120.0 g and 98.9 g CO₂/km respectively), but these have not been improving since 2014. Ethanol-fuelled vehicles (E85) have the highest

⁽¹³⁾ Tail-pipe emissions are the exhaust emissions of the vehicles. There are no end-of-pipe emissions for BEVs. However, BEVs produce indirect emissions when they are plugged into the electricity grid. The indirect emissions are not taken into account in this report and in the regulation.

⁽¹⁴⁾ This figure includes only vehicles correctly reported as plug-in vehicles.

⁽¹⁵⁾ Starting from 1 January 2016, the exemption is being phased out in annual increments over the next 5 years, increasing the purchase price of most models.

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



specific emissions (142.7 g CO₂/km). The improvement in these technologies is marginal compared with the previous year and the other technologies: in 2014, NG and LPG vehicles emitted respectively 120.3 and 97.8 g CO₂/km. Emissions from LPG cars are, on average, higher than from diesel vehicles, even though their mass is significantly lower (1 220 kg for LPG cars, 1 524 kg for diesel cars).

Italy has the highest number of LPG and NG vehicles, almost 12 % of its total number of vehicles. In the other countries the proportion of LPG and NG vehicles is below 2 %.

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 2014 (Table 3.5). While the mass of petrol vehicles has been stable over the last 10 years, the mass of diesel vehicles increased consistently until a slight decrease in the last 2 years (1 524 kg in 2015). As a result, the difference in mass between petrol and diesel vehicles has been increasing slowly but constantly between 2004 (226 kg) and 2015 (310 kg). The mass of AFVs varies over the years in relation to the composition of the fleet.

Table 3.5 Average mass (kg) of new passenger cars sold in 2015 by fuel

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 ^(*) | 2013 ^(*) | 2014 ^(*) | 2015 ^(*) |
|-----------|-------|-------|-------|-------|-------|-------|-------|-------|---------------------|---------------------|---------------------|---------------------|
| 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 |
| 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 |
| 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 |
| 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 |

Note: ^(*) 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.

The new car fleets of Sweden and Luxembourg were the heaviest, at 1 526 and 1 495 kg respectively (Annex 1). The lightest new cars were sold in Malta, Denmark and Greece (1 206, 1 227 and 1 250 kg respectively). Among the five largest Member States, Germany has the heaviest fleet (1 447 kg) and Italy the lightest (1 305 kg).

During the 2004–2015 period the average mass has been quite stable while CO₂ emissions have decreased significantly (43.9 g CO₂/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 average mass of the fleet has increased for all fuel types between 2009 and 2012 (more for diesel cars than for petrol cars), but has decreased again in the last 3 years and it is now again similar to the 2010 level.

There was a slight decrease in average engine capacity in the last 4 years: the average engine capacity of new passenger cars in 2015 was 45 cm³ less than in 2011. The difference between new diesel and petrol vehicles is around 453 cm³, whereas in 2011 it was 372 cm³. In

the same period, the engine power has increased from 86 to 93 kW. For both petrol and diesel vehicles, an increase in engine power has been observed: in 2015 diesel vehicles had average engine power greater than 100 kW, while for petrol vehicles it was below 85 kW. This means that manufacturers are producing more powerful cars (higher engine power in terms of kW) even if they are using smaller engine capacities.

3.5 Average specific CO₂ emissions per manufacturer in 2015

Table 3.6 presents data (number of registrations, average mass and average emissions) for 2015 for all large manufacturers⁽¹⁶⁾ individually, i.e. those that registered more than 100 000 vehicles in 2015. Manufacturers are ranked according to their 2015 average specific emissions (low to high). In total, these manufacturers sold 13.2 million new cars in the EU-28 in 2015, equivalent to 96 % of the total new registrations. The average emissions of each of those manufacturers in previous years (2009–2014) are also included in the table.

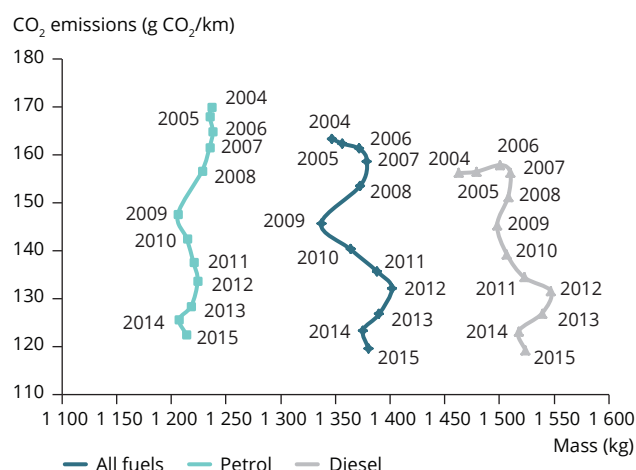
The EU fleet is quite stable over the years. As in 2014, the most popular brand is Volkswagen, with 13 % of the cars registered in the EU, followed by Ford (8 %) and Renault, Adam Opel and BMW (7 % each).

The average CO₂ emissions of the large manufacturers were 118.5 g CO₂/km, i.e. 1.0 g CO₂/km lower than the average of the total new registrations.

In 2015, 20 large manufacturers had average emissions below 130 g CO₂/km, whereas in 2014 only 16 manufacturers were below this value. Eleven of these 20 manufacturers had average emissions below 120 g CO₂/km and 4 of them had average emissions below 110 g CO₂/km. The average emissions of these large manufacturers varied from 103.7 g to 164.0 g CO₂/km.

Automobiles Peugeot and Automobiles Citroën had significantly improved their performance from the previous year by 5.8 and 5.0 g CO₂/km respectively,

Figure 3.9 CO₂ emissions versus vehicles' mass in the EU-28



⁽¹⁶⁾ 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 ^(a) | Average mass (kg) 2015 | Average CO ₂ emissions (g CO ₂ /km) | | | | | |
|--|------------------------------|------------------------|---|------|------|------|------|------|
| | | | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 |
| Automobiles Peugeot | 857 467 | 1 260 | 104 | 110 | 115 | 121 | 128 | 131 |
| Automobiles Citroën | 618 627 | 1 244 | 106 | 111 | 116 | 123 | 126 | 131 |
| Renault SAS | 984 981 | 1 263 | 106 | 108 | 110 | 121 | 129 | 134 |
| Toyota Motor Europe NV SA | 585 335 | 1 315 | 108 | 113 | 116 | 122 | 126 | 129 |
| Hyundai Assan Otomotiv Sanayi ve Ticaret AS ^(b) | 155 201 | 1 079 | 114 | 113 | 112 | - | - | - |
| Nissan International SA | 548 778 | 1 366 | 115 | 115 | 131 | 137 | 142 | 147 |
| Skoda Auto AS | 585 559 | 1 275 | 116 | 121 | 125 | 132 | 135 | 139 |
| Fiat Group Automobiles SPA | 703 654 | 1 159 | 116 | 116 | 116 | 117 | 118 | 125 |
| Seat SA | 332 988 | 1 248 | 117 | 117 | 119 | 127 | 125 | 131 |
| Ford-Werke GmbH | 993 383 | 1 333 | 118 | 121 | 122 | 129 | 132 | 137 |
| Volkswagen AG | 1 655 413 | 1 391 | 119 | 124 | 127 | 133 | 135 | 140 |
| Magyar Suzuki Corporation Ltd | 125 532 | 1 161 | 120 | 123 | 126 | 128 | 128 | 137 |
| Kia Motors Corporation ^(c) | 228 179 | 1 309 | 122 | 125 | 128 | 129 | 137 | 143 |
| Volvo Car Corporation | 266 351 | 1 703 | 122 | 126 | 131 | 142 | 151 | 157 |
| Automobile Dacia SA | 378 487 | 1 204 | 123 | 125 | 127 | 137 | 143 | 145 |
| Daimler AG | 800 325 | 1 561 | 125 | 131 | 137 | 143 | 153 | 160 |
| Bayerische Motoren Werke AG | 887 020 | 1 569 | 126 | 131 | 134 | 138 | 144 | 146 |
| Mazda Motor Corporation | 194 754 | 1 362 | 127 | 128 | 134 | 142 | 147 | 149 |
| Adam Opel AG | 915 125 | 1 387 | 127 | 130 | 132 | 133 | 134 | 140 |
| Audi AG | 717 955 | 1 590 | 127 | 131 | 133 | 138 | 145 | 152 |
| Honda of the UK Manufacturing Ltd | 104 595 | 1 453 | 133 | 134 | 145 | 156 | 161 | 162 |
| Hyundai Motor Manufacturing Czech SRO ^(b) | 236 932 | 1 454 | 135 | 140 | 138 | - | - | - |
| Kia Motors Slovakia SRO ^(c) | 151 884 | 1 438 | 138 | 141 | 140 | - | - | - |
| Jaguar Land Rover Limited | 172 792 | 1 997 | 164 | 178 | 182 | - | - | - |

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.

reaching the two lowest average CO₂ emissions (104 and 106 g CO₂/km respectively) among the large manufacturers. This is mainly related to the improved performances of the conventional vehicles. The percentages of vehicles emitting less than 95 g CO₂/km were 18 % and 12 % in 2014 and increased to 28 % and 22 % in 2015 respectively for Automobiles Peugeot and Automobiles Citroën. For both manufacturers, diesel vehicles represented

around 60 % of their fleet. These diesel vehicles had low emissions (102 and 105 g CO₂/km) and were small in mass (1 360 and 1 349 kg) compared with the average diesel fleet in EU-28 (Tables 3.1 and 3.5). Their petrol cars are also smaller in mass than the European average (around 1 100 kg). The increased number of electric cars had an additional small effect on the decrease in the average emission level (< 0.2 g CO₂/km).

Over the last 3 years, Renault's average emissions decreased by almost 15 g CO₂/km. In 2015, 94 % of Renault vehicles emitted less than 130 g CO₂/km and 36 % of those vehicles emitted less than 95 g CO₂/km (Figure 3.12). Almost 2 % of the Renault fleet were BEVs; they contributed to reduce the average CO₂ emissions by 2 g CO₂/km. Diesel vehicles were almost 60 % of the Renault fleet, with average emissions of 102.2 g CO₂/km, one of the lowest among all cars manufacturers.

Toyota Motor Europe continued to produce some of the lowest-emitting cars, as one third of its fleet had emissions below 95 g CO₂/km (41 %). The Toyota Motor Europe fleet comprised 76.8 % petrol vehicles, with the lowest average emissions (104.4 g CO₂/km) of the large manufacturers. This was mainly related to the high proportion of hybrid vehicles emitting between 75 and 100 g CO₂/km.

As in 2014, Hyundai Assan had the lowest mass among the group (1 079 kg) and the highest percentage of petrol vehicles (almost 90 %). However, the average emissions increased compared with the previous 2 years.

Nissan made significant improvements in CO₂ emissions in 2013 and 2014 (almost 16 g CO₂/km), but was stable in 2015. The good performance of recent years is related to the increased number of electric vehicles (which corresponds to a CO₂ saving of almost 3 g CO₂/km), to the downsizing of the fleet (30–40 kg lighter than in 2013) and to the improved performances of the conventional vehicles (the percentage of the vehicles emitting less than 130 g CO₂/km was 82 % in 2015, 86 % in 2014 and only 56 % in 2013).

For both Skoda and Fiat, the average emission is 116 g CO₂/km. Skoda improved by 5 g CO₂/km improvement in 2015. Fiat reported the same emission level as observed in 2013. Skoda's fleet has had a stable average mass over the last few years (fifth lightest in the group of large manufacturers), but the proportion of vehicles emitting less than 130 g CO₂/km increased from 76 % to 84 %. As in previous years, in 2015 Fiat had one of the lowest average masses among the large manufacturers (1 159 kg), but was eighth in terms of emissions. The proportion of AFVs in Fiat's fleet is quite high (11 %), but mainly composed of those vehicles that run on LPG and NG. On average,

NG vehicles registered in Italy emitted 96.8 g CO₂/km while LPG vehicles emitted 113.7 g CO₂/km, around 6.4 g CO₂/km less than petrol vehicles and slightly more than diesel vehicles (113.2 g CO₂/km). Since the emissions of NG and LPG vehicles are becoming comparable to those of conventional vehicles, Fiat performances did not improve in 2015: its vehicles emitted on average 116 g CO₂/km, as in 2014 and 2013, and only 1 g CO₂/km less than in 2012.

The majority of large manufacturers reduced their average emission levels in 2015 from 2014. The largest reductions were achieved by Jaguar Land Rover Limited (14.4 g CO₂/km) and Daimler AG (6.9 g CO₂/km). These decreases enabled Daimler AG to get below the 130 g CO₂/km threshold (125 g CO₂/km). Thanks to the decreases observed in recent years, BMW AG, Opel and Audi AG were below the 130 g CO₂/km threshold (126 g and 127 g CO₂/km). 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 (51.2 g, 42.2 g and 39.2 g CO₂/km respectively).

As a general observation, dieselisation⁽¹⁷⁾ (the introduction of more diesel vehicles) of the total fleet was still continuing in 2015. For only 5 out of the 12 large manufacturers, the proportion of diesel vehicles in 2015 was lower than 50 %: Ford Werke (46.4 %), Skoda (46.1 %), Opel (35.1 %), Fiat (30.7 %) and Toyota (21.4 %) (Figure 3.10).

Despite the increasing trend, the proportion of AFVs remains low in absolute terms, and hence has not contributed significantly to the observed emission reductions. However, in 2015, the contribution of AFVs became important for some manufacturers, accounting for more than 5 % of registrations for Dacia, Kia and Fiat (Figure 3.11). The majority of electric vehicles registered in the EU are produced by Renault (almost 16 600), Nissan (almost 12 900) and Tesla (almost 9 300).

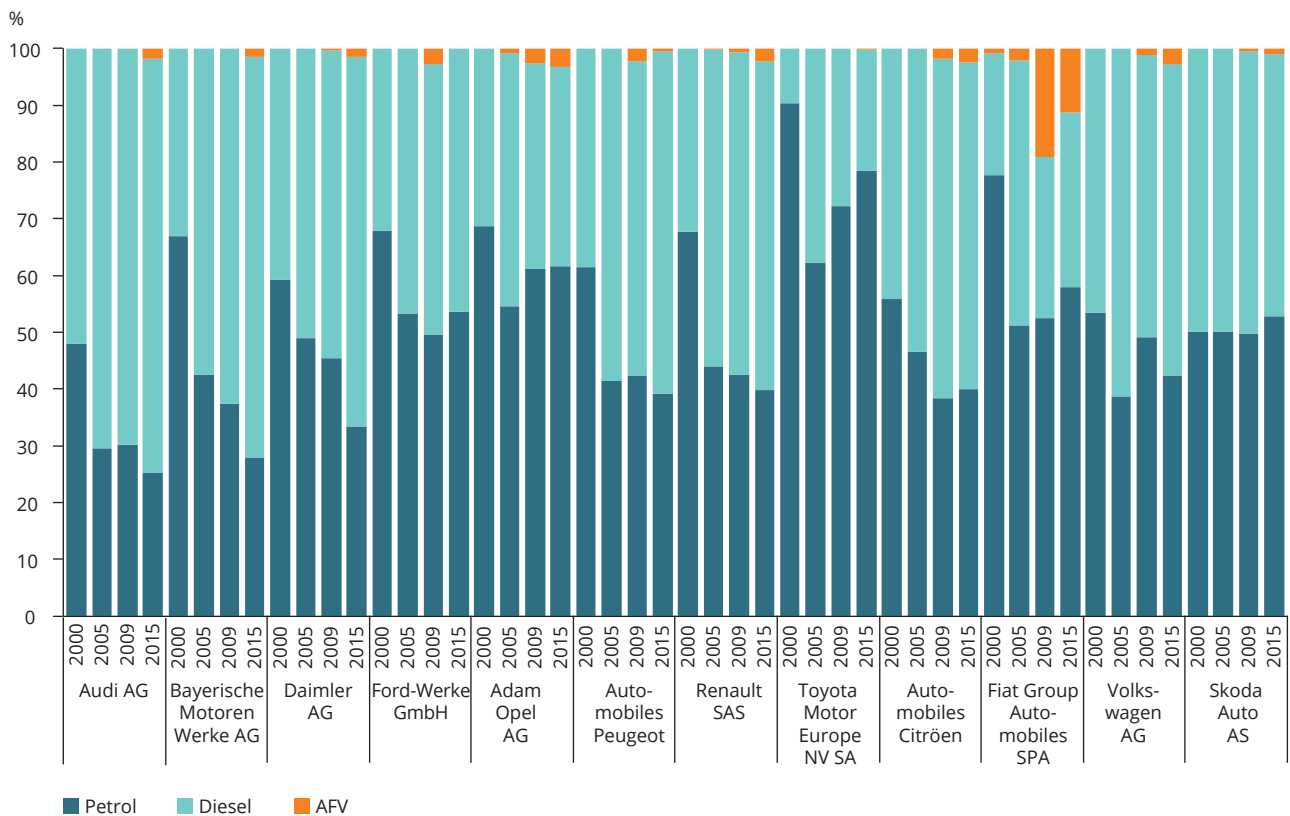
The distribution of registrations over different emission classes (Figure 3.12) shows that for some manufacturers (Volvo, Nissan, Renault and BMW AG) the market for cars emitting less than 50 g CO₂/km is increasing. However, for each of those manufacturers the percentage of electric vehicles is lower than 3.2 %. For Toyota and Renault the percentages of vehicles

⁽¹⁷⁾ 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 oxide (NO_x). See EMEP/EEA air pollutant emission inventory guidebook 2016 (<http://www.eea.europa.eu/publications/emep-eea-guidebook-2016>).

emitting less than 95 g/km are relatively high, being 41 % and 32 % respectively. Vehicles with emissions below 130 g CO₂/km account for the largest proportion of registrations for all the large manufacturers (76 % on average). Only for a few manufacturers

of this group (Hyundai Motor Manufacturing Czech SRO, Kia Motors Slovakia SRO and Jaguar Land Rover Limited) did the large majority of the vehicles sold emit more than 130 g CO₂/km.

