EN 2024

01

Special report

Reducing carbon dioxide emissions from passenger cars

Finally picking up pace, but challenges on the road ahead

EUROPEAN COURT OF AUDITORS

Contents

Executive summary

I While the European Union has managed to reduce greenhouse gas emissions in many areas over the last 30 years, carbon dioxide emissions from the transport sector have continued to grow. In 2021, they accounted for 23 % of the EU's total greenhouse gas emissions, with passenger cars responsible for more than half.

II The Regulation on carbon dioxide (CO_2) emission performance standards for new passenger cars (hereafter the "Cars CO_2 Regulation") is the key EU measure for reducing carbon dioxide emissions produced by new vehicles. From 2010, it set an EU-wide average emissions target for new vehicles and set manufacturer-specific emission targets from 2012.

III This report provides an early insight into the implementation of the Cars CO_2 Regulation for new passenger cars, which changed significantly in 2019. With our findings and recommendations, we aim to provide input for the Commission and stakeholders to make the implementation of the Regulation more efficient and effective in reducing new passenger car CO_2 emissions and help the EU meet its 2030 and 2050 climate targets.

IV As of 2020, 11 years after the first Cars CO_2 Regulation entered into force, new passenger car CO_2 emissions began to drop significantly. This was mainly due to a significant uptake of electric vehicles, while real-world CO_2 emissions from cars with combustion engines have not dropped. While car CO_2 emissions data were collected and verified by the Commission in line with the Regulation, there is insufficient assurance on the accuracy of CO_2 emissions declared by manufacturers on certificates of conformity for new cars at the start of the process.

V The reason for this insufficient assurance is twofold. Firstly, type-approval authorities in two of the three visited member states did not carry out the required manufacturer checks, and the Commission only has limited information on these checks. Secondly, the Commission did not use the information on CO_2 emissions from pollutant emissions testing to assess the risk of incorrect CO_2 values. We note that there was no legal requirement to make use of such information.

VI We observed delays in member states' submission of the 2020 data, and detected issues that affected the completeness and accuracy of the data. The many exchanges between the European Environment Agency and member states make the clearing of the data a cumbersome process. Nevertheless, the provisional data were published by the Commission in a timely fashion. Its subsequent clearing with manufacturers improved the overall completeness and accuracy of the data. However, the entire process takes too long, and the final data for 2020 were finally published almost one year after the regulatory deadline. We can confirm the Commission's calculations of EU-wide and manufacturers' average emissions, targets, and excess-emission premiums.

VII In the 2009-2019 period, the average real-world emissions of new vehicles did not drop, mainly because manufacturers focused on reducing emissions in the laboratory rather than on the road. In 2017, a new laboratory test cycle that better reflected actual driving conditions became compulsory for new type-approved vehicles. This effectively closed many loopholes that had been created under the previous test cycle, and narrowed the gap between laboratory and real-world emissions. Since 2022, the Commission has been collecting information on real-world emissions from on-board fuel consumption meters installed in new vehicles. It therefore has information on the extent of the gap between laboratory and real-world emissions for new vehicles registered from 2021 onwards, and would be able to monitor if this gap were to increase again.

VIII From 2020, when more stringent emission targets started to apply, we could see that the Cars CO_2 Regulation contributed positively to reducing real-world emissions from new vehicles, mainly due to the significant uptake of electric vehicles. At the same time, emissions from new combustion vehicles and plug-in hybrids remain an area of concern.

IX We consider that the CO_2 emission reduction targets for new passenger cars and the EU's climate ambitions up to 2030 are not sufficiently well aligned. The key challenge for meeting emission reduction targets for 2030 and beyond will be to ensure a sufficient uptake of zero-emission vehicles. In particular, it will be important to address electric vehicle affordability, provide sufficient electric vehicle charging infrastructure, and secure the supply of raw materials to produce batteries.

X We recommend that the Commission:

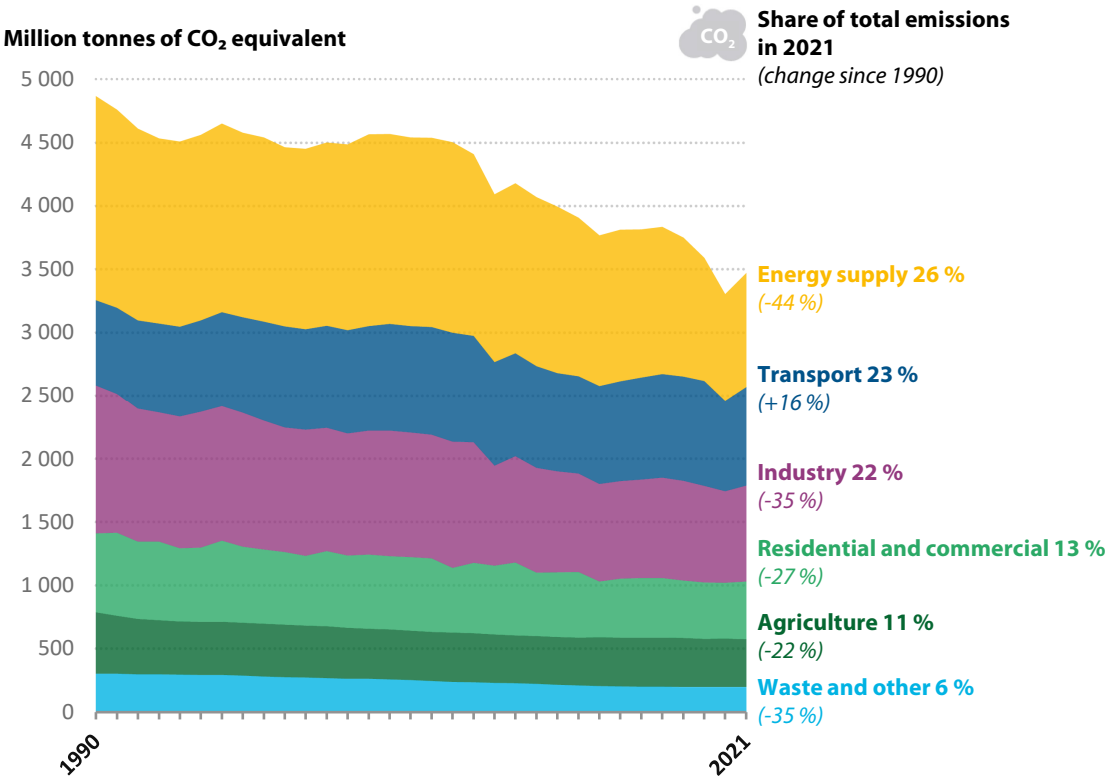
- increase the level of assurance that vehicle CO_2 emissions do correspond to manufacturer-declared levels on certificates of conformity;
- make better use of electronic tools for collecting and verifying car data;
- refocus the CO_2 emission reduction targets to address key elements that affect the CO_2 emissions from new passenger cars.

Introduction

Passenger car CO_2 emissions

01 In 2021, the carbon dioxide (CO_2) emissions from transport accounted for almost 23 % of European Union (EU-27) greenhouse gas emissions, representing the second largest source of these emissions after energy supply[1]. In the EU, transport remains the only economic sector where the total level of emissions has not dropped since 1990 (***Figure 1***).

Figure 1 – EU-27: greenhouse gas emissions by sector (1990-2021)



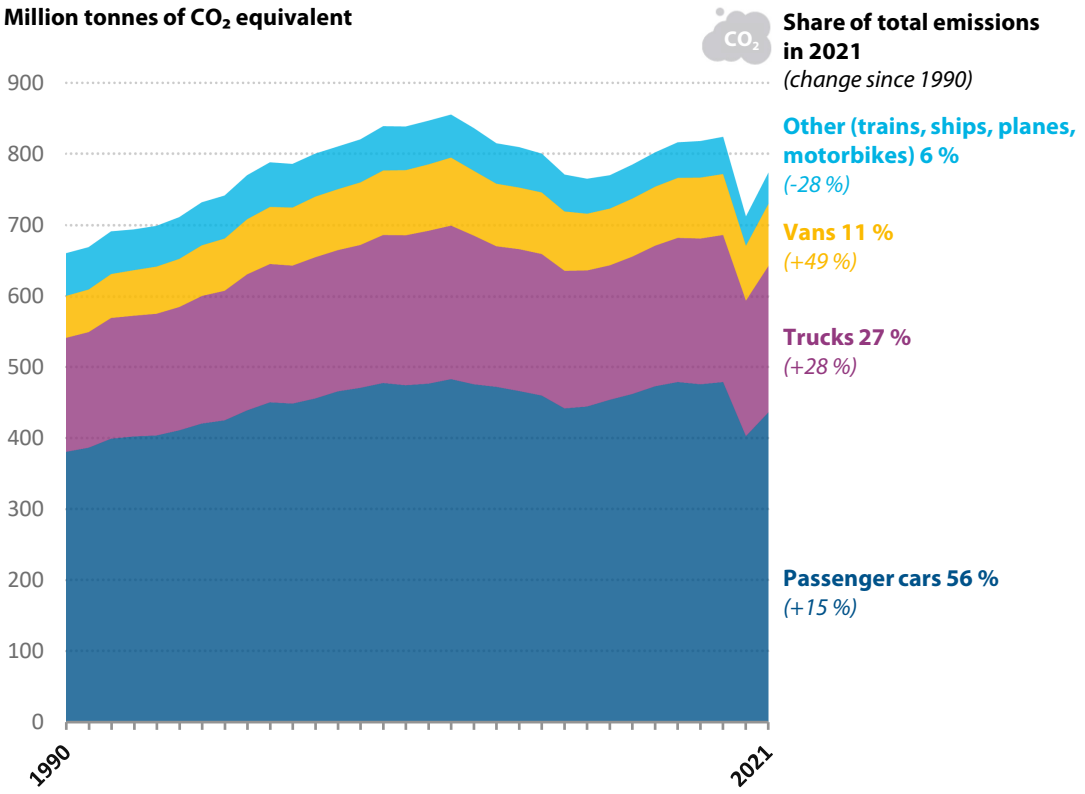
Note: Transport emissions exclude emissions from international aviation and shipping.

Source: ECA based on EEA (greenhouse gases – data viewer 22 June 2023).

[1] EEA, Greenhouse gases – data viewer 22 June 2023.

02 Carbon dioxide emissions from passenger cars accounted for 56 % of the total amount of transport-generated emissions in 2021[2]. ***Figure 2*** shows that the emissions from passenger cars have increased compared to 1990 levels, except for occasional drops triggered by economic downturns such as the COVID-19 pandemic in 2020.

Figure 2 – EU 27: Breakdown of CO_2 emissions from transport (1990-2021)

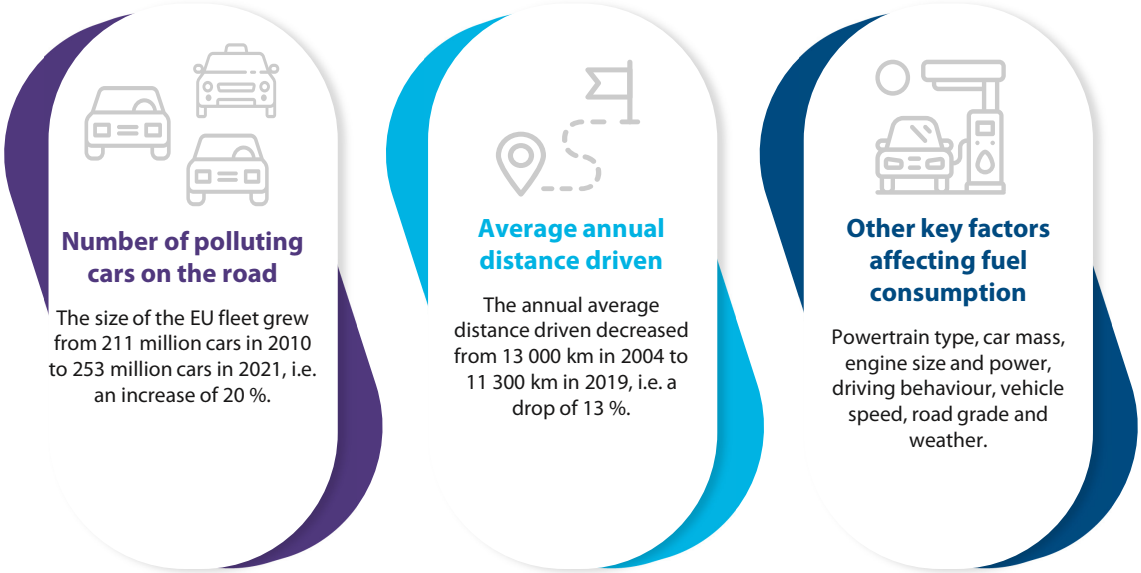


Source: ECA based on EEA (greenhouse gases – data viewer 18 April 2023).

[2] EEA, Greenhouse gases – data viewer 22 June 2023.

03 *Figure 3* provides an overview of the key factors driving CO_2 emissions from passenger cars.

Figure 3 – Key factors driving CO_2 emissions from passenger cars



Source: ECA based on data from Eurostat and Odyssee-Mure.

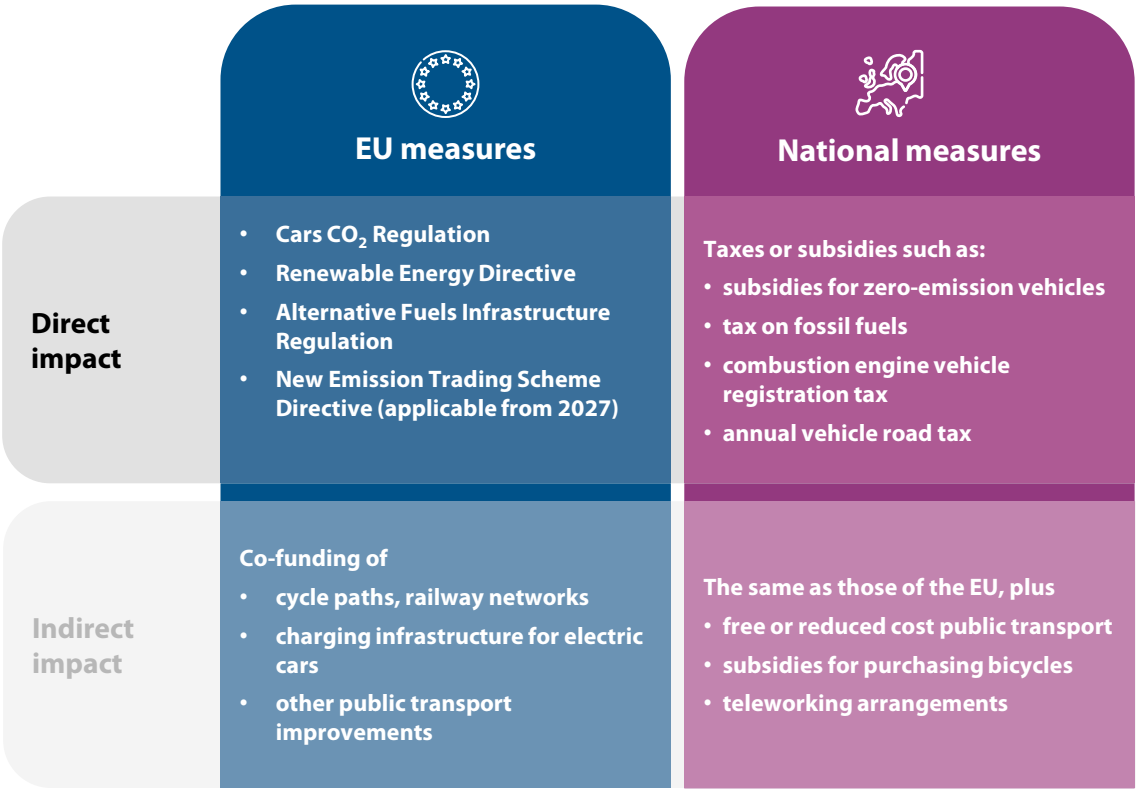
EU and member state actions to reduce CO_2 emissions

04 The EU signed the Kyoto Protocol in 1997. It committed to reducing its greenhouse gas emissions by 20 % by 2020, using 1990 emissions levels as a baseline. In 2015, the EU signed up to the Paris Agreement, with the aim of limiting global warming to "well below" 2 °C and preferably even to 1.5 °C, compared to pre-industrial levels.