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



Note: Data for the time series 2001–2009 were gathered by the monitoring regulated by Decision 1753/2000/EC, which was repealed by Regulation (EC) No 443/2009. These data do not include all Member States in all years. Manufacturers' names and groups may have changed. Moreover, because of changes in methodology and monitoring improvements, breaks in trends may occur.

Figure 3.11 Registrations of alternative fuel vehicles (AFVs)

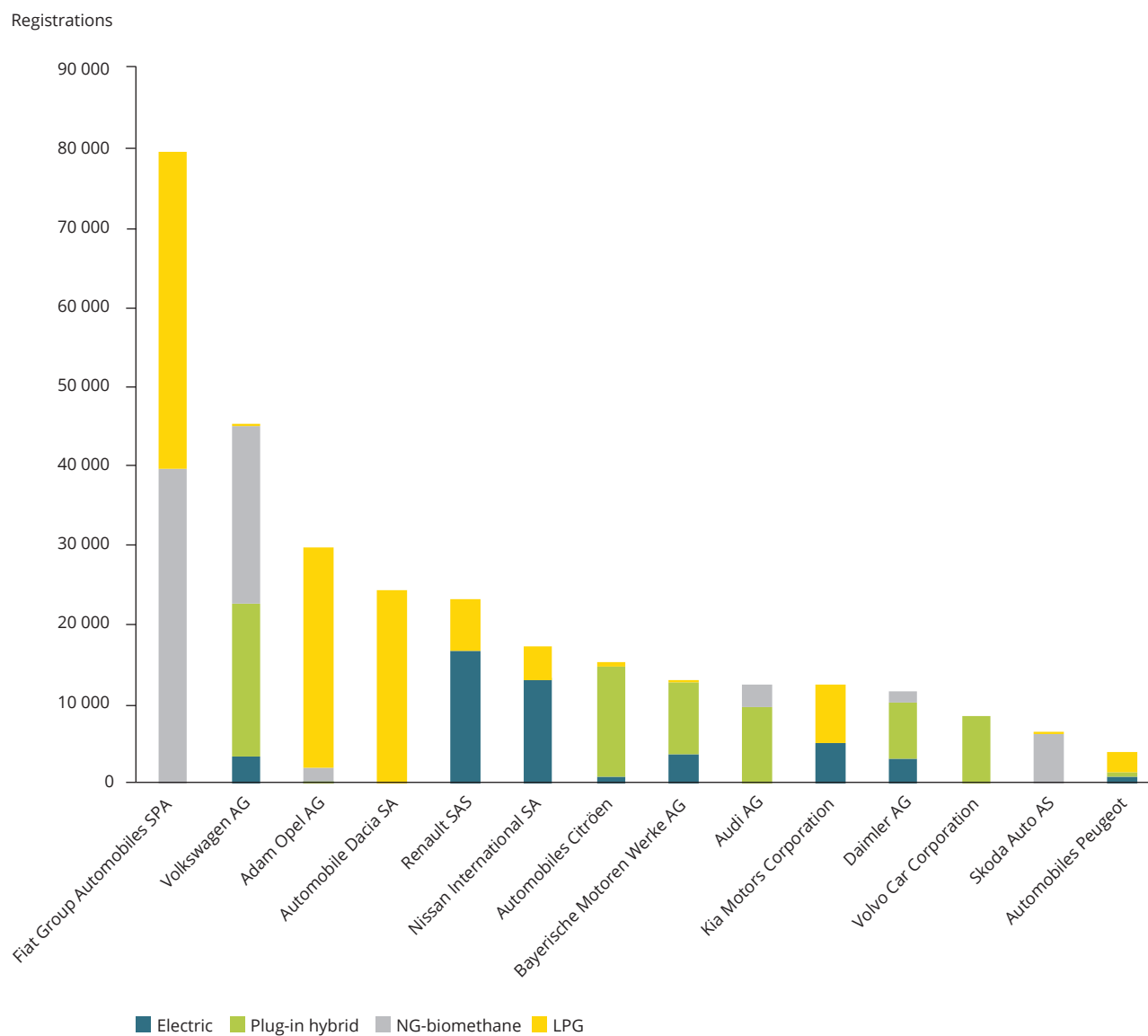
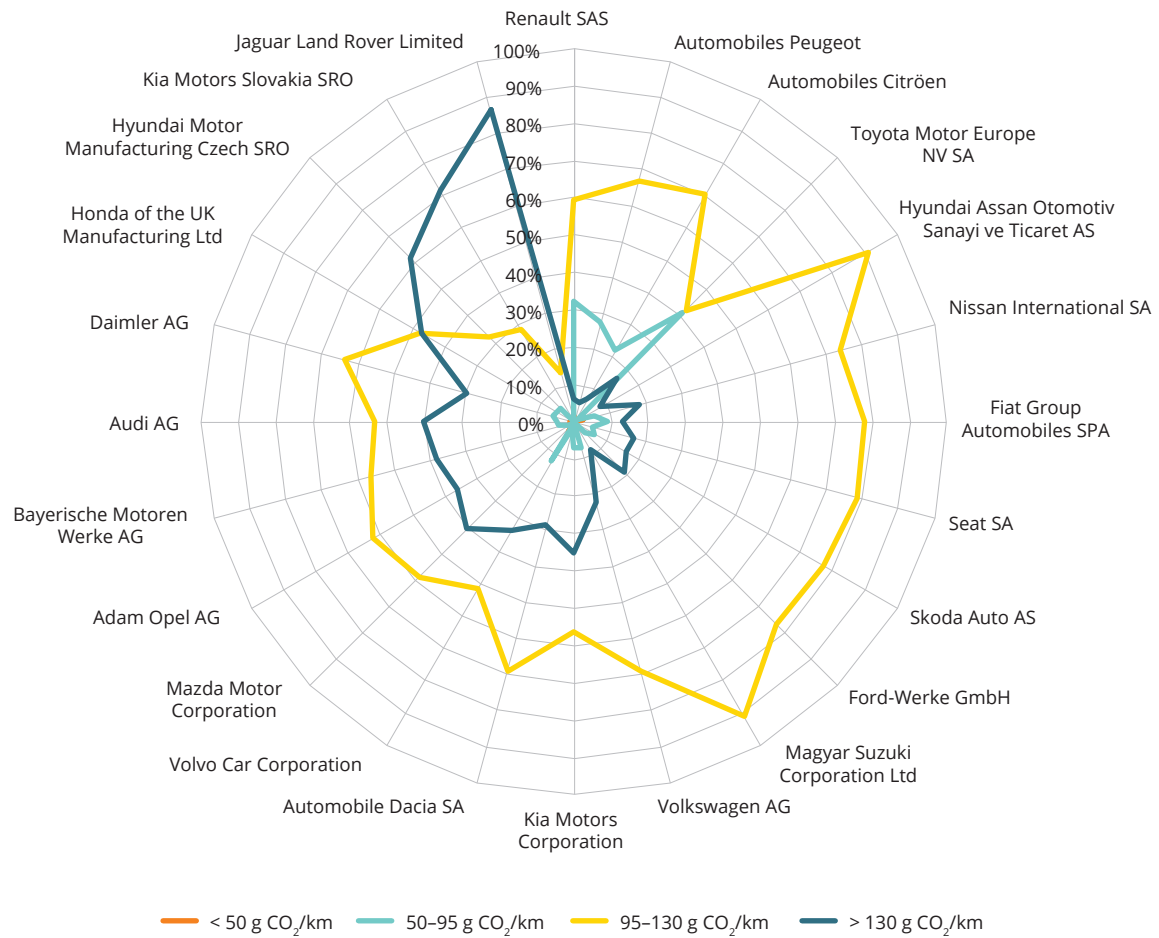


Figure 3.12 Percentage of registrations in different specific emission classes



3.6 Distance to the 2015 target

The distance of manufacturers to their specific emission targets is calculated by considering the average emissions of their entire new car fleet (no phase-in any more in 2015), while taking into account the modalities listed in Chapter 2 (super-credits, E85 credits and eco-innovations), as well as applicable derogations.

Based on their average CO₂ emissions in 2015, 49 manufacturers out of 92, representing 93 % of the total registrations in the EU, achieved their

specific emission targets for the year 2015. Taking into account the pools, 71 manufacturers out of 92 achieved their targets.

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, 24 manufacturers with fewer than 4 030 vehicles registered in 2015, i.e. fewer than 0.01 % of all registrations, benefited from the de minimis exemption. The data are available in Annex 2.

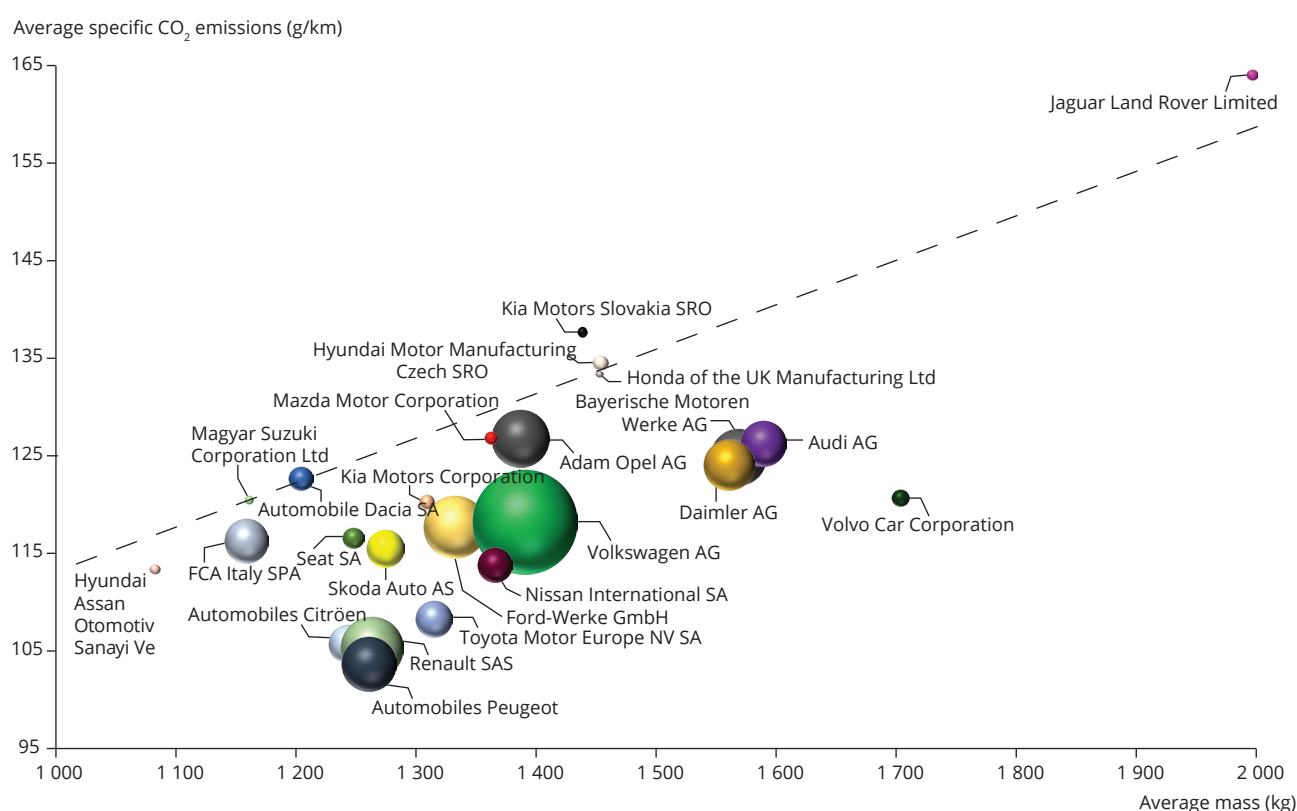
Figure 3.13 shows the distance to target for the manufacturers that registered more than 100 000 vehicles in 2015. Some manufacturers that may have missed their specific emission targets have met their obligations as members of a pool (see above for further details). This was the case for Kia Motors Slovakia (Kia pool), Hyundai Motor Manufacturing Czech SRO (Hyundai pool) and Dacia (Renault pool), which would not have met their specific emission targets, as their average specific emissions would have been 4.7, 0.79 and 0.36 g CO₂/km above the target. This also applies to Magyar Suzuki Corporation and Jaguar Land Rover. In addition to a pooling arrangement, the

Suzuki pool and the Tata and Jaguar Land Rover pool benefited from niche derogations (see Chapter 2). For 2015 Mazda was also granted a niche derogation.

The distance to the target varies between 4.7 g CO₂/km above target for Kia Motors Slovakia and 24.5 g CO₂/km below target for Volvo. All relevant data are included in Annex 1.

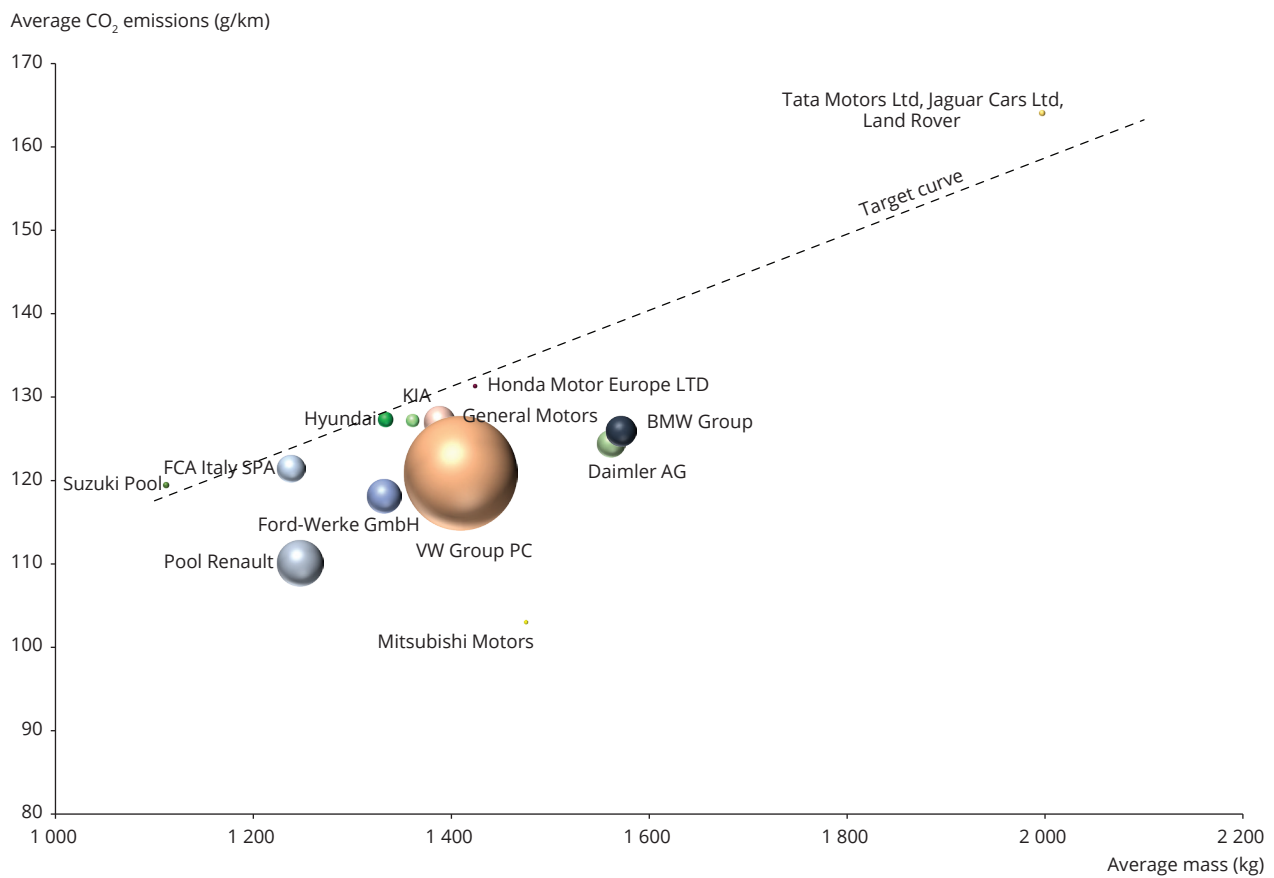
As explained in Chapter 2, the limit value curve implies that heavier cars are allowed higher emissions than lighter cars. As a result, the specific CO₂ emission targets range from 117 to 178 g CO₂/km.

Figure 3.13 Distance to 2015 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.

Figure 3.14 Distance to 2015 target by pools



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

The distance to target for pools of manufacturers is presented in Table 3.7. In 2015, all the pools respected their specific emission targets. However, the distributions of emissions are different in the different pools.