05 For the EU, the obligation stemming from the Paris Agreement was translated into the EU's intermediate 2030 emissions reduction target, which was initially set at 40 %. Following the adoption of the European Climate Law in 2021, this target was increased to 55 %. This law also established a binding EU target of "net zero" greenhouse gas emissions by 2050.

06 *Figure 4* provides an overview of key EU and national measures to reduce CO_2 emissions from passenger cars.

Figure 4 – Key measures to reduce CO_2 emissions from passenger cars

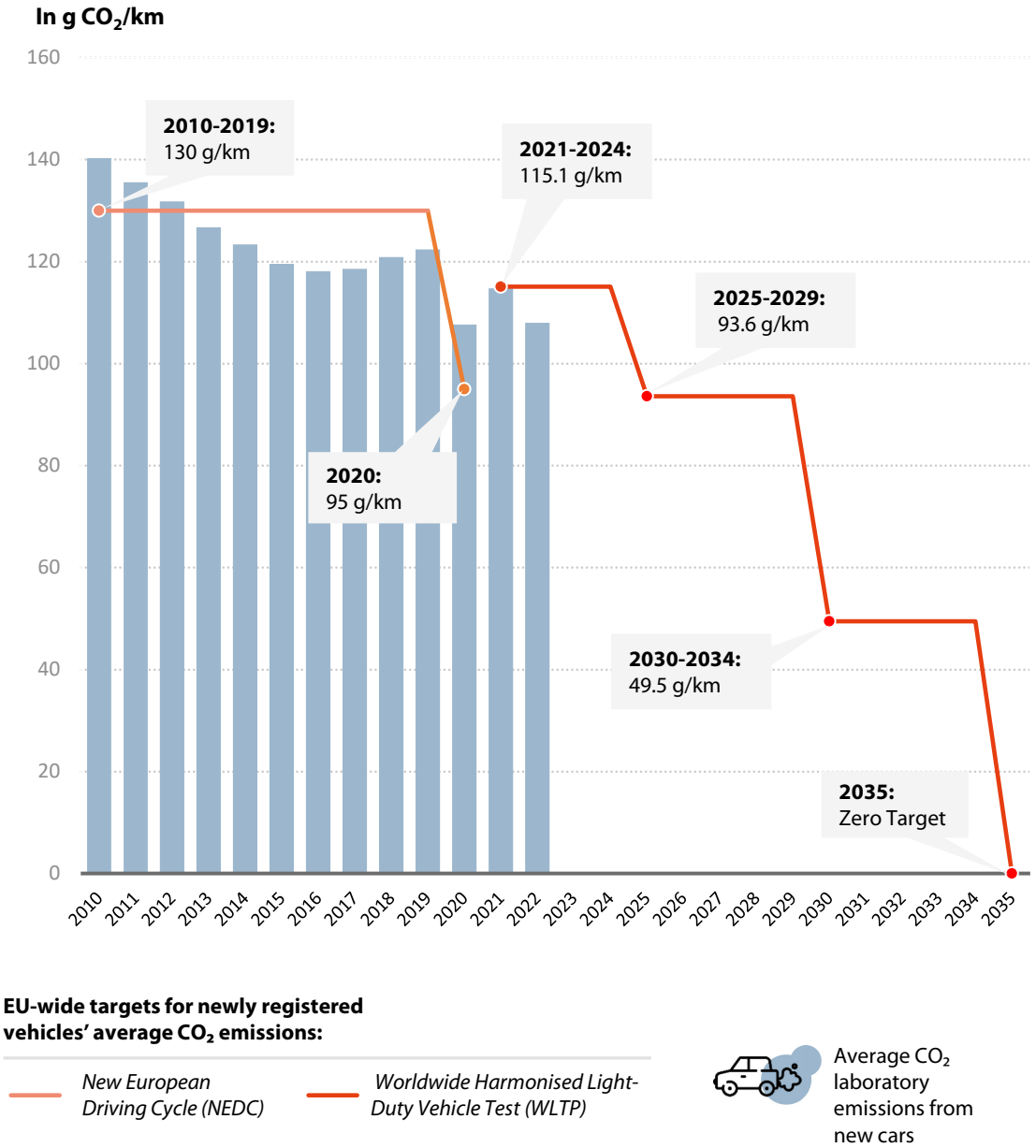


Source: ECA.

07 The Regulation on CO_2 emission performance standards for new passenger cars is the key piece of legislation at European level for reducing the CO_2 emissions from new cars. It was adopted in 2009, with significant changes introduced in 2019 (see ***Annex I***). The Regulation applies to the 27 EU member states and to Iceland (from 2018), Norway (from 2019), and the UK (until 2020), altogether hereafter the "reporting countries". It does not provide for any EU funding. The Regulation has set an EU fleet-wide target for average CO_2 emissions from newly registered cars since 2010. From 2012, specific emission targets were set for each manufacturer or pool of manufacturers. If they do not meet these specific emission targets, manufacturers have to pay an excess-emission premium. Over time, EU fleet-wide and specific emission targets have become increasingly ambitious, with zero-emission targets poised to take effect from 2035. The basis on which these targets are set has changed, from the "New European Driving Cycle" (NEDC) test procedure to the "Worldwide Harmonised Light Vehicles Test Procedure" (WLTP) in 2021. ***Figure 5*** provides an overview of the EU fleet-wide targets and average CO_2 emissions from new cars since 2010[3].

[3] Regulation (EC) No 443/2009 and Regulations (EU) 2019/631 and 2023/851.

Figure 5 – EU targets and average laboratory CO_2 emissions of new cars

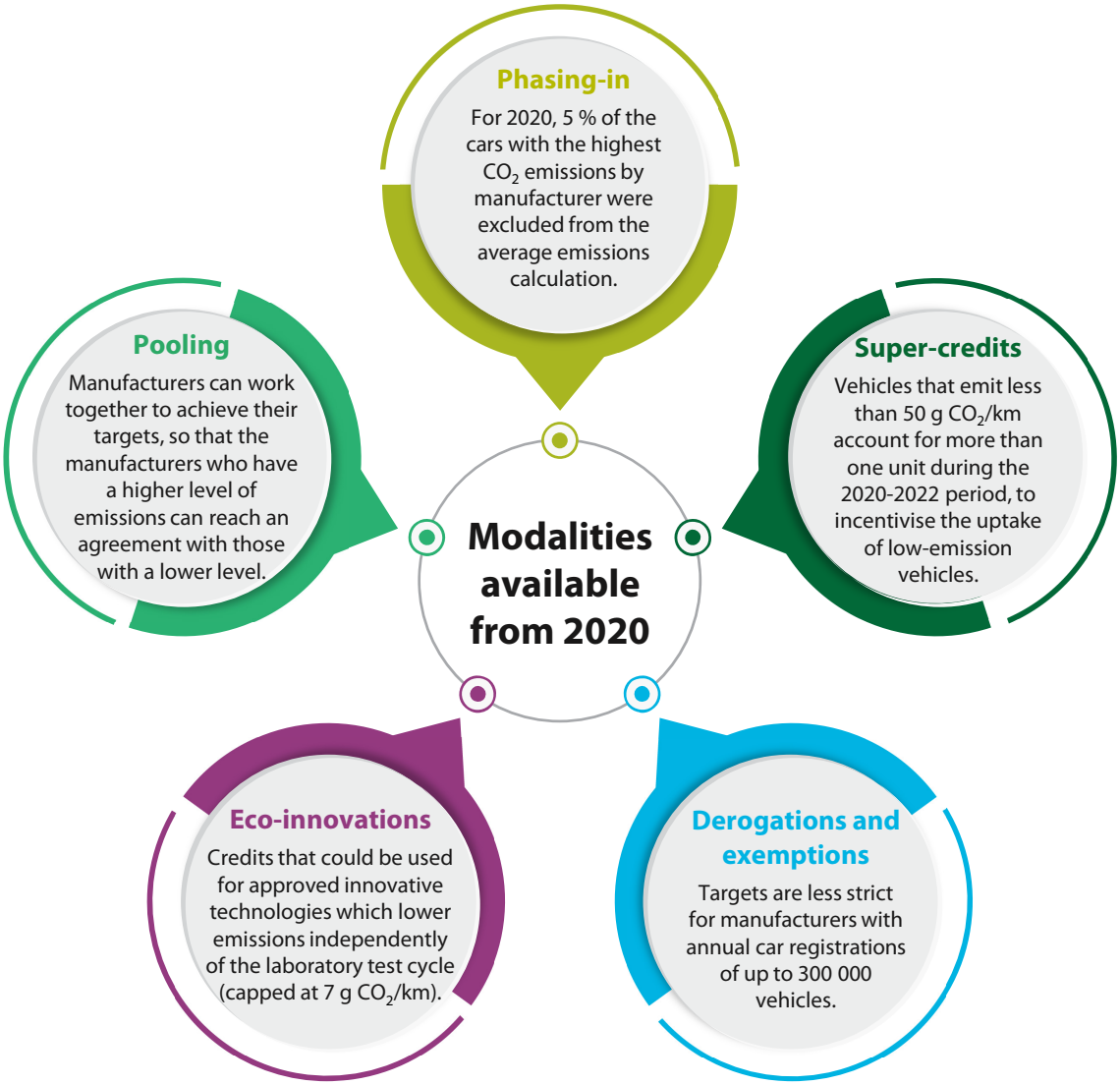


Source: ECA, based on EEA, JRC, and Cars CO_2 Regulations (EC).

08 For the purposes of the Cars CO_2 Regulation, the CO_2 emissions of an individual car are based on measurements made under standardised conditions in a laboratory, as opposed to emissions measured on the road. This means that it is possible to compare the CO_2 values obtained across different car models. However, CO_2 emissions on the road are usually higher than those measured in a laboratory setting. On the road, emissions depend on factors such as driver behaviour, outside temperature, traffic, altitude, and the use of energy consuming features (e.g. lights, air conditioning).

09 The purpose of the Cars CO_2 Regulation is to stimulate the car manufacturing industry to reduce the quantity of emissions from newly produced vehicles. Manufacturers can do this by producing cars that consume lower quantities of fuel (e.g. diesel or petrol), by producing zero-emission vehicles like electric cars, or by combining the technologies (e.g. plug-in hybrids). Certain modalities were introduced in the Cars CO_2 Regulation negotiation process to make it easier and less costly for manufacturers to comply with the specific emission targets (***Figure 6***).

Figure 6 – Modalities available to manufacturers



Source: ECA based on the Regulation (EU) 2019/631.

Overview of the EU's systems aiming to ensure reliable data on new vehicle CO_2 emissions

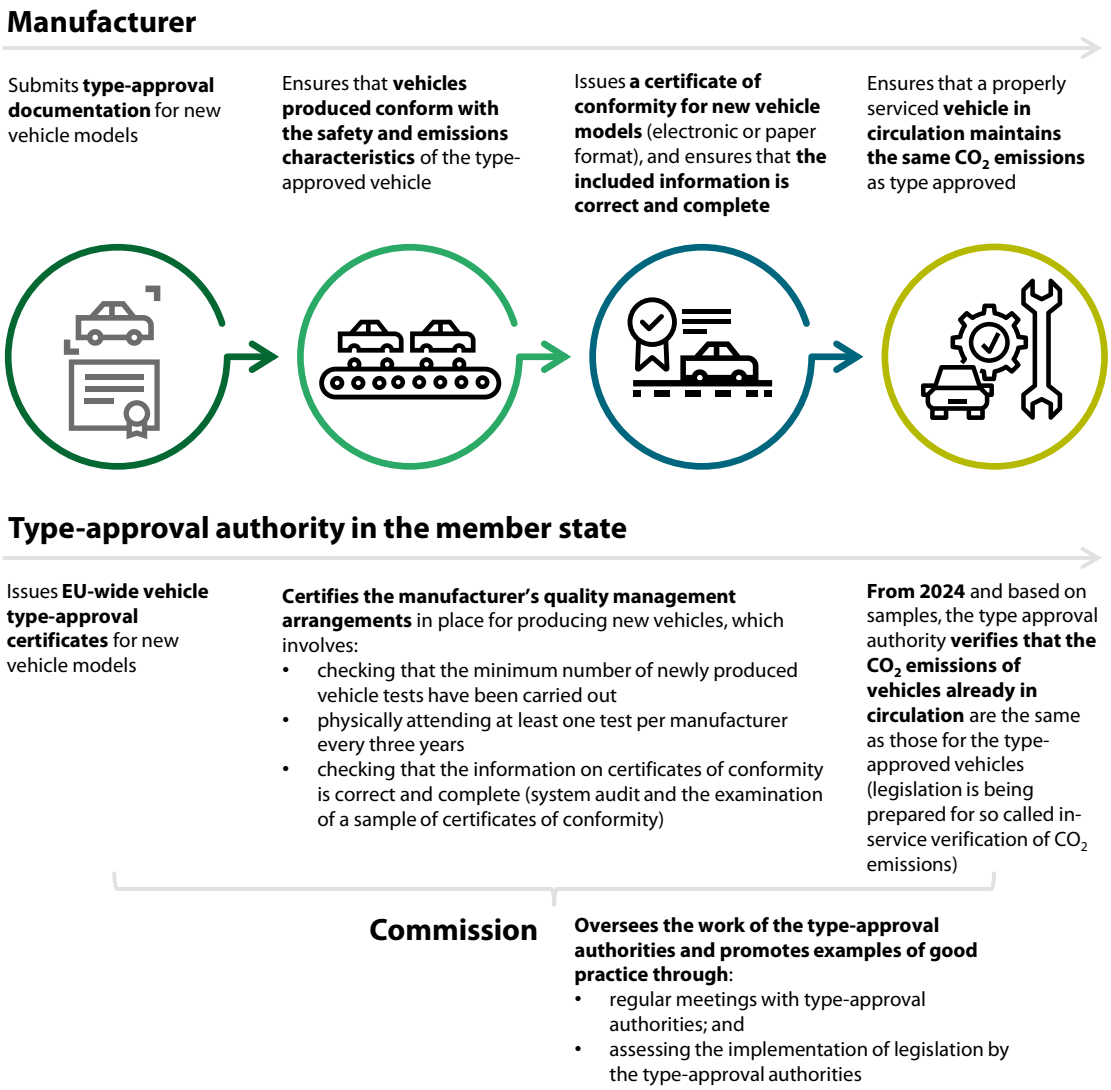
10 Before a new model of vehicle can be sold in the EU, the manufacturer must submit it for "type approval", which certifies that a vehicle prototype meets more than 70 EU safety, environmental, and technical requirements[4]. The "dieselgate" scandal of 2015[5], prompted the EU to make changes to the EU framework for the type-approval of new vehicles, to ensure that vehicles in circulation behave like type-approved vehicles in terms of air pollution and CO_2 emissions. The changes mainly related to increasing the Commission's powers, introducing more detailed requirements for vehicle type approval, and checking cars both recently produced and in circulation.

11 ***Figure 7*** describes the elements under the EU framework for vehicle type approval which exist to ensure that vehicle CO_2 emissions measured in laboratories correspond to the values stated on certificates of conformity (CoCs). Certificates of conformity are required for initial vehicle registration. This framework of checks and tests should provide assurance on the data included on CoCs, which are then used to determine new vehicles' average CO_2 emissions for the purposes of the Cars CO_2 Regulation.

[4] See Annex II of Regulation (EU) 2018/858 of the European Parliament and of the Council (OJ L 151, 14.6.2018, p. 1).

[5] See our 2019 briefing paper on The EU's response to the "dieselgate" scandal.

Figure 7 – Overview of the EU framework for vehicle type approval



Source: ECA.

12 ***Figure 8*** sets out the system for the annual collection, verification, and publication of newly registered vehicle data relating to CO_2 emissions as set out in the Cars CO_2 Regulation. It also includes the roles and responsibilities of the different actors that have a part to play in the system. It builds on the system described in ***Figure 7*** because most of the information collected comes from the CoCs.

Figure 8 – Overview of the system for the annual collection, verification, and publication of newly registered vehicle data relating to CO_2 emissions

Source: ECA.

Audit scope and approach

13 European citizen interest in the EU's climate actions was the driving force behind our audit. This report provides an early insight into the implementation of the Cars CO_2 Regulation for new passenger cars, which changed significantly in 2019. Most of the assessed legal provisions that were in effect during the audited period (2020-2022) will continue to apply after the 2023 amendment. The report's findings and recommendations should provide input for the Commission and stakeholders to make the implementation of the Regulation more efficient and effective in reducing CO_2 emissions, with a view to helping the EU meet its ambitious 2030 and 2050 climate targets.