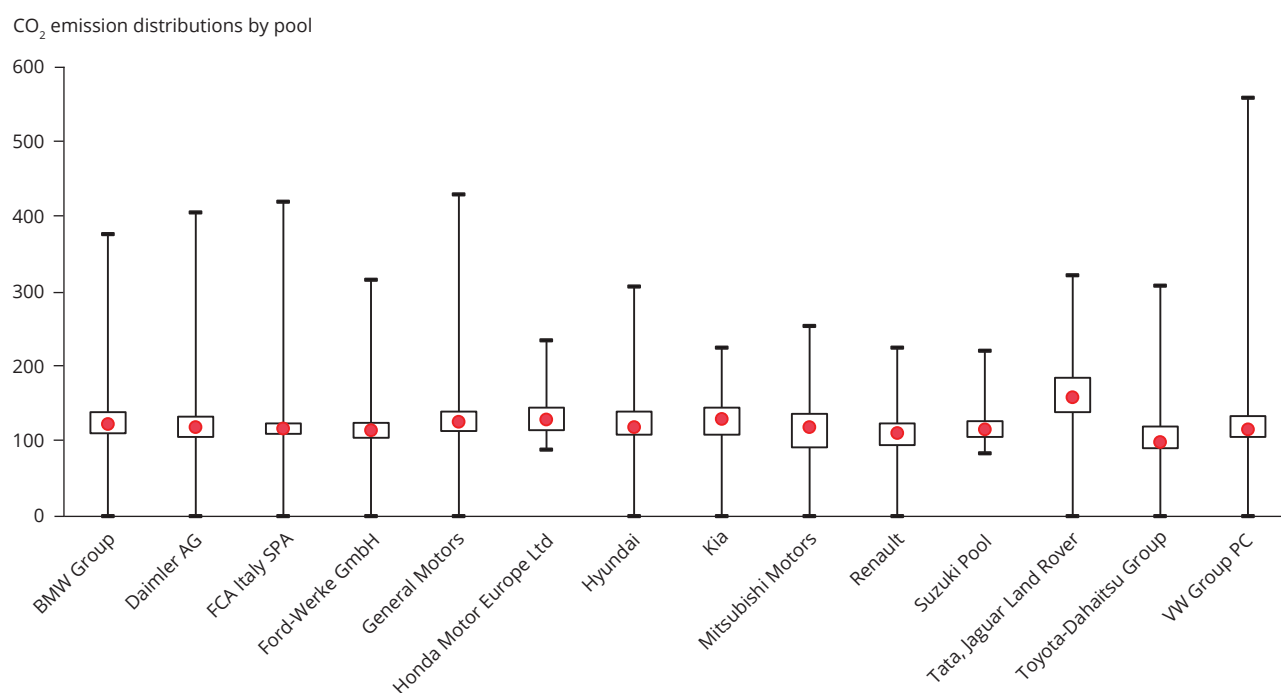
Figure 3.15 shows the emission distributions for all the pools: the lowest and highest CO₂ emissions (represented by the whiskers in the graph), the median emissions and the lower and upper quartiles (represented by the boxes in the graph) ⁽¹⁸⁾. Regarding pool data, the main findings are:

- FCA Italy SPA has a small interquartile range (14 g CO₂/km). This suggests that 50 % of the emission factors are included in a narrow range.
- Mitsubishi Motors and Tata Motors Ltd, Jaguar Cars Ltd, Land Rover have high interquartile ranges (45–46 g CO₂/km). This suggests a high variability of CO₂ emission factors inside the pool.
- Tata Motors Ltd, Jaguar Cars Ltd, Land Rover has high quartile values. This suggests that this pool has in general higher emissions than the other pools.

⁽¹⁸⁾ The lower quartile splits off the lowest 25 % of the data and the upper quartile splits off the highest 25 % of the data. Quartiles give an indication of the distribution of the values around the average. If the first quartile is far away from the median while the third quartile is closer to it, for example, it means that the data points that are smaller than the median are spread far apart while the data points that are greater than the median are closely packed together.

- The Renault and Suzuki pools have similar data distributions: the medians are all at the same level, the interquartile range is narrow, the minimum emissions (lower whisker ⁽¹⁹⁾) are very close to the first quartile and the maximum emissions (upper whisker) are relatively high. This suggests that 75 % of the emission factors are included in a narrow range.
- BMW, Daimler, FCA Italy, General Motors and Volkswagen Group have small interquartile ranges, but very high maximum emissions. This suggests that the variability of emission factors in these pools is particularly high and biased towards very high emission values (> 350 g CO₂/km).

Figure 3.15 CO₂ emission distributions by pool



Note: The graph is based on the CO₂ emission values. The diagram indicates the minimum, the maximum, the median and the lower and upper quartiles. The lower quartile splits the lowest 25 % of the emission data and the upper quartile splits the highest 25 % of the emission data.

⁽¹⁹⁾ The ends of the whiskers represent the minimum and the maximum of the distributions.

Table 3.7 Distance to target for the pools in 2015

| Pool | Manufacturer | Average emissions (gCO ₂ /km) | Target (CO ₂ /km) | Distance to target (gCO ₂ /km) |
|---|---|--|------------------------------|---|
| | Bayerische Motoren Werke AG | 125 | 139 | - 14.1 |
| | BMW M GmbH | 198 | 148 | 49.6 |
| | Rolls-Royce Motor Cars Ltd | 331 | 181 | 150.1 |
| BMW Group | | 126 | 139 | - 13.2 |
| | Daimler AG | 124 | 139 | - 14.5 |
| | Mercedes-Amg GmbH | 209 | 145 | 63.8 |
| Daimler AG | | 124 | 139 | - 14.2 |
| | FCA US LLC | 159 | 149 | 10.2 |
| | FCA Italy SPA | 116 | 120 | - 3.9 |
| | Alfa Romeo SPA | 116 | 128 | - 12.1 |
| FCA Italy Spa | | 121 | 124 | - 2.4 |
| | Ford-Werke GmbH | 118 | 128 | - 10.5 |
| | Ford Motor Company | 252 | 146 | 105.9 |
| | CNG-Technik GmbH | 116 | 122 | - 6.4 |
| Ford-Werke GmbH | | 118 | 128 | - 10.0 |
| | Mitsubishi Motors Corporation MMC | 105 | 142 | - 37.4 |
| | Mitsubishi Motors Europe BV MME | 125 | 113 | 11.5 |
| | Mitsubishi Motors Thailand Co Ltd Mmth | 97 | 110 | - 13.0 |
| Mitsubishi Motors | | 103 | 135 | - 31.7 |
| | Chevrolet Italia SPA | 132 | 131 | 0.9 |
| | General Motors Company | 282 | 154 | 127.5 |
| | GM Korea Company | 126 | 125 | 1.3 |
| | Adam Opel AG | 127 | 131 | - 3.9 |
| General Motors | | 127 | 131 | - 3.7 |
| | Honda Automobile China Co Ltd | 125 | 119 | 5.2 |
| | Honda Motor Co Ltd | 120 | 126 | - 5.9 |
| | Honda of the UK Manufacturing Ltd | 133 | 134 | - 0.3 |
| | Honda Turkiye AS | 155 | 126 | 28.7 |
| Honda Motor Europe Ltd | | 131 | 132 | - 1.0 |
| | Hyundai Motor Company | 134 | 136 | - 2.1 |
| | Hyundai Assan Otomotiv Sanayi Ve Ticaret AS | 114 | 117 | - 3.1 |
| | Hyundai Motor Manufacturing Czech SRO | 135 | 134 | 0.8 |
| | Hyundai Motor Europe GmbH | 98 | 119 | - 20.7 |
| Hyundai | | 127 | 128 | - 0.9 |
| | Kia Motors Corporation | 120 | 127 | - 6.8 |
| | Kia Motors Slovakia SRO | 138 | 133 | 4.7 |
| Kia | | 127 | 129 | - 2.3 |
| | Avtovaz JSC | 202 | 124 | 78.0 |
| | Lada France SAS | 179 | 129 | 49.5 |
| | Automobile Dacia SA | 123 | 122 | 0.4 |
| | Renault SAS | 105 | 125 | - 19.7 |
| Renault | | 110 | 124 | - 14.1 |
| | Suzuki Motor Corporation | 164 | 123 | 41.3 |
| | Maruti Suzuki India Ltd | 98 | 123 | - 25.2 |
| | Magyar Suzuki Corporation Ltd | 120 | 123 | - 2.6 |
| | Suzuki Motor Thailand Co Ltd | 96 | 123 | - 26.8 |
| Suzuki Pool | | 119 | 123 | - 3.7 |
| | Jaguar Land Rover Limited | 164 | 178 | - 14.0 |
| | Tata Motors Limited | 185 | 178 | 7.2 |
| Tata Motors Ltd, Jaguar Cars Ltd, Land Rover | | 164 | 178 | - 14.0 |
| | Audi AG | 126 | 140 | - 13.7 |
| | Audi Hungaria Motor KFT | 143 | 131 | 11.4 |
| | Bentley Motors Ltd | 291 | 298 | - 7.1 |
| | Bugatti Automobiles SAS | 542 | 161 | 380.9 |
| | Automobili Lamborghini SPA | 317 | 325 | - 7.8 |
| | Dr Ing Hcf Porsche AG | 184 | 154 | 30.1 |
| | Quattro GmbH | 225 | 150 | 74.8 |
| | Seat SA | 117 | 124 | - 7.7 |
| | Skoda Auto AS | 116 | 126 | - 10.0 |
| | Volkswagen AG | 118 | 131 | - 12.6 |
| VW Group PC | | 121 | 132 | - 10.8 |

3.7 Effect of super-credits

Regulation (EC) No 443/2009 gives an incentive to car manufacturers to produce vehicles with emissions below 50 g CO₂/km. As explained in Chapter 2, each of those cars is counted as 1.5 cars in 2015 for the calculation of the fleet average. After 2015, super-credits will not be applied until 2020.

Table 3.8 summarises the average emissions calculated when including or excluding the

super-credits for the large manufacturers. The number of vehicles with emissions of less than 50 g/km increased by 200 % in the last year. However, the effect of super-credits on the average CO₂ emissions was rather limited by the low weighting factor in 2015. It is noted that, even when excluding the super-credits, all the large manufacturers, which met the target when including super-credits, achieved their 2015 targets. The effect of the super-credits on the average fleet emissions per manufacturer was less than 1.3 g CO₂/km.

Table 3.8 Performance of the manufacturers that registered more than 100 000 vehicles in 2015 including and excluding super-credit adjustments

| Manufacturer | CO ₂ specific emissions | Target | Distance to target | CO ₂ specific emissions — no super credit | Distance to target — no super credit | Difference with or without super credit |
|---|------------------------------------|---------|--------------------|--|--------------------------------------|---|
| Adam Opel AG | 126.775 | 130.695 | - 3.92 | 126.785 | - 3.91 | 0.01 |
| Audi AG | 126.245 | 139.941 | - 13.696 | 126.834 | - 13.107 | 0.589 |
| Automobile Dacia SA | 122.694 | 122.337 | 0.357 | 122.716 | 0.379 | 0.022 |
| Automobiles Citröen | 105.713 | 124.141 | - 18.428 | 105.768 | - 18.373 | 0.055 |
| Automobiles Peugeot | 103.659 | 124.904 | - 21.245 | 103.713 | - 21.191 | 0.054 |
| Bayerische Motoren Werke AG | 124.883 | 138.988 | - 14.105 | 125.545 | - 13.443 | 0.662 |
| Daimler AG | 124.079 | 138.62 | - 14.541 | 124.565 | - 14.055 | 0.486 |
| FCA Italy SPA | 116.3 | 120.249 | - 3.949 | 116.3 | - 3.949 | 0 |
| Ford-Werke GmbH | 117.701 | 128.204 | - 10.503 | 117.701 | - 10.503 | 0 |
| Honda of the UK Manufacturing Ltd | 133.387 | 133.699 | - 0.312 | 133.388 | - 0.311 | 0.001 |
| Hyundai Assan Otomotiv Sanayi ve Ticaret AS | 113.524 | 116.604 | - 3.08 | 113.525 | - 3.079 | 0.001 |
| Hyundai Motor Manufacturing Czech SRO | 134.525 | 133.738 | 0.787 | 134.525 | 0.787 | 0 |
| Jaguar Land Rover Limited | 164.029 | 178.025 | - 13.996 | 164.029 | - 13.996 | 0 |
| Kia Motors Corporation | 120.295 | 127.138 | - 6.843 | 121.59 | - 5.548 | 1.295 |
| Kia Motors Slovakia SRO | 137.69 | 133.038 | 4.652 | 137.691 | 4.653 | 0.001 |
| Magyar Suzuki Corporation Ltd | 120.485 | 123.114 | - 2.629 | 120.486 | - 2.628 | 0.001 |
| Mazda Motor Corporation | 126.779 | 129.426 | - 2.647 | 126.786 | - 2.64 | 0.007 |
| Nissan International SA | 113.778 | 129.73 | - 15.952 | 115.108 | - 14.622 | 1.33 |
| Renault SAS | 105.304 | 125.023 | - 19.719 | 106.191 | - 18.832 | 0.887 |
| Seat SA | 116.577 | 124.324 | - 7.747 | 116.577 | - 7.747 | 0 |
| Skoda Auto AS | 115.511 | 125.552 | - 10.041 | 115.511 | - 10.041 | 0 |
| Toyota Motor Europe NV SA | 108.264 | 127.386 | - 19.122 | 108.309 | - 19.077 | 0.045 |
| Volkswagen AG | 118.259 | 130.864 | - 12.605 | 118.849 | - 12.015 | 0.59 |
| Volvo Car Corporation | 120.67 | 145.148 | - 24.478 | 121.828 | - 23.32 | 1.158 |

Note: If the difference is 0.000, the manufacturer does not produce cars emitting < 50 g CO₂/km.

3.8 Distance to the 2021 targets

Regulation No 333/2014 defines the modalities for reaching the 95 g/km target. Taking into account those modalities, it is possible to make an estimate of the emission reduction that manufacturers would have to achieve from 2015 on in order to reach their respective targets in 2021.

Some manufacturers are well on track to reach the 2021 target. For instance, Automobiles Peugeot, Renault SAS, Automobiles Citroën and Toyota are already very close to their 2021 targets: they need to reduce their average emissions by less than 16 g CO₂/km in the next 6 years (Figure 3.16).

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

Figure 3.17 presents the progress of the manufacturers responsible for more than 500 000 vehicles a year in terms of annual percentage changes for two periods: 2000–2009 and 2009–2015. These rates are compared with the expected reductions for respecting the 2021 target set by the regulation.

For these manufacturers the rate of progress required from now till 2021 is in general lower than or comparable to the rate that has been achieved in the last 4 years, since Regulation (EU) No 443/2009 came into force. There are only four manufacturers for which the progress rates required in the 2015–2021 period are greater than in the previous years. The figure also shows that the highest improvements were achieved over the 2009–2015 period.

Figure 3.16 Comparison of past and future progress towards meeting the 2021 target