14 We assessed whether the implementation of the Cars CO_2 Regulation, supported by the EU Framework for vehicle type approval, has complied with the legal provisions, and contributes effectively to reducing the emissions produced by new passenger cars. We split our main question into three sub-questions and organised our observations section accordingly. The first two questions assessed whether the two systems described in ***Figure 7*** and ***Figure 8*** had been properly implemented. With our last question, we planned to ascertain whether the Regulation leads to reductions in new car CO_2 emissions, in line with the EU's climate ambitions.

- Did the EU framework for vehicle type approval ensure that new vehicle CO_2 emissions measured in laboratories corresponded to the values stated on CoCs?
- Did the Commission publish timely and reliable data on new vehicle CO_2 emissions in line with the Cars CO_2 Regulation?
- Does this Regulation contribute to reducing vehicles' real-world CO_2 emissions in line with the EU's climate ambitions?

15 To answer the first question, we looked at the EU Framework over the 2020-2022 period. To assess the second question, we focused our work on 2020 because this was the most up-to-date set of finalised data at the time of our audit. With our last question, we looked at all of the information available once the Cars CO_2 Regulation had entered into force, i.e. from 2010 to 2022.

16 We obtained evidence from the following sources.

- Documentary reviews and interviews with representatives from three Commission Directorates-General (Climate Action; Joint Research Centre and Internal Market Industry, Entrepreneurship and SMEs), and from the European Environment Agency (EEA).
- Interviews with type-approval authorities and ministries of the environment in Germany, Italy, and the Netherlands. We selected these three member states due to their relative significance in terms of the number of newly registered cars in 2020, and the results of our preliminary assessment of 2020 data quality.
- Documentary reviews and analysis of 2020 data submitted to the EEA by these three member states. We checked the quality of the data in terms of its completeness (e.g., newly registered cars or critical parameters not reported), accuracy and coherence. We then reran all the calculations which produced the final published data.
- A review of various studies on CO_2 emissions from passenger cars and discussions with stakeholders from industry, academia and non-governmental environment organisations.

Observations

Insufficient assurance that the CO_2 values declared by manufacturers on CoCs are correct

17 We examined the EU's framework for vehicle type approval, the purpose of which is to ensure that vehicle emissions measured in laboratories correspond to the declared levels on manufacturer CoCs. We expected:

- that the type-approval authorities in the three member states visited would carry out appropriate checks on the CO_2 values declared by manufacturers on their CoCs, and that the Commission would have sufficient information about these checks; and
- that the Commission would use the information available on the CO_2 emissions from cars already in circulation to assess the risk that the CO_2 values stated on the CoC may be incorrect.

Weaknesses in the checks on CO_2 values declared by manufacturers

18 To obtain assurance on the CO_2 values declared by manufacturers on CoCs, type-approval authorities are required to check that manufacturers have verified the CO_2 emissions for a minimum number of manufactured vehicles. This means carrying out at least one laboratory test for every 5 000 vehicles produced in each vehicle family[6]. The quality of these verifications is supposed to be ensured by the physical presence of the authorities during at least one such test for each manufacturer in a three-year period.

19 The type-approval authorities in Italy and the Netherlands did not provide sufficient evidence that they had verified whether the manufacturers had tested the minimum number of vehicles in either 2020 or 2021. The Dutch type-approval authority did not witness any manufacturer tests in 2020-2021, whereas the Italian authority attended two vehicle tests. While the Commission allowed the authorities to opt out of physically attending vehicle tests during the COVID-19 pandemic, the two authorities risk not being able to meet the minimum requirement of one test verification per manufacturer every three years.

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[6] Regulation (EU) 2017/1151, Annex I.

20 In 2020 and 2021, the German type-approval authority was able to confirm that manufacturers tested the required minimum number of vehicles. It witnessed tests on 79 vehicles, meaning that it met the minimum number of physically attended verifications. None of the 81 witnessed tests (2 in Italy and 79 in Germany) over the 2020-2021 period indicated any problem between the measured CO_2 values and those stated on CoCs.

21 Type-approval authorities also need to check manufacturers' systems for generating the data for CoCs to ensure that they contain complete and accurate information, including CO_2 emissions values[7]. We found that Germany had a robust approach, where the manufacturers' systems for generating the data for CoCs are checked initially during the type-approval procedure, and then reviewed on an annual basis during the vehicle production process. The German authorities also annually check a sample of CoCs and communicate any issues detected to the relevant manufacturers. We were unable to find evidence that similar checks had been carried out by either the Italian or the Dutch type-approval authorities.

22 To ensure a uniform application of the Framework and to disseminate best practice, the Commission is required to carry out assessments every five years[8]. By mid-2023, the Commission had neither carried out any assessments nor planned them, although the new framework had been in force since September 2020. The Commission's contacts with type-approval authorities have been limited to a few meetings per year of the "Forum for the Exchange of information on Enforcement".

23 The above-mentioned weaknesses in the checks carried out by the type-approval authorities, coupled with the Commission's lack of knowledge about how these checks were done, means there is insufficient assurance that the CO_2 values included on CoCs are correct.

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[7] Article 31(2) and Annex IV of Regulation (EU) 2018/858 of the European Parliament and of the Council of 30 May 2018.

[8] Article 10 of Regulation (EU) 2018/858 of the European Parliament and of the Council of 30 May 2018.

The information from pollutant emissions testing was not used to assess the risk of incorrect CO_2 values

24 For air-polluting emissions from 2020 onwards, the Commission, vehicle manufacturers, and type-approval authorities are required to test a minimum number of vehicles already in circulation[9] on an annual basis, to check whether their exhaust pipe emissions fall within the limits set in the Euro 5 and Euro 6 Regulations[10]. These tests also include measuring CO_2 emissions.

25 The Commission, using its own facilities (***Picture 1***), tested 50 vehicles for air-polluting emissions in the period leading up to and including 2021, but it did not use this information to assess the risk that the CO_2 values stated on the CoC may be incorrect.

Picture 1 – European Commission test laboratory (JRC, Italy)

Source: ECA.

[9] Regulation (EU) 2018/1832 of 5 November 2018.

[10] Regulation (EC) No 715/2007 of the European Parliament and of the Council of 20 June 2007 on type approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6).

26 In the three selected member states, both the type-approval authorities and the manufacturers tested fewer vehicles already in circulation for air-polluting emissions than is required by legislation[11] (see ***Annex II***). This was mainly due to the following reasons:

- Germany experienced delays because of its decision to build and staff its own vehicle testing laboratory;
- Italy was unable to find any contractor to carry out the work, so they did not test any cars in 2020 or 2021;
- in the Netherlands, no vehicles were tested in 2020 because of the COVID-19 pandemic. The type-approval authority contracted it out from 2021 onwards;
- manufacturers and type-approval authorities found it difficult to procure vehicles for testing because such vehicles have to meet a number of criteria, e.g. mileage, a proper service history, and availability for testing (i.e. owned by a leasing company or a car dealer). This was further exacerbated by the COVID-19 pandemic due to the heightened demand for second-hand vehicles.

27 The Commission did not collect the information from member states because there was no legal requirement to do so. In our view, these data, combined with the Commission's data (see paragraph ***25***), could be useful to identify potential discrepancies between the CO_2 values for cars in circulation and those stated on CoCs. It would also help to assess the risk that the CO_2 values stated on CoCs may not be correct.

28 Under the Cars CO_2 Regulation, the Commission is now required to collect and annually publish aggregated information on the real-world fuel consumption of new cars that have been registered since 2021. Information tailored to consumers' specific needs would provide more useful information on vehicles' real-world fuel consumption (and CO_2 emissions), possibly influencing purchase decisions and thus motivating manufacturers to reduce the gap between laboratory and on-the-road emissions.

[11] Article 9 and Annex II of Regulation (EU) 2017/1151 of 1 June 2017.

29 In December 2023, the Commission expects to adopt new legislation on the procedures that type-approval authorities should follow in terms of checking the CO_2 emissions for a sample of cars already in circulation (known as "in-service verification of CO_2 emissions")[12]. This sample is in addition to the sample of vehicles tested for air-polluting emissions. We consider that this new methodology may encounter the same challenges in terms of carrying out the minimum number of tests (see paragraph ***26***).