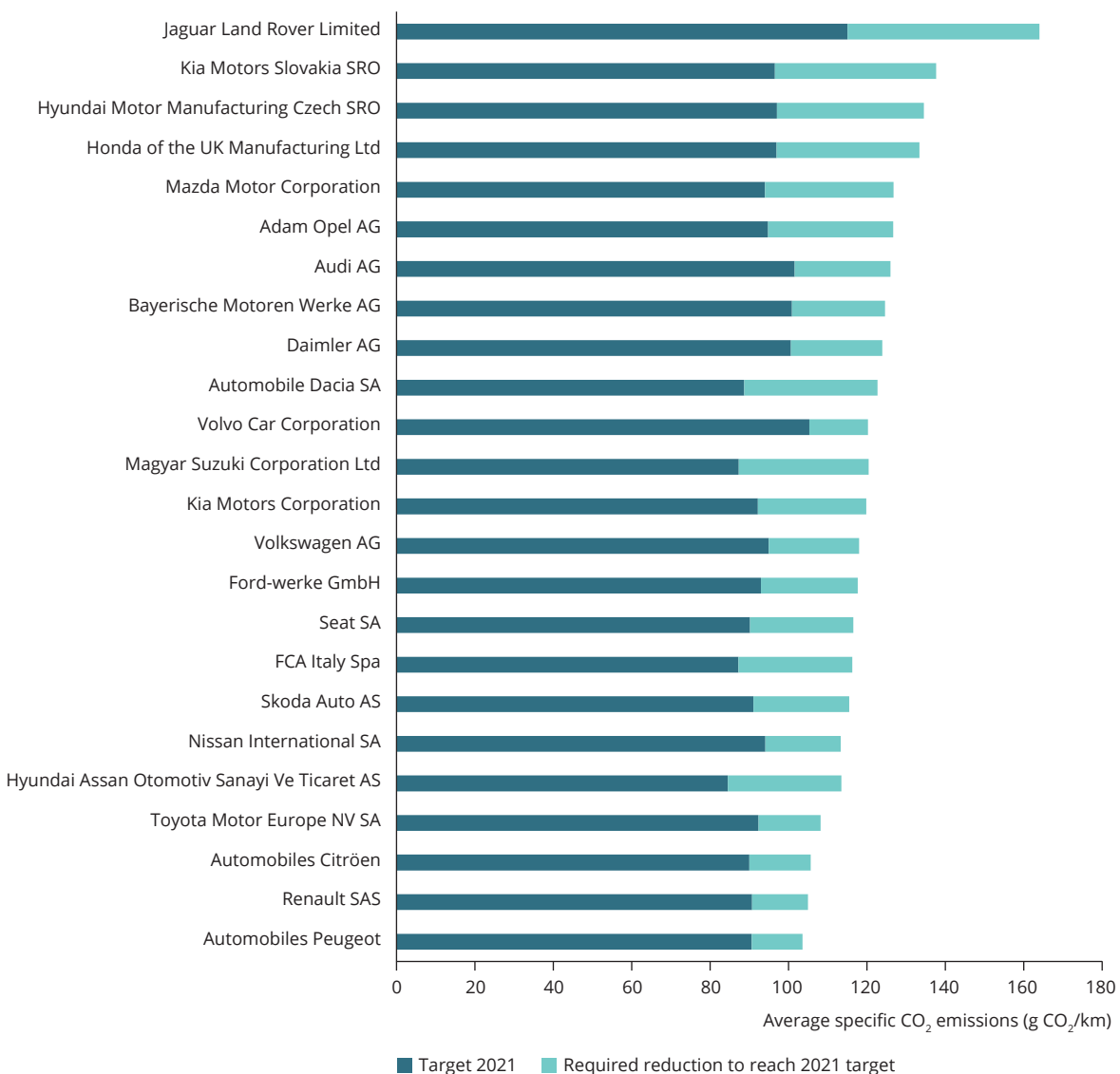
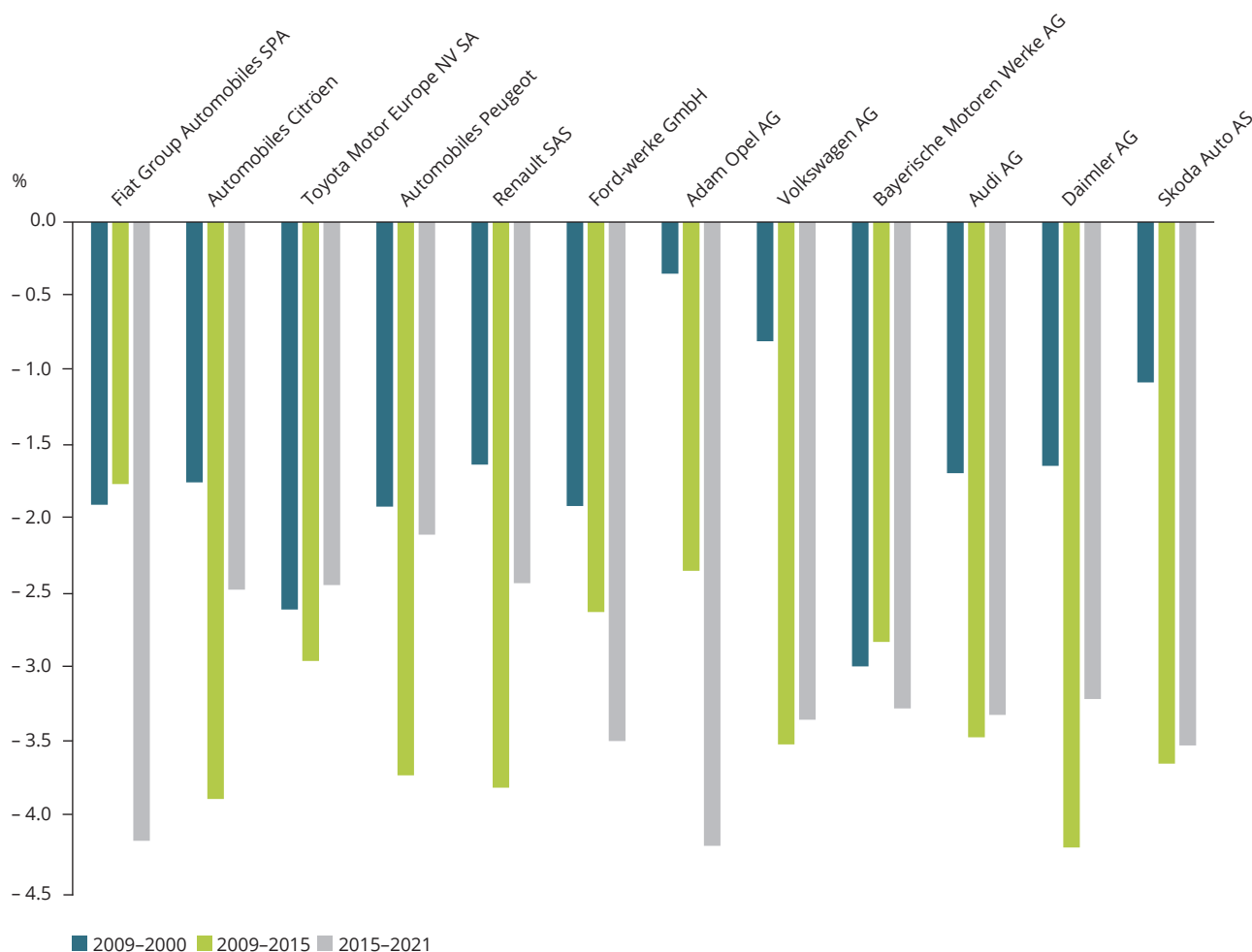


Figure 3.17 Comparison of past and future progress towards meeting the 2021 target



Note: Only manufacturers registering more than 500 000 vehicles per year in Europe.

3.9 Excess emission premiums

If a manufacturer's or a pool's average specific CO₂ 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 CO₂/km), i.e. the excess emissions;
- the number of vehicles registered by the manufacturer during that year;
- the premium level included in Table 3.9.

The premium amounts to EUR 5 for the first gram of CO₂/km of exceedance, EUR 15 for the second, EUR 25 for the third and EUR 95 for each subsequent gram. A higher distance to the target therefore implies a higher excess premium per gram of CO₂/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 CO₂/km, the first formula in Table 3.9 applies and the excess emission premium = 0.5 * 5 * 100 000 = EUR 250 000;

- if the distance to the target is 1.5 g CO₂/km, the second formula in Table 3.9 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 CO₂/km, the third formula in Table 3.9 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 CO₂/km, the fourth formula in Table 3.9 applies and the excess emission premium = $(1 * 5 + 1 * 15 + 1 * 25 + (3.5 - 3) * 95) * 100\,000$ = EUR 9 250 000.
- In 2015 only two manufacturers will be required to pay the excess emission premium: Aston Martin Lagonda and Ferrari (see Annex 2).

Table 3.9 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

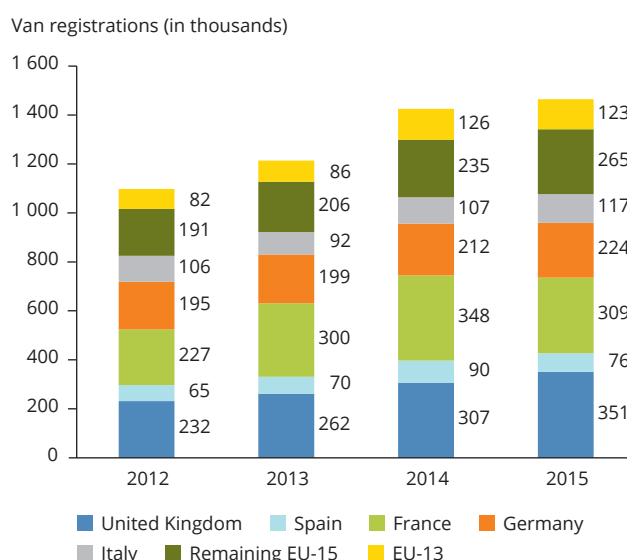
In 2015, there were around 1.5 million new light commercial vehicle registrations in the EU-28 (around 10 % of the total light-duty vehicles ⁽²⁰⁾). This includes around 4 900 IVAs ⁽²¹⁾, 9 300 vehicles approved under NSS rules, 2 300 unknown ⁽²²⁾ vehicles and 3 660 unidentified ⁽²³⁾ vehicles.

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 ⁽²⁴⁾. These uncertainties were reduced by the new monitoring system, based on vehicle identification numbers, in place from 2015 with effect for the 2014 data collection.

For almost all Member States, the number of registrations increased in 2015 from 2014, except for Poland (- 23 %), Spain (- 6 %), France (- 11 %) and Latvia (- 6 %). The biggest increases in new vehicle registrations were observed in Croatia (+ 54 %), Ireland (+ 41 %) and Estonia (+ 36 %).

The largest markets in Europe with regard to the new registrations of vans are the United Kingdom (24 %), France (21 %) 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 91.6 % of the total registrations. Compared with 2014, the number of vehicles registered in the EU-13 has decreased by 4.5 %, while the number of newly registered vehicles in the EU-15 has increased by 2.6 %.

Figure 4.1 Number of light commercial vehicles registered in the EU-28 between 2012 and 2015



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 CO₂ emissions from the new light commercial vehicle fleet in the EU-28 in 2015 were 168.3 g CO₂/km, a reduction of 0.8 g CO₂/km from the previous year (169.1 g CO₂/km in 2014).

⁽²⁰⁾ Light-duty vehicles include cars and vans.

⁽²¹⁾ IVAs are applicable to vehicles imported from third countries or 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.

⁽²²⁾ Unknown vehicles are vehicles 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.

⁽²³⁾ Unidentified vehicles are vehicles for which the entries for the mass in running order or the CO₂ emissions are missing in the database.

Unidentified vehicles were not considered for the calculation of the average specific emissions or the specific emission targets for manufacturers.

⁽²⁴⁾ 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).

Table 4.1 Average CO₂ emissions (g CO₂/km) from light commercial vehicles by region

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

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

In 2015, the average new light commercial vehicle in the EU-15 emitted 4.9 g CO₂/km less than the average newly registered vehicle in the EU-13, a difference greater by 1.5 g CO₂/km than in 2014. In fact, while the average new light commercial vehicle in the EU-15 emitted 0.84 g CO₂/km less than the average newly registered vehicle in 2014 (Table 4.1), in the EU-13 it emitted 0.58 g CO₂/km more.

Diesel vehicles accounted for more than 96.7 % of the total new van registrations in 2015 (Table 4.2). The average CO₂ emissions of diesel vehicles decreased by 0.7 g CO₂/km, while the average emissions of petrol vehicles increased by 3.2 g CO₂/km, compared with 2014 (Table 4.2 and Figure 4.2). In 2015 the average diesel vehicle emitted 169.8 g CO₂/km, about 17.6 g CO₂/km more than the average petrol vehicle (in 2014 the difference between diesel and petrol vehicles was 21.5 g CO₂/km). It should be noted that this difference in the average CO₂ emissions between diesel and petrol vehicles is due to the difference in their average mass. Diesel vehicles are generally bigger, and hence heavier (1 794 kg on average), than petrol vehicles (1 289 kg on average). There are also differences in terms of engine capacity and engine power: 1 907 cm³ and 85.9 kWh for diesel, 1 505 cm³ and 77.6 kWh for petrol vehicles. It has also to be noted that the proportion of petrol vehicles is particularly small: less than 2 %.

There were about 7 850 newly registered electric vehicles, compared with 6 700 registered in 2014 (6 000 in 2013). Of the other types of AFVs, LPG and NG are the most sold vehicles (around 3 500 and 8 000 vehicles registered respectively).

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

| | 2012 | 2013 | 2014 | 2015 |
|--------|------|------|------|------|
| Diesel | 96.5 | 96.5 | 96.8 | 96.7 |
| Petrol | 1.8 | 2.0 | 2.0 | 1.8 |
| AFV | 1.7 | 1.5 | 1.2 | 1.5 |

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

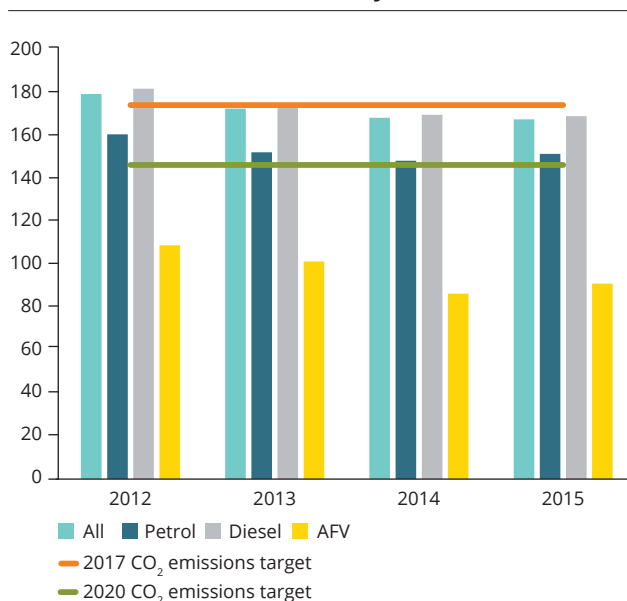
Table 4.3 Average CO₂ emissions (g CO₂/km) from light commercial vehicles by fuel (EU)

| | 2012 | 2013 | 2014 | 2015 |
|-----------|-------|-------|-------|-------|
| All fuels | 180.2 | 173.3 | 169.1 | 168.3 |
| Petrol | 161.3 | 153.0 | 149.0 | 152.2 |
| Diesel | 182.7 | 175.2 | 170.5 | 169.8 |
| AFV | 109.4 | 101.8 | 86.8 | 91.4 |

Note: (*) For the calculation of the average CO₂ 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.

Figure 4.2 Average CO₂ emissions (g CO₂/km) from new vans by fuel (EU)



4.3 Member States comparison

With the exception of Poland, Malta, France and Ireland, in which the average CO₂ emissions in 2015 increased from 2014, in all other countries CO₂ emissions from light commercial vehicles fell in 2015 (Figure 4.3). Twenty Member States had average CO₂ specific emissions from newly registered vans already below the 175 g CO₂/km EU target set for 2017 ⁽²⁵⁾ (Figure 4.4). Ten of these had emission values below 160 g CO₂/km. There is a clear correlation between the average emissions and the average mass by Member States: higher average mass values correspond to higher average emissions. For some Member States (Bulgaria and Portugal), 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 below 1 600 kg. Portugal had registered vans with the lowest average engine capacity in Europe and one of the lowest average engine powers (third position). Malta had the lowest average engine power value, followed by Spain, Portugal, Croatia and France. There were only three Member States with average CO₂ emissions higher than 180 g CO₂/km: the Czech Republic, Germany and Slovakia. Their fleets also had high average mass (> 1 890 kg), engine size (> 2 000 cm³) and power (> 90 kW).

For light commercial vehicles, the percentage of diesel vehicles is very high. In some Member states more than 99.5 % of the fleet is fuelled with diesel: Ireland, Portugal and the United Kingdom. For the majority of Member States (exceptions are Bulgaria, Denmark, 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 CO₂ emissions from light commercial vehicles. Of these five, France, Italy and Spain have the lowest average CO₂ emissions. In Italy, this was for a combination of reasons. Italy, similar to Croatia, Spain and Portugal, had one of the lowest average engine capacity values (1 762 cm³, the fourth lowest among the EU Member States). In addition to this, Italy had registered the most AFVs among EU-28 (6.3 % of all new registrations in Italy). The latter are mainly NG vehicles (70 % of all AFVs registrations in Italy) with an average value of 141.5 g CO₂/km and LPG vehicles (24 % of all AFVs registrations) with an average value of

145.1 g CO₂/km. In France, it seems that the small diesel fleet (156.8 g CO₂/km with an average mass of 1 681 kg) was the main reason for the low CO₂ emissions. In addition, France had a relatively high percentage of battery electric vans (1.3 % of vehicles registered in France), with zero emissions. Like France, Spain had a very small diesel fleet (1 662 kg) with very low CO₂ emissions (155.5 g CO₂/km).

4.4 Average specific CO₂ emissions per manufacturer in 2015

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 2015. In total they account for 98.1 % of the van fleet. The same table also presents the average emissions of those manufacturers in 2012–2015.

In 2015 the most popular brand was Renault, with 15 % of the vans registered in the EU-28. Ford-Werke GmbH and Volkswagen AG followed with 14 % and 12 % each.

Seven manufacturers, representing almost 65.3 % of the European new van fleet, had average emissions lower than 175 g CO₂/km: Automobile Dacia SA, Renault, Automobiles Citroën, Automobiles Peugeot, Fiat Group Automobiles SPA, Adam Opel AG and Ford-Werke GmbH. The first six of these manufacturers also had the lowest average mass in the group. The average emissions for the large manufacturers are in the range of 133–268 g CO₂/km. Average mass values are in the range of 1 281–2 293 kg.

For the third year in a row, Automobile Dacia SA achieved the lowest average CO₂ emissions (133 g CO₂/km), and like the previous year it had the lowest average mass (1 281 kg). However, the emission level of its fleet is comparable to that of the previous year.

The next three best-performing manufacturers had similar emission levels, around 150 g CO₂/km. Among them, Renault decreased emissions by 1.0 g CO₂/km in the last year, while for the others increases in emissions of 1.7 and 4.2 g CO₂/km were observed in the same period. For all of them an increase of average mass (50 kg on average) has been observed in the last year. The main market of these manufacturers is France (34–37 % of their registrations). Part of the reason for the emissions and mass variations of these manufacturers was the regulatory changes in France.

⁽²⁵⁾ Regulation (EU) No 510/2011 sets an average emission target of 175 g CO₂/km by 2017 for the 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 2015

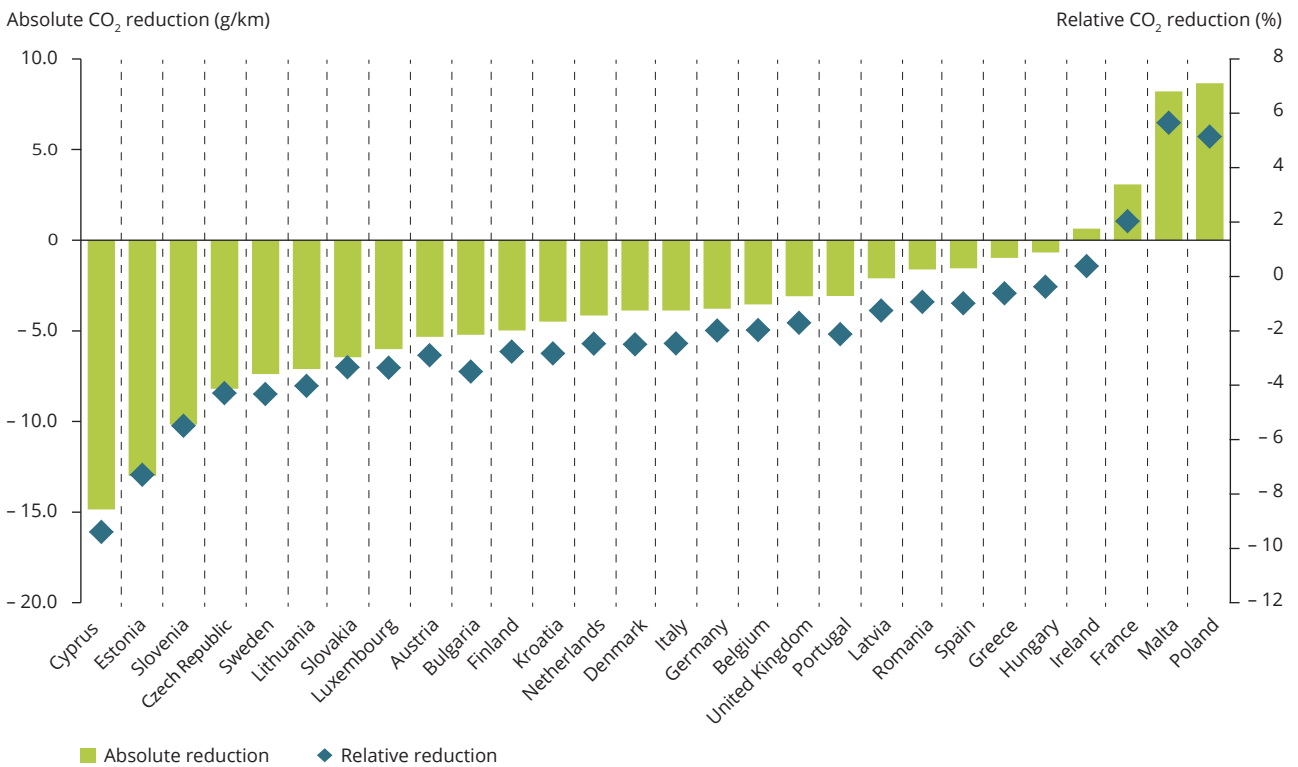
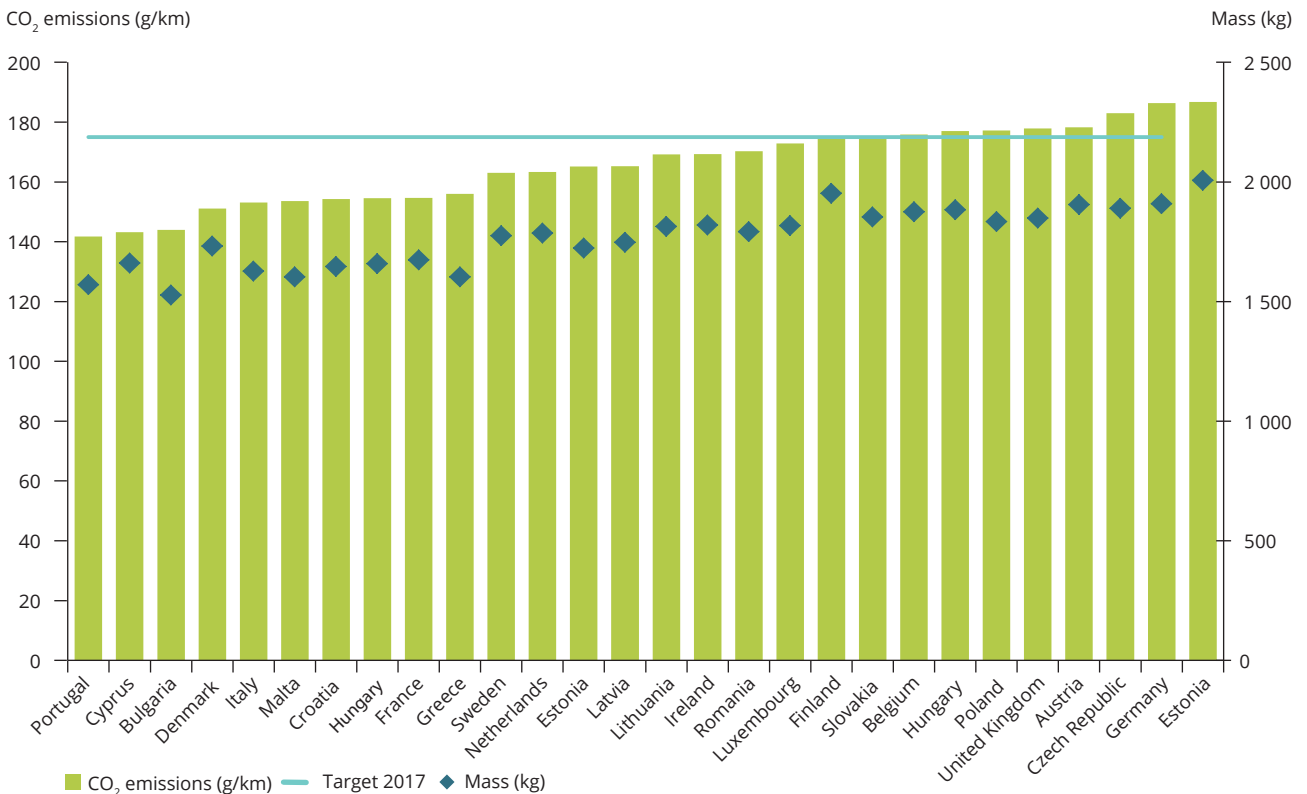


Figure 4.4 Average CO₂ emissions and average mass by EU Member State in 2015



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

Companies can no longer register company cars as light commercial vehicles, as the technical classifications used for vehicle registrations were altered. As a result the percentage of lower-emitting vehicles with small masses in the total number of newly registered vans in France has decreased.

Over the last 4 years, the Fiat Group has not improved its performance: the average emissions have been constantly around 157–158 g CO₂/km.

Half of the manufacturers in this group reduced their average emission levels in 2015 compared with 2014. The largest reductions in average emissions were achieved by Mitsubishi Motors Thailand (– 11.8 g CO₂/km), Adam Opel (– 11.7 g CO₂/km) and Daimler (– 10.3 g CO₂/km). Over the 4 years following 2011, when the car emission legislation came into force, Daimler AG, Renault and Nissan recorded

average decreases in emissions of 29.4 g, 22.8 g and 22.2 g CO₂/km respectively. These are the greatest decreases among the largest manufacturers.

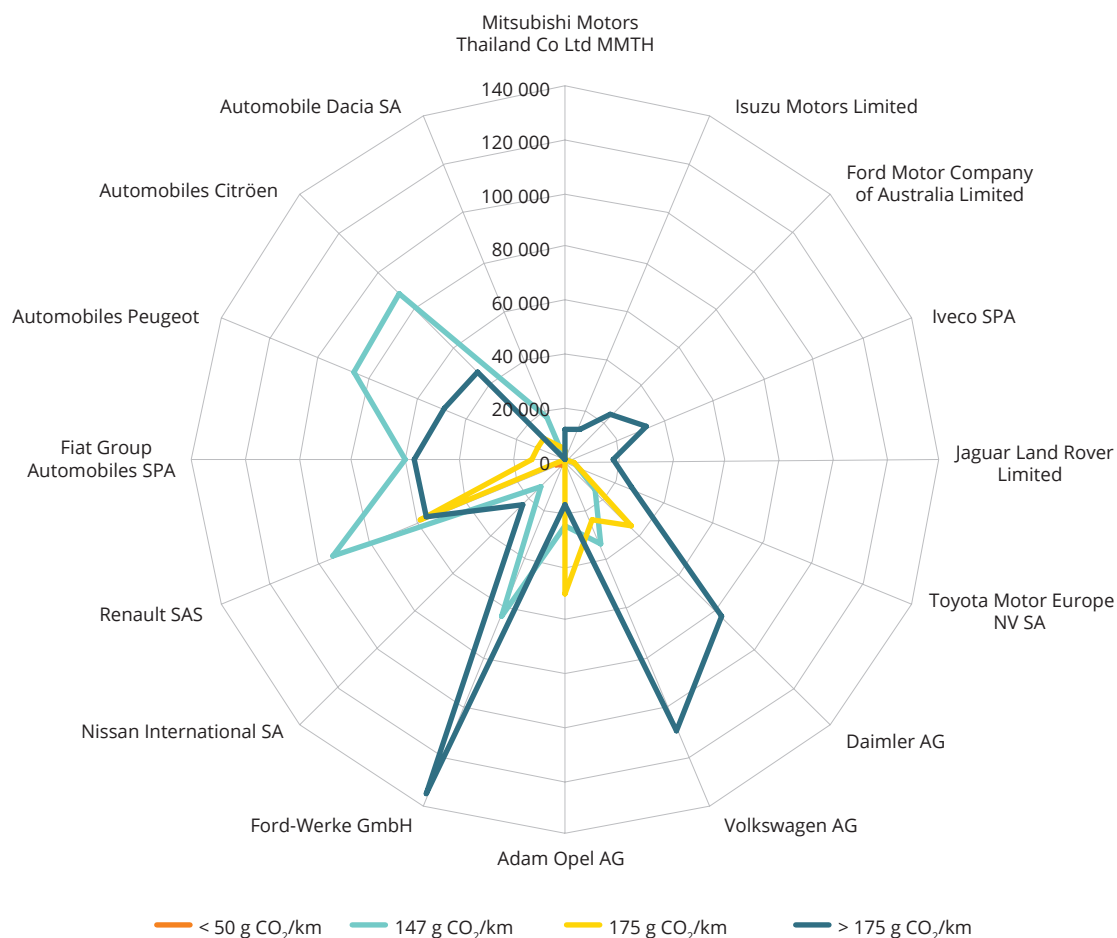
The distribution of registrations over different emission classes (Figure 4.5) shows that the fleet composition is very different among manufacturers. The low-emitting vehicles (< 50 g CO₂/km) represent a very small percentage for the large majority of the manufacturers: only for Renault and Nissan the proportions of these vehicles are around 2 % and 6 % respectively. For 3 manufacturers (Automobile Dacia SA, Automobiles Peugeot and Automobiles Citroën), the percentage of vehicles emitting less than 147 g CO₂/km is higher than 50 %. For Renault SAS and Fiat Group, the most frequent class is 50–147 g CO₂/km. For Adam Opel, vehicles emitting between 147 and 175 g CO₂/km are the most registered. For all the other manufacturers, most vehicle emit more than 175 g CO₂/km.

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

| Manufacturer | Registrations 2015 | Average mass (kg) 2015 | Average CO ₂ emissions (g CO ₂ /km) | | | |
|---|-----------------------|---------------------------|---|------|------|------|
| | | | 2015 | 2014 | 2013 | 2012 |
| Automobile Dacia SA | 23 348 | 1 281 | 133 | 132 | 132 | 145 |
| Renault SAS | 214 371 | 1 665 | 148 | 149 | 152 | 171 |
| Automobiles Citroën | 145 781 | 1 594 | 150 | 148 | 153 | 158 |
| Automobiles Peugeot | 147 245 | 1 609 | 151 | 147 | 154 | 159 |
| Fiat Group Automobiles SPA | 130 737 | 1 694 | 158 | 158 | 157 | 157 |
| Adam Opel AG | 91 914 | 1 748 | 161 | 173 | 178 | 178 |
| Ford-Werke GmbH | 199 794 | 1 880 | 171 | 175 | 189 | 188 |
| Nissan International SA | 39 779 | 1 838 | 176 | 184 | 192 | 199 |
| Volkswagen AG | 168 452 | 1 856 | 181 | 180 | 180 | 185 |
| Toyota Motor Europe NV SA | 32 767 | 1 910 | 188 | 193 | 191 | 202 |
| Daimler AG | 133 590 | 2 100 | 189 | 200 | 205 | 219 |
| Mitsubishi Motors Thailand Co Ltd MMTH | 15 226 | 1 949 | 195 | 207 | 207 | 210 |
| Isuzu Motors Limited | 12 765 | 2 072 | 201 | 200 | 203 | 212 |
| Iveco SPA | 32 711 | 2 293 | 219 | 228 | 224 | 230 |
| Ford Motor Company of Australia Limited | 23 786 | 2 207 | 236 | 228 | 227 | 228 |
| Jaguar Land Rover Limited | 18 466 | 2 044 | 268 | 267 | 276 | |

Note: In 2012, Jaguar and Land Rover appeared as two separate manufacturers.

Figure 4.5 Number of registrations over different specific emission classes



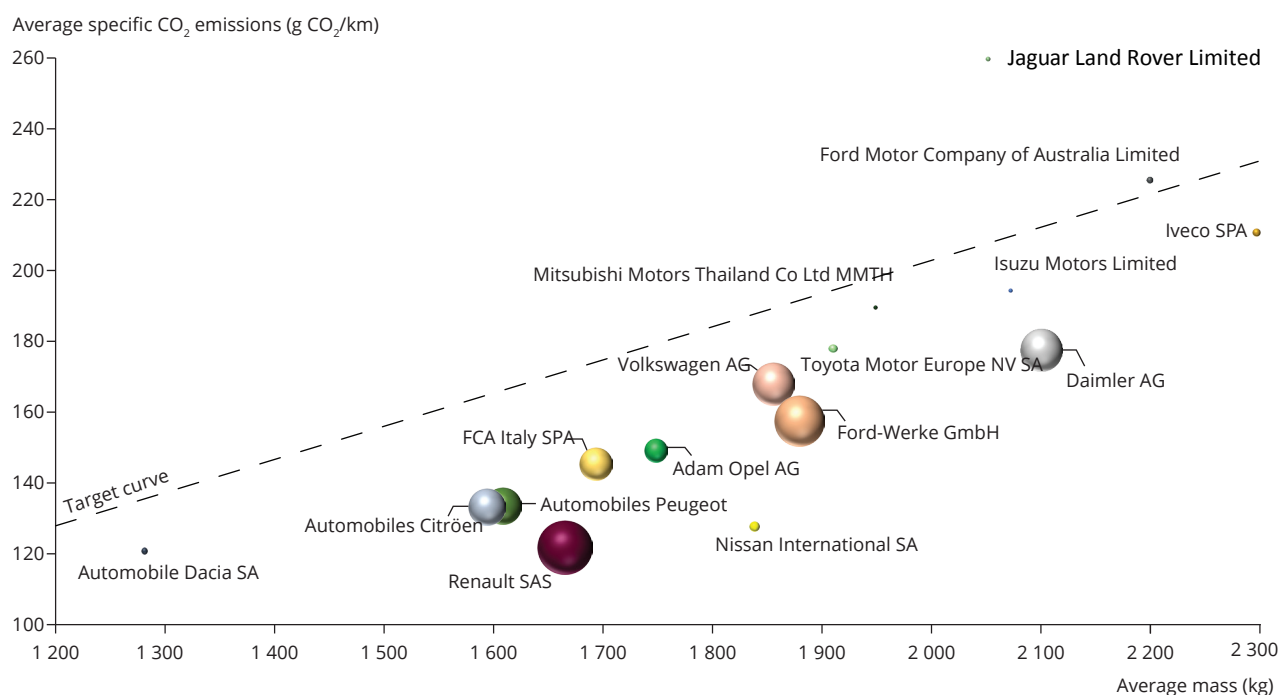
4.5 Distance to the 2015 target

The distance of the manufacturers to their specific emission targets is calculated by taking into account the modalities listed in Chapter 2 (i.e. phase in, super-credits, E85 extra credits and eco-innovations).

Based on their average CO₂ emissions in 2015, 15 out of the 16 larger manufacturers, representing about 98.1 % of the total registrations in the EU, achieved their specific emission targets for the year 2015. One manufacturer (Ford Motor Australia), which may have missed its specific emission target, has met its obligations as member of a pool (see above for further details). Jaguar Land Rover was granted a derogation target, which it met.

Only a small number of the remaining manufacturers did not meet their specific emission targets in 2015. These are all small-volume manufacturers with fewer than 1 000 registrations. Some of the companies concerned applied for a pool in 2015, or fall within the scope of the *de minimis* threshold, according to which manufacturers with fewer than 1 000 registrations will be exempt from achieving a specific emission target. In total, nine manufacturers with fewer than 1 560 vehicles registered in 2015 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 2015.

Figure 4.6 Distance to 2015 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 Europe.

The distance to target for the eight pools of manufacturers is presented in Table 4.5. In 2015, all the pools of manufacturers achieved their specific emission targets. A derogation target has been granted for Mitsubishi Motors.