The process of collecting and verifying data on new car CO_2 emissions improves data quality, but is lengthy

30 We examined the process for collecting and verifying data on new car CO_2 emissions provided for in the Cars CO_2 Regulation, the purpose of which is to assess whether manufacturers comply with their emission targets. This process builds upon the information collected from the CoCs (see previous section). We expected:

- reporting authorities in the three visited member states to collect and verify data from the certificates of conformity (CoCs) supplied by manufacturers;
- the Commission and the EEA to collect and verify data from member states, ensuring the timely publication of provisional data;
- the Commission and the EEA to clear the data with manufacturers, ensuring the timely publication of reliable final data; and
- the Commission to correctly calculate EU-wide and manufacturers' CO_2 emissions targets, average emissions, and excess-emission premiums.

Member states' data collection and verification systems provide insufficient assurance in terms of data quality

31 Member states' reporting authorities are responsible for collecting, verifying, and transmitting passenger car CO_2-related data to the Commission, building upon the initial data from the certificates of conformity (CoCs) supplied by manufacturers.

[12] CIRCABC: Expert group – CO_2 from road vehicles, documents from March 2023 meeting.

32 The first step for the authorities is to collect the data from the CoCs supplied by manufacturers. As of 2026, CoCs will only be available electronically. The authorities in Germany (KBA), Italy (MIT), and the Netherlands (RDW) have already been using electronic certificates for new vehicle registrations for several years. They explained that this had reduced the number of manual errors when inputting data from CoCs on paper.

33 When collecting these data, authorities in Germany and the Netherlands checked their consistency with type-approved data. Such data had been manually inputted from type-approval certificates because it was not available electronically. The RDW is developing an electronic type-approval certificate, which should make the whole process less labour-intensive in future. The Italian authority claimed to carry out similar checks, but this was not a formalised procedure, and the checks were not documented.

34 The second step for the authorities is to check the data collected from the CoCs for newly registered vehicles in a given reporting year, before submitting them to the European Environment Agency (EEA). These checks are to ensure that the data are accurate, complete, and in line with the Commission's yearly reporting guidelines.

35 Our assessment of the 2020 data checks carried out by the reporting authorities in Germany, Italy, and the Netherlands showed that they did not provide sufficient assurance in terms of data quality.

- Overall, the authorities do follow the Commission's guidelines, which they find helpful. However, neither the results of their checks nor the changes introduced to the key data are properly documented.

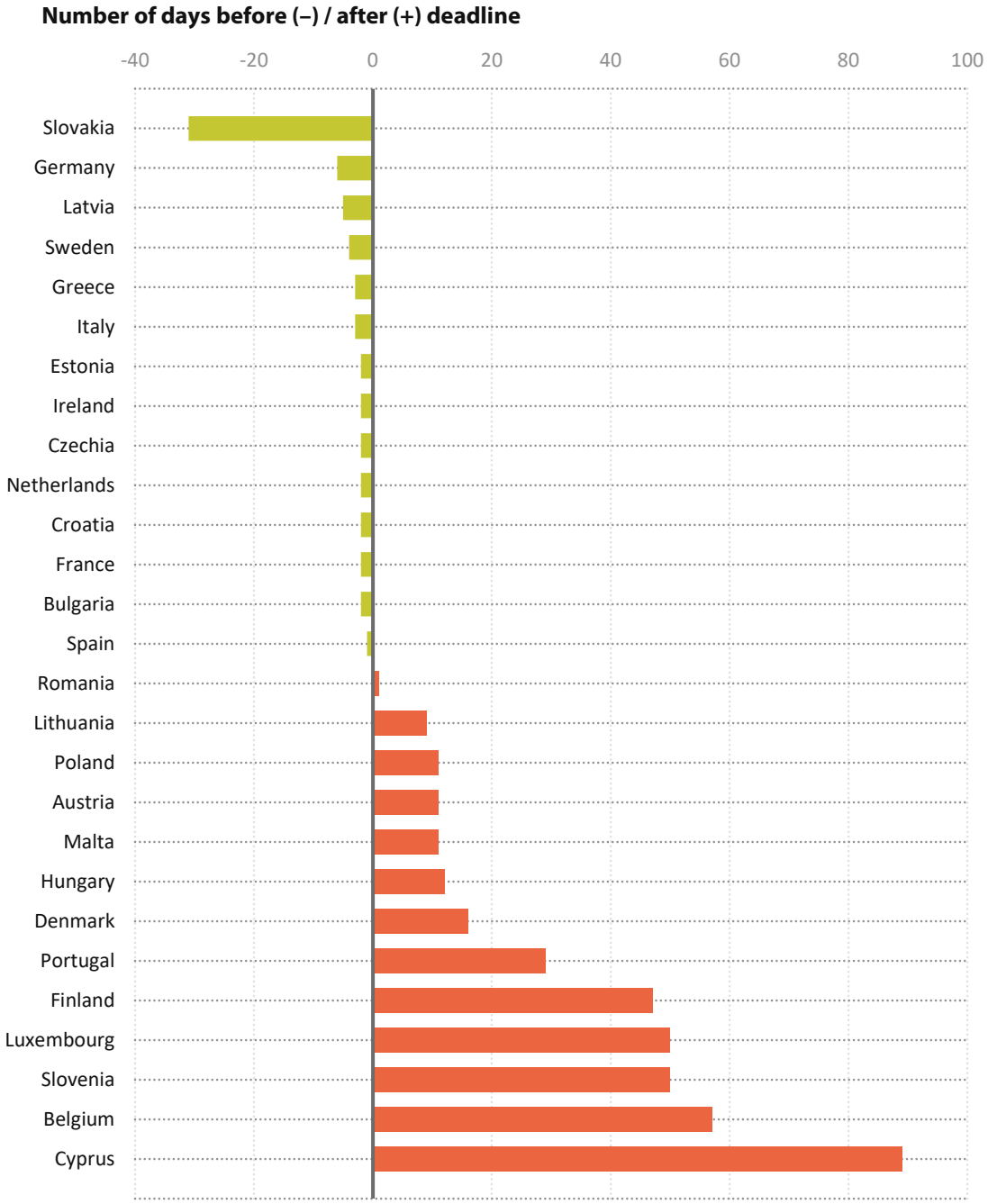
- We were unable to find evidence that the national authorities reconciled data on all car registrations with those of newly registered cars. Such a reconciliation could help to avoid omissions when reporting data, e.g. the Netherlands had initially failed to report around 38 000 vehicles.

- Our review of the 2020 data, as well as checks carried out by the EEA, show that the initial data submitted after member state authorities had carried out their checks contained incorrect or missing values. For example, missing values for critical parameters accounted for 1 % of the new cars reported by Germany, 14 % reported by Italy, and 27 % reported by the Netherlands.

Provisional data are published in a timely manner, but their collection and verification is a cumbersome process

36 We found that many countries were late in reporting their initial data to the EEA. For 2020 data, 13 out of 27 countries only reported after 28 February 2021 (see ***Figure 9***), with an average delay of nearly a month. After the EEA receives the data, it verifies them and aims for the timely publication of provisional data i.e. before the end of June of the following year.

Figure 9 – First member states' data submissions for 2020 (EU-27)



Source: ECA based on the data from the EEA.

37 We found that the EEA has clear and comprehensive written procedures for carrying out these checks, and can confirm that they correctly identified discrepancies in the data. The EEA clarified any findings resulting from their checks with the reporting authorities, which led them to resubmit corrected data. For 2020 data, countries submitted data three times on average. This slows down the process, i.e. an average of two and a half months between the first and final submission of 2020 data. Despite this cumbersome process, the Commission managed to publish the provisional data for 2010-2020 on time every year.

38 We found that the EEA verification process of the data submitted by member states was effective in detecting missing values or incoherence of the data with type-approval information, with one exception. This related to omissions in the number of newly registered cars reported by Austria, the Netherlands, and Spain. These omissions were detected by the manufacturers, and then corrected for the final published data by the member states concerned.

39 As one part of checking data quality, we examined whether the EEA had IT systems in place to collect and verify CO_2 car emissions data in a timely, consistent, and reliable manner. We reviewed the EEA's general IT control environment and the tools they use to collect and process CO_2 car emissions data. Overall, we found that effective controls were in place.