4.6 Distance to the 2017 targets

The distance of the largest manufacturers (i.e. manufacturers registering more than 10 000 vehicles per year) to their 2017 targets is calculated based on the 2015 CO₂ 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 vehicle fleet, and manufacturers receive super-credits of 1.5 for vehicles emitting less than 50 g CO₂/km. Manufacturers have 2 more years to further reduce CO₂ emissions and ensure compliance with their targets in 2017. In 2015, among the 16 large manufacturers, 15 already complied with their 2017 targets.

Some manufacturers appear well on their way to reaching the 2020 target. For instance, Daimler AG, Renault SAS, Ford Werke GmbH and Adam Opel are already very close to their 2020 targets: they need to reduce their average emissions by less than 15 g CO₂/km in the next 5 years. Other manufacturers still have to make significant progress to achieve their 2020 targets (Figure 4.7).

Figure 4.8 presents the progress of the manufacturers in terms of annual percentage changes for two periods: 2012–2015 and 2015–2020. These rates are compared with the expected reductions for respecting the 2020 target set by the regulation.

For these manufacturers the rate of progress required from now till 2021 is in general lower than or comparable to the rate that has been achieved in the last 4 years, since Regulation (EU) No 443/2009 came into force. There are only three manufacturers for which the progress rates in the 2015–2021 period are greater than in the previous years. The figure also shows that the highest improvements were achieved over the 2009–2015 period.

Table 4.5 Distance to target for the pools in 2015

| Pool | Manufacturer | Specific CO ₂ emissions (g CO ₂ /km) | Target (g CO ₂ /km) | Distance to target (g CO ₂ /km) |
|----------------------|---|--|--------------------------------|--|
| | Daimler AG | 178 | 212 | - 34 |
| | Mitsubishi Fuso Truck & Bus Corporation | 236 | 265 | - 29 |
| | Mitsubishi Fuso Truck Europe SA | 235 | 276 | - 41 |
| | MFTBC | 236 | 264 | - 28 |
| Daimler | | 178 | 212 | - 34 |
| | FCA US LLC | 197 | 207 | - 10 |
| | FCA Italy SPA | 145 | 174 | - 28 |
| FCA Italy SPA | | 146 | 174 | - 28 |
| | CNG-Technik GmbH | 119 | 155 | - 37 |
| | Ford Motor Company of Australia Limited | 225 | 222 | 3.2 |
| | Ford Motor Company | 187 | 216 | - 29 |
| | Ford-Werke GmbH | 157 | 191 | - 34 |
| Ford-Werke GmbH | | 162 | 194 | - 32 |
| | General Motors Company | 280 | 257 | 23 |
| | Adam Opel AG | 149 | 179 | - 30 |
| General Motors | | 149 | 179 | - 30 |
| | Kia Motors Corporation | 111 | 142 | - 31 |
| | Kia Motors Slovakia SRO | 117 | 152 | - 34 |
| Kia | | 113 | 146 | - 32 |
| | Mitsubishi Motors Corporation MMC | 162 | 210 | - 48 |
| | Mitsubishi Motors Thailand Co Ltd MMTH | 190 | 210 | - 20 |
| Mitsubishi Motors | | 188 | 210 | - 22 |
| | Avtovaz JSC | 209 | 137 | 73 |
| | Automobile Dacia SA | 121 | 135 | - 15 |
| | Renault SAS | 122 | 171 | - 49 |
| Renault | | 122 | 168 | - 46 |
| | Audi AG | 128 | 178 | - 50 |
| | Dr Ing HCF Porsche AG | 181 | 216 | - 35 |
| | Quattro GmbH | 223 | 205 | 18 |
| | Seat SA | 99 | 127 | - 28 |
| | Skoda Auto AS | 111 | 133 | - 22 |
| | Volkswagen AG | 168 | 189 | - 21 |
| Volkswagen Group LCV | | 165 | 187 | - 22 |

Figure 4.7 Van manufacturers' progress towards meeting the 2020 target

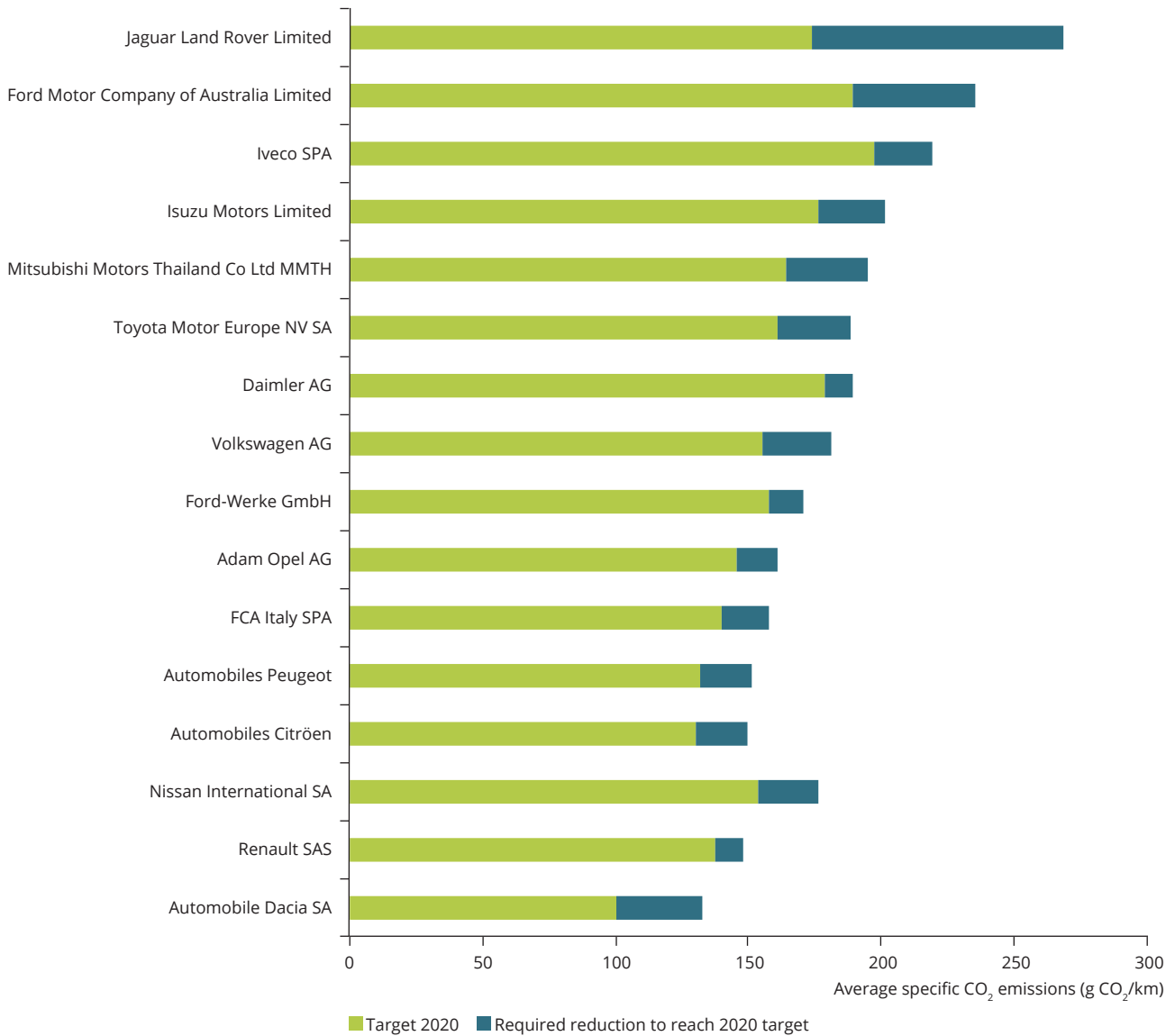
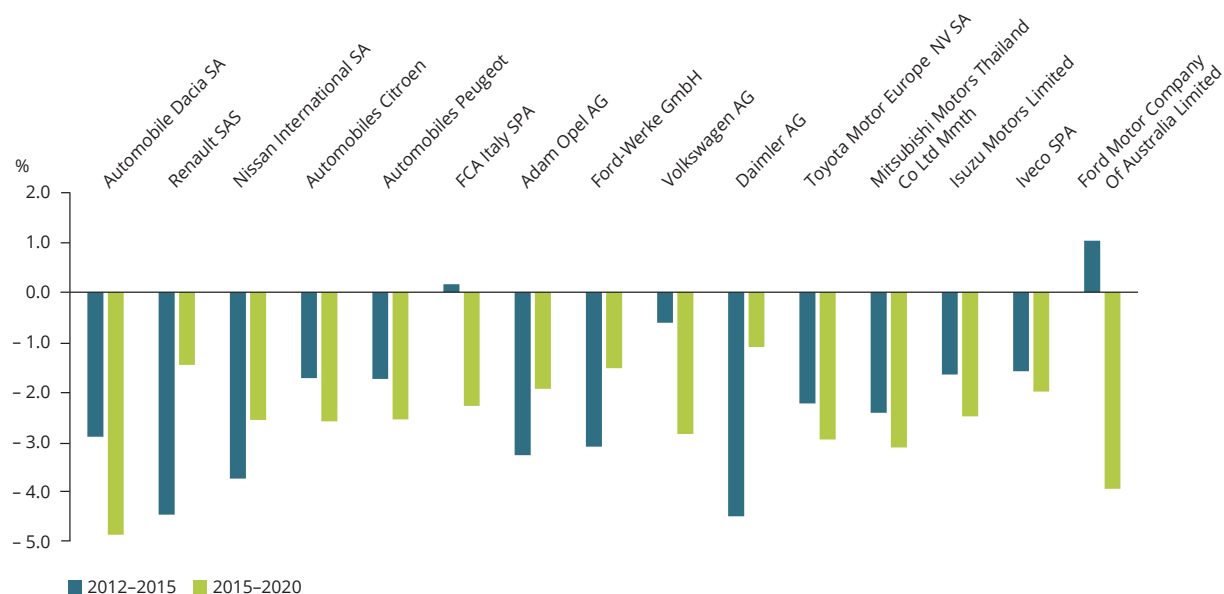


Figure 4.8 Comparison of past and future progress towards meeting the 2020 target



4.7 Excess emission premiums

Similarly to Regulation (EC) No 433/2009, if a manufacturer's or a pool's average specific CO₂ 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 CO₂ 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. No manufacturers exceeded their target.

5 Explanatory factors behind reducing emissions

The previous chapters of this report have documented the past trends in CO₂ emissions from passenger cars and vans officially reported by Member States and vehicle manufacturers. While these emission values are based on measurements performed in the laboratory using the standard European vehicle test cycle, it is nowadays widely accepted that such measurements may not reflect real-world driving performance. This chapter therefore complements the preceding analysis by also evaluating the impact that certain underpinning factors may have had in terms of their contribution to changes in the past real-world emission trends for cars in selected Member States. This helps provide a more integrated view of the evolution in past emissions than can be gained from official statistics alone.

The downward trend in official and real-world CO₂ emissions from new cars registered in the EU has been the result of the combined effect of technical and non-technical measures. On the technical side, the fuel efficiency of new car models has steadily improved over the years through the development of a number of relevant technologies, such as direct fuel injection, variable valve timing and lift, cylinder deactivation, turbocharging, start-stop systems, etc.

On the non-technical side, several policies and measures were adopted by an increasing number of Member States to further reduce emissions at the vehicle fleet level. Most countries, for example, currently apply some form of CO₂ taxation to the registration and/or ownership of passenger cars as well as

providing fiscal incentives — mainly tax reductions and exemptions — for the purchase of low-emitting vehicles. As a result, in certain countries there is a clear trend in consumer preference towards the purchase of more fuel-efficient cars such as diesel and/or electric vehicles.

The trend of the real-world CO₂ emissions from new vehicles registered in several Member States is analysed and discussed in this chapter. The effect on nitrogen oxide (NO_x) emissions is also assessed, both because NO_x is an important air pollutant emitted by especially diesel-engined vehicles, and also in the light of the failures of late Euro vehicle technologies to deliver the originally anticipated on-road emission reductions. With this aim, the COPERT (EMISIA, 2016) model has been used to calculate real-world emissions of CO₂ (JRC, 2011) and NO_x for the illustrated Member States, chosen because over recent years their fleets have changed rapidly towards more efficient diesel cars and electric vehicles.

5.1 Methodology

The COPERT road transport emission software is a recognised and widely used tool for calculating road transport GHG and air pollutant emission inventories based on real-world emissions. It is supported by the EEA and the JRC, while it has been developed, maintained and updated through the activities of the EEA's European Topic Centre on Air Pollution and Climate Change Mitigation (ETC/ACM).

For estimating emissions, COPERT uses several types of input data:

- Emission factors (g/km). COPERT provides real-world emission factors for each vehicle category and fuel type. A correction factor was applied to adjust the in-use fuel consumption predicted by COPERT to the national stock characteristics (JRC, 2011).
- Number of vehicles. COPERT applies the Eurostat classification to define vehicle fleets, in which cars are distinguished into capacity classes (< 0.8 l, 0.8–1.4 l, 1.4–2.0 l and > 2.0 l for petrol and < 1.4 l, 1.4–2.0 l and > 2.0 l for diesel cars) as a method to group together vehicles with similar characteristics. As a first step for the COPERT implementation, the number of vehicle registrations was extracted from the final cars CO₂ database (EEA, 2016b) for the years 2010 to 2015 for the different fuels and they were allocated to the respective size classes (mini, small, medium, large).
- Activity levels (such as annual mileage and circulation data) for each vehicle category. These are taken from relevant data sets developed in the context of relevant activities funded by the European Commission, such as the DG Climate Action TRACCS project ⁽²⁶⁾.

The vehicle categories considered for the analysis include:

- conventional petrol and diesel vehicles;
- electric vehicles, including (i) petrol hybrid, (ii) diesel hybrid, (iii) PHEVs and (iv) BEVs;
- other AFVs, including LPG and CNG vehicles.

In the CO₂ database there is no distinction between hybrid and plug-in hybrid vehicles. Therefore, a number of vehicle models were manually checked by their

commercial name, emissions and other identification parameters to correctly allocate them to the relevant category (hybrid or plug-in hybrid).

Three Member States were selected (the Netherlands, Sweden and Greece), representing countries in which the percentage of low CO₂-emitting vehicles has increased considerably over the time period considered (from 2010 to 2015):

In the Netherlands, the number of AFVs — and in particular PHEVs — more than tripled from 2010 to 2015, reaching about 13 % of all new registrations in 2015 (including hybrid vehicles). Over the same period the number of petrol vehicles decreased by about one third. Low-emitting vehicles had significantly lower taxes than conventional vehicles (EEA, 2016a), with electric vehicles being excluded from taxation.

In Sweden, the already high proportion of diesel cars further increased from 50 % to about 58 %. The number of AFVs has doubled, thanks to the increase in the sales of petrol hybrids and plug-in hybrids. A reduced price is offered for the purchase of cars emitting below 50 g CO₂/km.

In Greece, the total number of car registrations significantly decreased following the economic crisis. However, there was a significant increase in the sales of diesel vehicles when the ban on diesel-powered cars in certain urban areas was lifted in 2012 ⁽²⁷⁾. The diesel proportion of new sales exceeded 60 % in 2015, significantly higher than the 4 % in 2010. The penetration of electric vehicles still remains very low, despite the financial incentives given, such as exemption from circulation tax.

Table 5.1 summarises the registration data by vehicle category and by year for the above three Member States.

⁽²⁶⁾ <http://tracccs.emisia.com>.

⁽²⁷⁾ Diesel engines were banned from central Athens and Thessaloniki, where 70 % of the Greek population live, in 1991 and the ban was lifted only in 2012.

Table 5.1 Registration data by vehicle category and by year for the Netherlands, Sweden and Greece

| Netherlands | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---------------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Petrol | 364 790 | 376 076 | 323 589 | 268 902 | 246 672 | 254 067 |
| Diesel | 96 012 | 154 533 | 140 345 | 101 685 | 104 292 | 127 003 |
| Battery electric | 3 | 835 | 806 | 2 600 | 3 558 | 3 430 |
| Petrol hybrid | 15 970 | 14 409 | 17 688 | 16 037 | 12 289 | 12 612 |
| Diesel hybrid | - | 7 | 3 417 | 5 051 | 1 867 | 2 242 |
| FCEV | - | - | - | - | - | - |
| LPG bifuel | 690 | 6 430 | 8 439 | 1 939 | 908 | 307 |
| CNG bifuel | 140 | 513 | 590 | 481 | 3 239 | 626 |
| Petrol PHEV | 11 | - | 4 275 | 13 655 | 8 935 | 39 233 |
| All passenger cars | 477 616 | 552 803 | 499 149 | 410 350 | 381 760 | 439 520 |

| Sweden | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---------------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Petrol | 124 753 | 91 358 | 76 995 | 89 671 | 104 978 | 121 519 |
| Diesel | 136 848 | 172 716 | 172 781 | 149 951 | 174 165 | 194 396 |
| Battery electric | 40 | 153 | 260 | 430 | 1 241 | 2 863 |
| Petrol hybrid | 3 433 | 2 829 | 2 593 | 4 575 | 6 721 | 7 807 |
| Diesel hybrid | - | - | 298 | 528 | 257 | 149 |
| FCEV | - | - | - | - | - | - |
| LPG bifuel | - | - | 37 | - | - | - |
| CNG bifuel | 7 517 | 6 634 | 5 461 | 3 841 | 4 935 | 5 061 |
| Petrol PHEV | - | - | 641 | 521 | 2 692 | 5 747 |
| All passenger cars | 272 591 | 273 690 | 259 066 | 249 517 | 294 989 | 337 542 |

| Greece | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---------------------------|----------------|---------------|---------------|---------------|---------------|---------------|
| Petrol | 133 833 | 86 651 | 34 438 | 24 179 | 24 900 | 26 692 |
| Diesel | 5 488 | 9 302 | 22 636 | 33 478 | 44 911 | 47 103 |
| Battery electric | - | - | - | - | 38 | 31 |
| Petrol hybrid | 1 072 | 917 | 442 | 355 | 402 | 806 |
| Diesel hybrid | - | - | 3 | 23 | 24 | 175 |
| FCEV | - | - | - | - | - | - |
| LPG bifuel | 14 | 149 | 90 | 67 | 77 | 82 |
| CNG bifuel | 6 | 2 | 1 | 40 | 253 | 318 |
| Petrol PHEV | - | - | 1 | 1 | 19 | 36 |
| All passenger cars | 140 413 | 97 021 | 57 611 | 58 143 | 70 624 | 75 243 |

In order to quantify the impact upon emissions from the changing vehicle fleet registered over the last 6 years, a number of scenarios were assessed:

- The actual CO₂ and NO_x emissions calculated as described above form the **baseline scenario** against which the results from the other scenarios are compared.
- The **AFV scenario** quantifies the benefit in CO₂ and NO_x emissions from the penetration of AFVs in the national vehicle fleets.
- The **dieselisation scenario** quantifies the CO₂ benefit and NO_x damage from the increase in the sales of diesel at the expense of petrol vehicles.
- The **downsizing and efficiency improvement scenario** quantifies the additional CO₂ benefits from the reduction in vehicle size (weight and engine capacity) and overall improvements in fuel efficiency.
- The **no Euro 6 scenario** quantifies the NO_x emission benefits from the introduction of Euro 6 emission standards.

For the simulation of the above scenarios the following assumptions were made:

- For the **AFV scenario** the number of AFV registrations follows the overall passenger cars trend, i.e. their number is changed in proportion to the total number of registrations.
- In the **dieselisation scenario** the percentage of diesel vehicles remains constant over the years and is equal to the 2010 value.
- In the **downsizing and efficiency improvement scenario** the emissions of all vehicle categories remain constant over the years and are equal to the respective 2010 values.
- For the **no Euro 6 scenario** it is assumed that all vehicles registered in 2015 are Euro 5 instead of Euro 6, i.e. their emissions are not reduced.

5.2 Results and discussion

Calculated CO₂ emission factors and emissions for the above scenarios are presented for the selected Member States in Figure 5.1 and in Table 5.2 respectively.

The actual CO₂ emission factors correspond to the emission factors calculated on the basis of the actual fleet registered in each Member State every year.

Figure 5.1 also presents:

- the CO₂ saving due to the increase in AFV and the dieselisation of the fleet;
- the CO₂ saving due to the downsizing and efficiency improvements.

As can be seen for the Netherlands, the savings due to the downsizing and efficiency improvements of petrol and diesel cars have a much greater impact than those achieved because of the penetration of AFVs and the increase in diesel percentage over the entire period. This is despite the fact that AFVs reached the significant level of 13 % of new registrations (most of which are plug-in and hybrid vehicles) in 2015. The contribution of both effects is increasing over the years: in 2011 the CO₂ saving was 8 g CO₂/km, and in 2015 it increased to 27 g CO₂/km.

A similar effect can be also observed for Sweden: the contribution of the downsizing and the efficiency improvements is bigger than that due to AFVs and dieselisation. The first contributed a 9-g CO₂/km reduction in 2015. The latter, even lower than in the Netherlands, because of the lower AFV proportion (6 %), contributed only a 1-g CO₂/km reduction in 2015.

The effect of dieselisation in CO₂ emissions is more apparent in Greece, where the significant increase in the sales of diesel vehicles has resulted in CO₂ savings of a greater magnitude than the savings achieved by downsizing and efficiency improvements in the 2012–2014 period. In the last year, however, the CO₂ savings due to downsizing and efficiency improvements had a bigger impact on the emission factors.

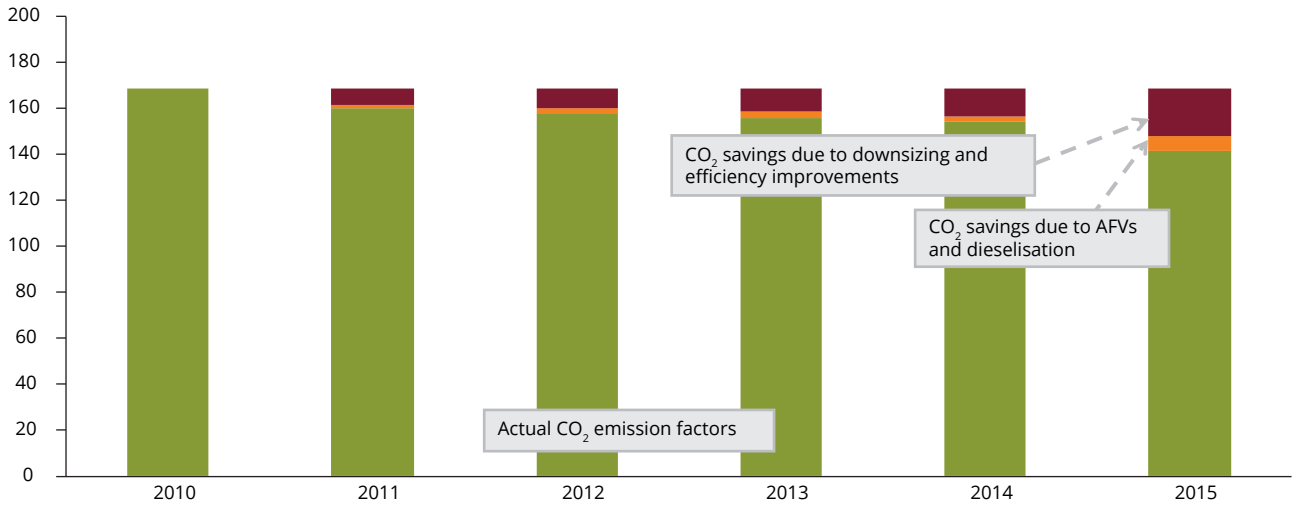
It should be also noted that the relative efficiency advantage of diesel over petrol cars is gradually diminishing over the years as diesels are, on average, generally becoming heavier than their petrol counterparts.

In terms of emissions, Table 5.2 shows that the baseline emissions follow to a large extent the fluctuations in the number of registrations in each Member State. This underlines the relevance of the number of vehicles in reducing the emissions.

Figure 5.1 Calculated CO₂ emission factors for the Netherlands (a), Sweden (b) and Greece (c)

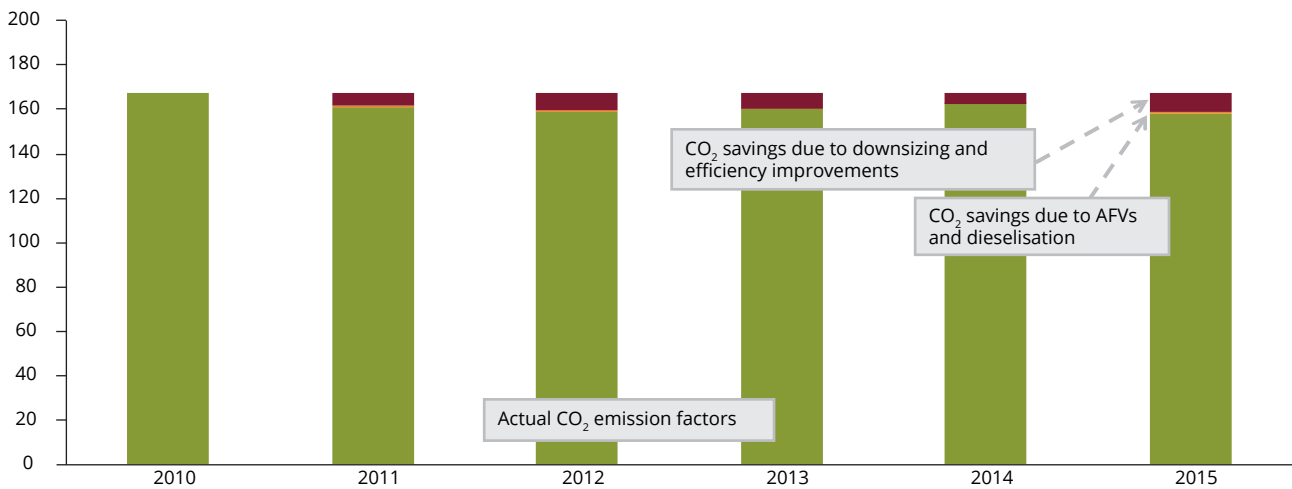
(a)

CO₂ emission factors (g CO₂/km)



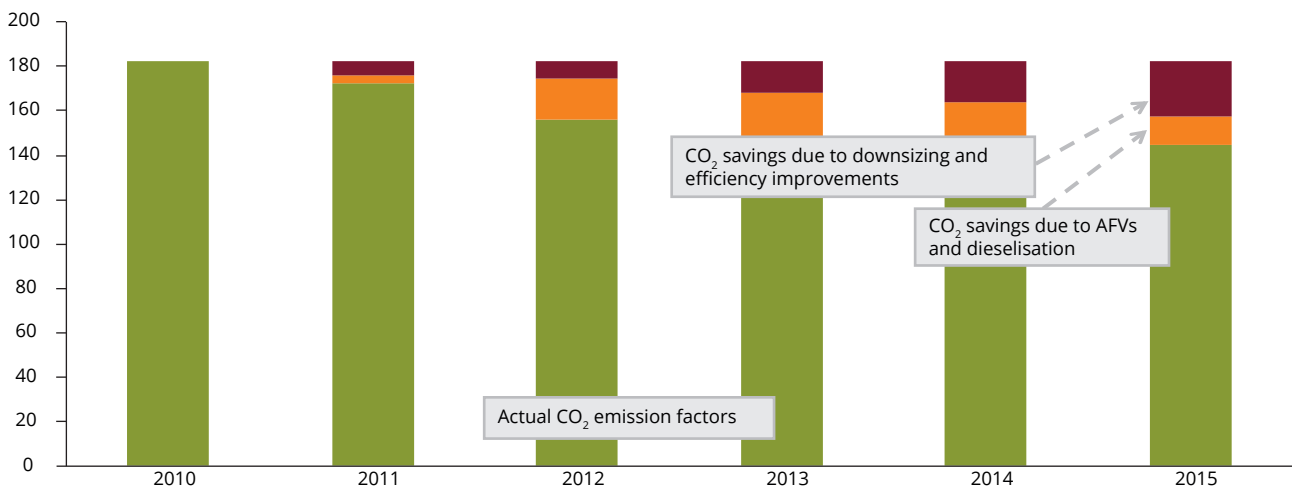
(b)

CO₂ emission factors (g CO₂/km)



(c)

CO₂ emission factors (g CO₂/km)



While the increase in diesel vehicle sales in the Member States considered had a limited effect on the reduction of CO₂ emissions, diesel vehicles emit significantly more NO_x than do conventional petrol-fuelled vehicles. Real-world NO_x emissions have increased considerably between 2010 and 2014, whereas they decreased in 2015 when the latest Euro 6 standards were introduced. The real-world NO_x emission performance of Euro 6 diesel vehicles has improved substantially compared to earlier generations of vehicles, with the average real-world emission factor being about one third that of a Euro 5 vehicle.

Calculated NO_x emission factors and emissions for the above scenarios are illustrated for the selected Member States in Figure 5.2 and in Table 5.2 respectively.

As for CO₂, the actual NO_x emission factors correspond to the emission factors calculated on the basis of the actual fleet registered in the three Member States every year.

Figure 5.2 also presents:

- the NO_x increase due to the dieselisation of the fleet;
- the NO_x saving due to the introduction of Euro 6.

The dieselisation effect in emission factors is evident in all Member States considered in the analysis. In the Netherlands, the increase in emission factors is estimated to be between 13 % and 18 %, and in Sweden between 4 % and 11 %. The increase is more apparent for Greece, which has seen the biggest increase in the sales of diesel vehicles (41–83 %). It is clear, however, that the introduction of the Euro 6 emission standards has decreased the average real-world NO_x emission factors in all Member States.

Figure 5.2 Calculated NO_x emission factors for the Netherlands (a), Sweden (b) and Greece (c)

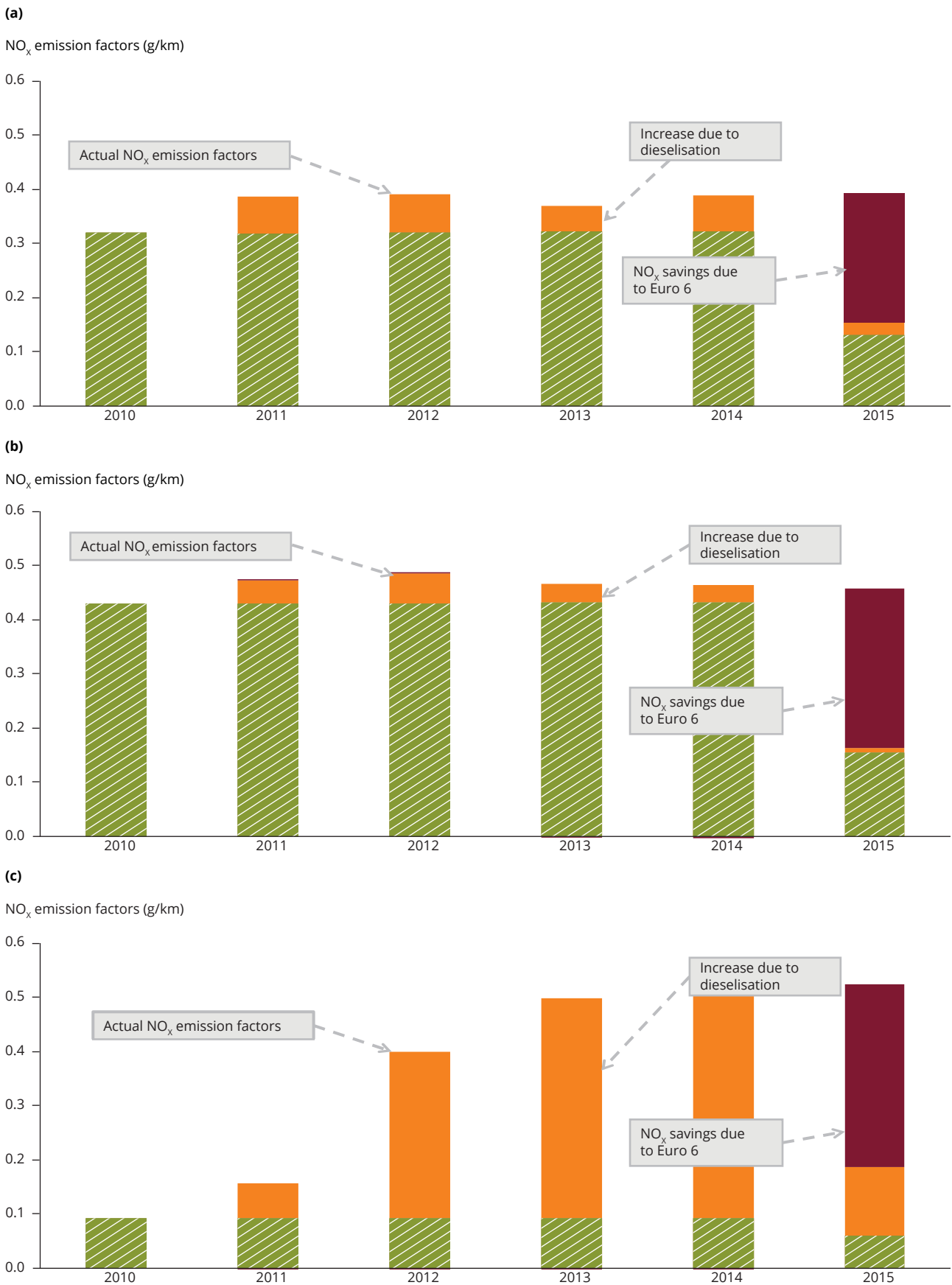


Table 5.2 Calculated CO₂ and NO_x emissions (tonnes) for the Netherlands, Sweden and Greece

| Country | Scenario | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|-------------|-------------|-------------|-------------|-------------|-------------|
| Netherlands | CO ₂ baseline | 1 477 954 | 1 814 320 | 1 620 616 | 1 239 774 | 1 177 981 | 1 268 214 |
| | CO ₂ savings due to AFVs and dieselisation | - | 14 213 | 19 248 | 24 937 | 15 890 | 58 142 |
| | CO ₂ savings due to downsizing and efficiency improvements | - | 82 646 | 90 653 | 76 802 | 90 940 | 181 635 |
| | NO _x baseline | 2 796 | 4 384 | 4 005 | 2 939 | 2 969 | 1 390 |
| | NO _x increase due to dieselisation | - | 787 | 725 | 373 | 511 | 225 |
| | NO _x savings due to EURO 6 | - | 0 | 0 | 0 | 0 | 2 199 |
| | Sweden | | 2010 | 2011 | 2012 | 2013 | 2014 |
| CO ₂ baseline | 1 262 074 | 1 353 285 | 1 304 122 | 1 207 591 | 1 444 505 | 1 592 904 | |
| CO ₂ savings due to AFVs and dieselisation | - | 4 772 | 3 700 | 632 | 1 583 | 5 873 | |
| CO ₂ savings due to downsizing and efficiency improvements | - | 51 294 | 66 200 | 52 317 | 44 462 | 88 639 | |
| NO _x baseline | 3 233 | 3 982 | 3 973 | 3 501 | 4 126 | 1 638 | |
| NO _x increase due to dieselisation | - | 366 | 441 | 257 | 278 | 72 | |
| NO _x savings due to EURO 6 | - | 1 | 1 | 1 | 1 | 2 990 | |
| Greece | | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
| CO ₂ baseline | 274 437 | 191 563 | 135 959 | 148 599 | 185 640 | 195 319 | |
| CO ₂ savings due to AFVs and dieselisation | - | 4 054 | 16 099 | 21 386 | 24 078 | 17 599 | |
| CO ₂ savings due to downsizing and efficiency improvements | 0 | 6 638 | 6 775 | 14 099 | 22 912 | 32 814 | |
| NO _x baseline | 138 | 174 | 349 | 504 | 673 | 252 | |
| NO _x increase due to dieselisation | - | 72 | 269 | 412 | 556 | 170 | |
| NO _x savings due to EURO 6 | - | -0 | 0 | 0 | 0 | 460 | |