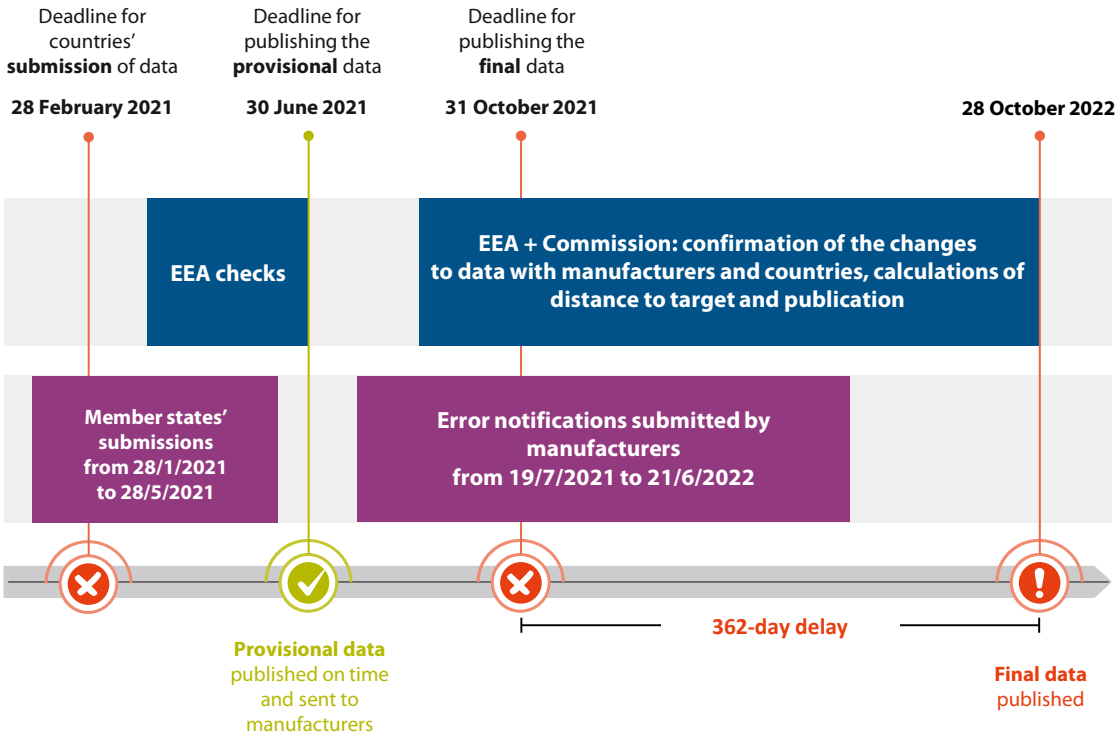
40 The EEA has developed a new tool for collecting and checking the data it receives from reporting authorities ("Reportnet3"), which was used for the first time in January 2022. However, at that time, the tool could not cope with the large volume of data, largely due to stress tests that had not been sufficiently well designed or carried out during development. Most of the Reportnet3 automated checks therefore had to be disabled. The EEA is currently taking corrective action.

The clearing of the provisional data with manufacturers improves their quality, but delays the publication of final data

41 Once the EEA has cleared the data with the reporting countries, the Commission shares the provisional data with manufacturers, who may, within three months, notify the EEA of any errors. For the 2020 reporting year, the Commission notified 93 manufacturers of the provisional data, of which 63 submitted error notifications. Of these, 16 were submitted late with an average delay of 18 days, and three error notifications had a delay of more than one month after the deadline.

42 The EEA then verifies the errors notified by the manufacturers by consulting them on the proposed changes to the data and confirming these changes with the member states' reporting authorities. For the 2020 data, this process required 1 050 exchanges with manufacturers alone. ***Figure 10*** shows that clearing the data with manufacturers is the lengthiest stage. The regulatory deadline for the publication of final data does not allow any time for the EEA to check for errors or correct data that have been notified by manufacturers. This process is, however, necessary, as we found that it increased the quality of the data, and because small differences between provisional and final data can have a significant impact on the absolute amount of excess-emission premium to be paid by manufacturers. For 2020, clearing the data resulted in a change to the amount of the excess-emission premium for one manufacturer by €58 million (23 %).

Figure 10 – Overview of phases in handling 2020 data

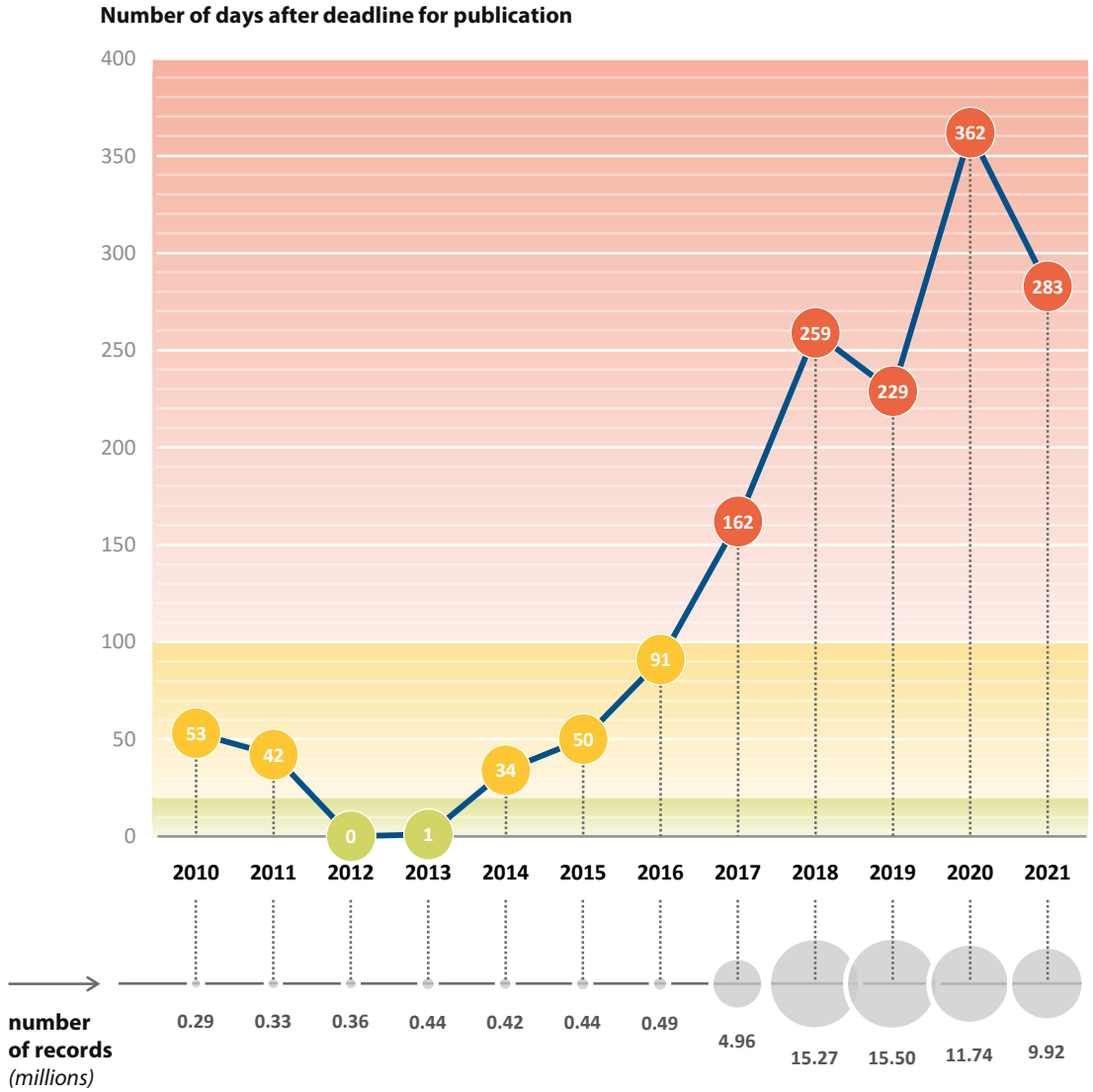


Source: ECA based on EEA data.