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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 |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Austria | 295 | 280 | 300 | 311 | 308 | 309 | 298 | 294 | 319 | 328 | 356 | 335 | 319 | 303 | 308 |
| Belgium | 497 | 468 | 459 | 485 | 480 | 526 | 525 | 536 | 475 | 551 | 577 | 490 | 490 | 485 | 503 |
| Bulgaria | - | - | - | - | - | - | 86 | 91 | 21 | 14 | 14 | 14 | 15 | 16 | 17 |
| Croatia | - | - | - | - | - | - | - | - | - | - | - | - | 28 | 35 | 36 |
| Cyprus | - | - | - | 20 | 18 | 20 | 25 | 24 | 16 | 15 | 15 | 11 | 7 | 8 | 9 |
| Czech Republic | - | - | - | 115 | 105 | 107 | 126 | 134 | 159 | 165 | 169 | 170 | 162 | 179 | 227 |
| Denmark | 97 | 113 | 102 | 124 | 147 | 154 | 160 | 148 | 111 | 151 | 170 | 171 | 184 | 188 | 204 |
| Estonia | - | - | - | 17 | 20 | 25 | 31 | 24 | 10 | 10 | 17 | 19 | 20 | 21 | 21 |
| Finland | 106 | 113 | 145 | 141 | 146 | 143 | 123 | 137 | 89 | 109 | 122 | 107 | 100 | 103 | 106 |
| 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 |
| 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 |
| Greece | 245 | 242 | 203 | 264 | 274 | 279 | 294 | 279 | 221 | 140 | 97 | 57 | 58 | 71 | 76 |
| Hungary | - | - | - | 230 | 199 | 193 | 167 | 163 | 66 | 43 | 47 | 52 | 55 | 68 | 77 |
| Ireland | 117 | 152 | 146 | 154 | 171 | 177 | 186 | 151 | 56 | 89 | 90 | 73 | 74 | 96 | 123 |
| Italy | 2 430 | 2 278 | 2 244 | 2 264 | 2 237 | 2 325 | 2 494 | 2 163 | 2 160 | 1 954 | 1 745 | 1 402 | 1 304 | 1 351 | 1 573 |
| Latvia | - | - | - | 11 | 16 | 25 | 31 | 19 | 5 | 6 | 10 | 10 | 10 | 12 | 14 |
| Lithuania | - | - | - | 9 | 11 | 15 | 21 | 22 | 7 | 7 | 12 | 12 | 12 | 14 | 17 |
| Luxembourg | 22 | 44 | 44 | 48 | 49 | 51 | 51 | 52 | 47 | 50 | 50 | 49 | 46 | 49 | 46 |
| Malta | - | - | - | 4 | 7 | 6 | 6 | 5 | 6 | 4 | 6 | 6 | 6 | 6 | 7 |
| Netherlands | 526 | 507 | 487 | 479 | 452 | 478 | 494 | 493 | 396 | 480 | 554 | 500 | 416 | 384 | 438 |
| Poland | - | - | - | 297 | 230 | 223 | 264 | 305 | 221 | 219 | 275 | 274 | 288 | 304 | 354 |
| Portugal | | 232 | 194 | 202 | 208 | 199 | 204 | 215 | 159 | 223 | 154 | 96 | 105 | 142 | 179 |
| Romania | - | - | - | - | - | - | 313 | 286 | 115 | 94 | 82 | 66 | 57 | 70 | 81 |
| Slovakia | - | - | - | - | 45 | 65 | 65 | 57 | 70 | 65 | 69 | 70 | 66 | 74 | 78 |
| Slovenia | - | - | - | 37 | 64 | 62 | 69 | 72 | 60 | 60 | 55 | 50 | 51 | 54 | 53 |
| Spain | 400 | 969 | 1 319 | 1 606 | 1 640 | 1 622 | 1 606 | 1 165 | 964 | 976 | 810 | 704 | 732 | 895 | 1 076 |
| Sweden | 223 | 249 | 257 | 260 | 269 | 278 | 300 | 248 | 209 | 277 | 289 | 263 | 252 | 297 | 338 |
| 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 |

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 |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 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 |
| 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 |
| Bulgaria | - | - | - | - | - | - | - | - | - | 1 454 | 1 462 | 1 485 | 1 475 | 1 424 | 1 408 |
| Croatia | - | - | - | - | - | - | - | - | - | - | - | - | 1 309 | 1 307 | 1 326 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| Malta | - | - | - | - | - | - | - | 1 317 | 1 182 | 1 200 | 1 216 | 1 465 | 1 212 | 1 199 | 1 206 |
| 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 |
| 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 |
| 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 |
| Romania | - | - | - | - | - | - | 1 268 | 1 286 | 1 291 | 1 281 | 1 325 | 1 381 | 1 365 | 1 347 | 1 333 |
| Slovakia | - | - | - | - | 1 174 | - | - | - | - | 1 386 | 1 418 | 1 421 | 1 410 | 1 410 | 1 420 |
| 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 |
| 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 |
| 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 |
| 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 |

Table A1.3 Average CO₂ emissions from new passenger cars by Member State (g CO₂/km)

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 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 |
| 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 |
| Bulgaria | - | - | - | - | - | - | 171.6 | 171.5 | 172.1 | 158.9 | 151.4 | 149.2 | 141.7 | 135.9 | 130.3 |
| Croatia | - | - | - | - | - | - | - | - | - | - | - | - | 127.1 | 115.8 | 112.8 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| Romania | - | - | - | - | - | - | 154.8 | 156.0 | 157.0 | 148.5 | 140.7 | 139.0 | 132.1 | 128.2 | 125.0 |
| Slovakia | - | - | - | - | 157.4 | 152.0 | 152.7 | 150.4 | 146.6 | 149.0 | 144.9 | 141.0 | 135.1 | 131.7 | 127.6 |
| 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 |
| 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 |
| 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 |
| 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 |

Table A1.4 New vans by Member State: registrations, mass and average emissions

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

Annex 2

Table A2.1 Data used in calculating the CO₂ emission performance of car manufacturers in 2015

| Manufacturer | Pools and derogations | Number of registrations | Average CO ₂ corrected | Specific emission target | Distance to target |
|---|-----------------------|-------------------------|-----------------------------------|--------------------------|--------------------|
| Alfa Romeo SPA | P3 | 18 961 | 116.269 | 128.395 | - 12.126 |
| Alpina Burkard Bovensiepen GmbH e Co KG | DMD | 690 | 172.174 | 225 | - 52.826 |
| Aston Martin Lagonda Ltd | D | 1 449 | 312.204 | 310 | 2.204 |
| Audi AG | P14 | 717 933 | 126.245 | 139.941 | - 13.696 |
| Audi Hungaria Motor KFT | P14 | 11 710 | 142.77 | 131.387 | 11.383 |
| Automobiles Citröen | | 618 570 | 105.713 | 124.141 | - 18.428 |
| Automobiles Peugeot | | 857 421 | 103.659 | 124.904 | - 21.245 |
| Avtovaz JSC | P10 | 905 | 202.287 | 124.3 | 77.987 |
| Bentley Motors Ltd | D | 2 251 | 290.891 | 298 | - 7.109 |
| Bluecar SAS | | 934 | 0 | 127.529 | - 127.529 |
| Bluecar Italy SRL | | 258 | 0 | 124.882 | - 124.882 |
| Bayerische Motoren Werke AG | P1 | 886 972 | 124.883 | 138.988 | - 14.105 |
| BMW M GmbH | P1 | 11 335 | 197.64 | 148.016 | 49.624 |
| Bugatti Automobiles SAS | P14 | 7 | 541.857 | 160.959 | 380.898 |
| BYD Auto Industry Company Limited | | 9 | 0 | 179.493 | - 179.493 |
| Caterham Cars Limited | DMD | 103 | 149.282 | 210 | - 60.718 |
| Chevrolet Italia SPA | P5 | 3 | 131.667 | 130.731 | 0.936 |
| FCA US LLC | P3 | 99 453 | 158.76 | 148.516 | 10.244 |
| CNG-Technik GmbH | P4 | 18 375 | 115.794 | 122.176 | - 6.382 |
| Automobile Dacia SA | P10 | 378 487 | 122.694 | 122.337 | 0.357 |
| Daimler AG | P2 | 800 292 | 124.079 | 138.62 | - 14.541 |
| DFSK Motor Co Ltd | DMD | 3 | 184 | 124.485 | 59.515 |
| Donkervoort Automobielen BV | DMD | 5 | 178 | 178 | 0 |
| DR Motor Company SRL | DMD | 435 | 145.848 | 135 | 10.848 |
| Ferrari SPA | D | 2 250 | 299.448 | 295 | 4.448 |
| FCA Italy SPA | P3 | 703 652 | 116.3 | 120.249 | - 3.949 |
| Ford Motor Company | P4 | 3 521 | 252.307 | 146.403 | 105.904 |
| Ford-Werke GmbH | P4 | 993 383 | 117.701 | 128.204 | - 10.503 |
| Fuji Heavy Industries Ltd | ND | 29 538 | 159.924 | 164.616 | - 4.692 |
| General Motors Company | P5 | 1 383 | 281.883 | 154.339 | 127.544 |
| GM Korea Company | P5 | 1 391 | 126.398 | 125.077 | 1.321 |
| Great Wall Motor Company Limited | DMD | 62 | 184.113 | 188 | - 3.887 |
| Honda Automobile China Co Ltd | P6 | 380 | 124.718 | 119.495 | 5.223 |
| Honda Motor Co Ltd | P6 | 19 845 | 119.878 | 125.749 | - 5.871 |
| Honda Türkiye AS | P6 | 691 | 155.174 | 126.494 | 28.68 |
| Honda of the UK Manufacturing Ltd | P6 | 104 589 | 133.387 | 133.699 | - 0.312 |

Table A2.1 Data used in calculating the CO₂ emission performance of car manufacturers in 2015 (cont.)

| Manufacturer | Pools and derogations | Number of registrations | Average CO ₂ corrected | Specific emission target | Distance to target |
|---|-----------------------|-------------------------|-----------------------------------|--------------------------|--------------------|
| Hyundai Motor Company | P7 | 64 425 | 134.125 | 136.218 | - 2.093 |
| Hyundai Assan Otomotiv Sanayi ve Ticaret AS | P7 | 155 198 | 113.524 | 116.604 | - 3.08 |
| Hyundai Motor Manufacturing Czech SRO | P7 | 236 926 | 134.525 | 133.738 | 0.787 |
| Hyundai Motor Europe GmbH | P7 | 5 | 97.8 | 118.529 | - 20.729 |
| Hyundai Motor India Ltd | P7 | 1 156 | 114.454 | 117.769 | - 3.315 |
| Isuzu Motors Ltd | DMD | 13 | 209.462 | 161.171 | 48.291 |
| Jaguar Land Rover Limited | P12 | 172 731 | 164.029 | 178.025 | - 13.996 |
| Jiangling Motor Holding Co Ltd | DMD | 1 | 137 | 129.223 | 7.777 |
| Kia Motors Corporation | P8 | 228 169 | 120.295 | 127.138 | - 6.843 |
| Kia Motors Slovakia SRO | P8 | 151 870 | 137.69 | 133.038 | 4.652 |
| Koenigsegg Automotive AB | DMD | 2 | 370.5 | 275 | 95.5 |
| KTM-Sportmotorcycle AG | DMD | 33 | 191.788 | 190 | 1.788 |
| Lada Automobile GmbH | DMD | 900 | 216.19 | 126.024 | 90.166 |
| Lada France SAS | P10 | 1 | 179 | 129.452 | 49.548 |
| Automobili Lamborghini SPA | D | 693 | 317.201 | 325 | - 7.799 |
| Litex Motors AD | DMD | 25 | 180.12 | 156 | 24.12 |
| Lotus Cars Limited | DMD | 694 | 203.032 | 280 | - 76.968 |
| Magyar Suzuki Corporation Ltd | P11 | 125 532 | 120.485 | 123.114 | - 2.629 |
| Mahindra & Mahindra Ltd | DMD | 410 | 177.888 | 162 | 15.888 |
| Maruti Suzuki India Ltd | P11 | 5 278 | 97.89 | 123.114 | - 25.224 |
| Maserati SPA | D | 5 336 | 195.311 | 255 | - 59.689 |
| Mazda Motor Corporation | ND | 194 752 | 126.779 | 129.426 | - 2.647 |
| Mclaren Automotive Limited | D | 325 | 267.446 | 275 | - 7.554 |
| Mercedes-AMG GmbH | P2 | 3 832 | 208.663 | 144.858 | 63.805 |
| MG Motor UK Limited | D | 3 114 | 133.934 | 146 | - 12.066 |
| Micro-Vett SRL | | 1 | 0 | 128.263 | - 128.263 |
| Mitsubishi Motors Corporation MMC | P9 | 95 403 | 104.631 | 142.028 | - 37.397 |
| Mitsubishi Motors Europe BV MME | P9 | 1 | 125 | 113.457 | 11.543 |
| Mitsubishi Motors Thailand Co Ltd MMTH | P9 | 27 831 | 96.744 | 109.703 | - 12.959 |
| Morgan Technologies Ltd | DMD | 427 | 193.948 | 170 | 23.948 |
| National Electric Vehicle Sweden | DMD | 129 | 200 | 141.059 | 58.941 |
| Nissan International SA | | 548 682 | 113.778 | 129.73 | - 15.952 |
| Adam Opel AG | P5 | 915 120 | 126.775 | 130.695 | - 3.92 |
| Pagani Automobili SPA | DMD | 1 | 349 | 340 | 9 |
| Perodua Manufacturing SDN BHD | DMD | 2 | 137 | 113.457 | 23.543 |
| PGO Automobiles | DMD | 19 | 174.158 | 175 | - 0.842 |
| Dr Ing HCF Porsche AG | P14 | 64 611 | 184.395 | 154.253 | 30.142 |
| Quattro GmbH | P14 | 6 313 | 224.593 | 149.793 | 74.8 |
| Radical Motosport Ltd | DMD | 4 | 314.5 | 200 | 114.5 |
| Renault SAS | P10 | 984 980 | 105.304 | 125.023 | - 19.719 |
| Renault Trucks | DMD | 22 | 183 | 168.282 | 14.718 |
| Rolls-Royce Motor Cars Ltd | P1 | 553 | 331.461 | 181.335 | 150.126 |
| Seat SA | P14 | 332 980 | 116.577 | 124.324 | - 7.747 |
| Secma SAS | DMD | 35 | 132.6 | 131 | 1.6 |
| Skoda Auto AS | P14 | 585 553 | 115.511 | 125.552 | - 10.041 |

Table A2.1 Data used in calculating the CO₂ emission performance of car manufacturers in 2015 (cont.)

| Manufacturer | Pools and derogations | Number of registrations | Average CO ₂ corrected | Specific emission target | Distance to target |
|------------------------------|-----------------------|-------------------------|-----------------------------------|--------------------------|--------------------|
| Ssangyong Motor Company | D | 13 225 | 165.625 | 180 | - 14.375 |
| Suzuki Motor Corporation | P11 | 12 654 | 164.37 | 123.114 | 41.256 |
| Suzuki Motor Thailand Co Ltd | P11 | 25 442 | 96.326 | 123.114 | - 26.788 |
| Tata Motors Limited | P12 | 315 | 185.238 | 178.025 | 7.213 |
| Tazzari GL SPA | | 2 | 0 | 99.838 | - 99.838 |
| Tesla Motors Ltd | | 9 284 | 0 | 167.44 | - 167.44 |
| Toyota Motor Europe NV SA | P13 | 585 317 | 108.264 | 127.386 | - 19.122 |
| Volkswagen AG | P14 | 1 655 305 | 118.259 | 130.864 | - 12.605 |
| Volvo Car Corporation | | 266 318 | 120.67 | 145.148 | - 24.478 |
| Westfield Sports Cars | DMD | 2 | 177.5 | 99.975 | 77.525 |
| Wiesmann GmbH | DMD | 5 | 281.8 | 274 | 7.8 |

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 CO₂ 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 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 CO₂ 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 CO₂ 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 CO₂ 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 CO₂ emissions from passenger cars and vans in 2015

2016 — 66 pp. — 21 x 29.7 cm

ISBN 978-92-9213-822-6

doi:10.2800/85593

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