43 There are four main reasons underpinning the increasing delays in publishing final data (*Figure 11*):

- the increase in the number of records submitted by countries;
- the insufficient quality of these records (see paragraph *35*);
- delays in the (re)submissions of data by countries (see paragraphs *36*-*37*); and
- the increase in the length of time required to clear the data with manufacturers.

Figure 11 – Delays in final data publication



Source: ECA based on information contained in the Commission's Monitoring Decisions.

44 To address the overall issue of delays, the EEA and the Commission took steps such as maintaining regular contact with member states which report late, simplifying reporting requirements, reinforcing the number of staff during peak reporting periods, and focusing on checking compliance parameters. In addition, the EEA is planning to move all of their quality checks on member states' submitted data and manufacturers' error notifications to the new reporting platform Reportnet3 (see paragraph ***40***). These automatic checks on data coherence, accuracy and completeness should improve data quality and shorten the number of exchanges with the EEA, depending on the use of the platform by the countries' reporting authorities and manufacturers. Nevertheless, these measures do not address manufacturers' late error notifications (see paragraph ***41***).

The Commission correctly calculated the various elements of the CO_2 performance standards

45 Using the final data compiled by the EEA, the Commission calculates EU-wide and manufacturers' average emissions, targets and excess-emission premiums. We re-ran these calculations, using the final 2020 data published on the EEA's website, and followed the relevant Commission guidance.

46 We concluded that the results from our calculations matched the Commission's results, with only very minor differences. The ICCT carried out its own calculations, confirming the Commission's results.

Stringent targets and various incentives made electric vehicles the key driver for the drop in CO_2 emissions, but there are challenges ahead

47 We examined whether the Cars CO_2 Regulation contributes to the reduction in CO_2 emissions from newly registered vehicles, in line with the EU's climate ambitions. We expected that:

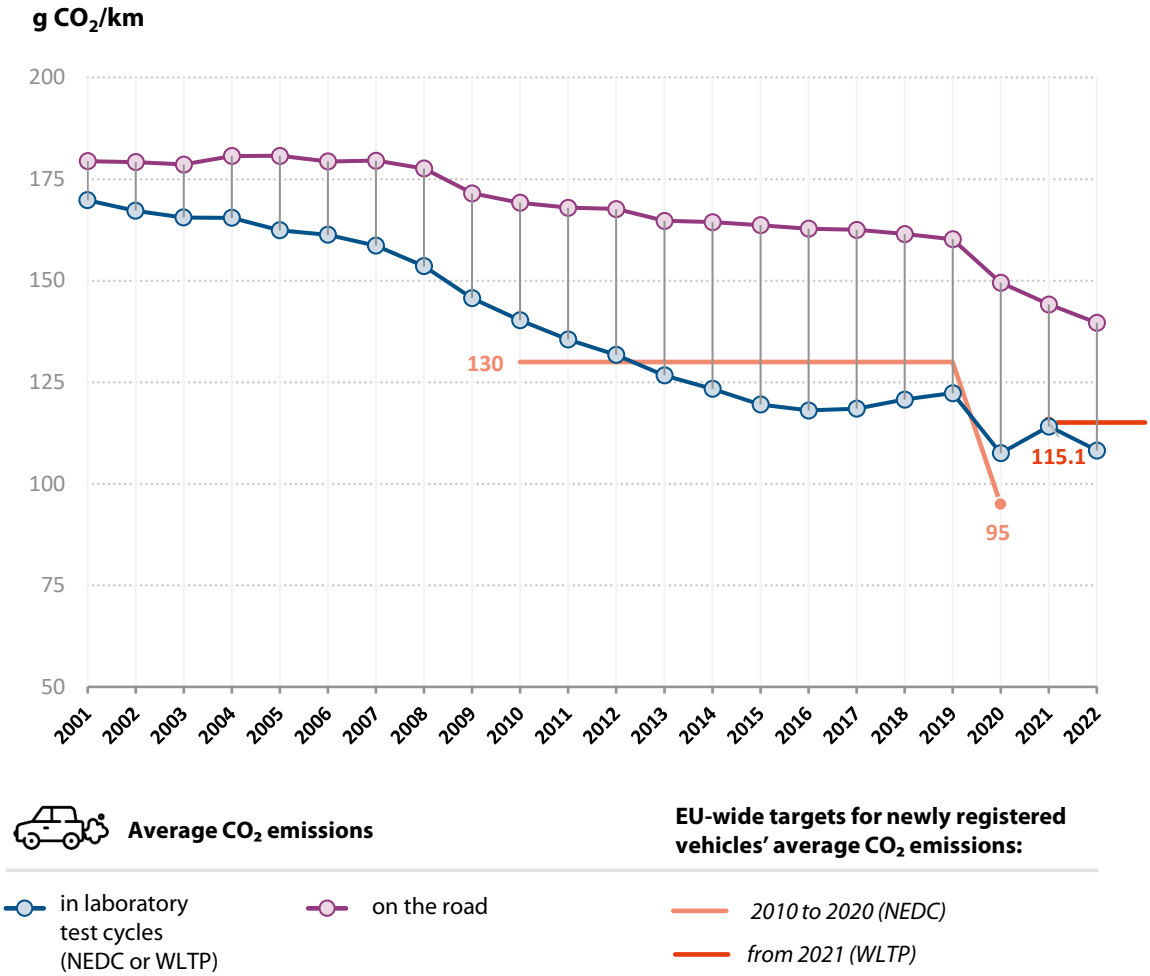
- the CO_2 emissions from newly registered vehicles would have dropped, both in laboratory tests and on the road;
- all vehicle engine types would produce reduced CO_2 emissions;
- the modalities would fulfil the purpose for which they were included in the Cars CO_2 Regulation;

- the reduction targets set under the Cars CO_2 Regulation would be aligned with the EU's climate targets.

Prior to 2020, emissions only decreased when measured in the laboratory and not on the road

48 ***Figure 12*** shows the emissions trend for newly registered vehicles since 2001 in terms of the average EU CO_2 emissions on the road compared to those measured in a laboratory. For the Cars CO_2 Regulation to achieve its intended impact, it is essential that the gap between laboratory and real-world emissions does not increase.

Figure 12 – Average emissions on the road and in the laboratory



Source: Up to 2020, the real-world gap for vehicles with combustion engines was kindly provided by the International Council on Clean Transportation. For plug-in-hybrids, we used the gap determined with the 2021 data from on-board fuel consumption meters. For 2021-2022, we used these data for all vehicle types.

49 This figure shows that prior to 2020, despite the existence of the Cars CO_2 Regulation and the fact that after the first three years all EU fleet-wide targets were met, there was only a marginal drop (less than 7 %) in real-world CO_2 emissions from newly registered cars. At the same time, laboratory CO_2 emissions dropped by 16 % from 145.7 g/km in 2009 to 122.3 g/km in 2019. Therefore, the increasing gap between laboratory and real-world emissions to a large extent offset the intended benefit of the Regulation. According to the International Council on Clean Transportation (ICCT), the average gap increased from 17 % in 2009 to around 38 % in 2018[13]. The main reason for this widened emissions gap was the fact that manufacturers focused on reducing emissions in the laboratory rather than on the road, by exploiting loopholes in the test requirements[14].

50 The Commission was aware of the need to change the "New European Driving Cycle" (NEDC) – a laboratory-based test established in the seventies – to better reflect modern real-world driving conditions. Therefore, in 2007, the Commission and Japan sponsored a United Nations technical working group to develop a new laboratory-based test. The "dieselgate" scandal accelerated the approval of a new laboratory test cycle: the Worldwide Harmonised Light Vehicles Test Procedure, which became mandatory for type approving new vehicles from September 2017. For the purposes of the Cars CO_2 Regulation, the WLTP CO_2 emission values were first used in 2021. Available studies estimate that the WLTP closed about half of the gap between laboratory and real-world emissions[15]. ***Annex III*** shows the main difference between the two laboratory cycles.

51 The Commission also decided to collect information on real-world vehicle fuel consumption on the road, and introduced a requirement for manufacturers to install an on-board fuel consumption meter in every new vehicle registered from 2021 onwards[16]. By converting the information obtained from the fuel meter into CO_2 emissions and then comparing these figures with laboratory emission values, it is possible to calculate the size of the gap and detect any changes. Vehicle manufacturers

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[13] ICCT, On the way to "real-world" CO_2 values, May 2022. Underlying data was kindly provided to the ECA by the ICCT.

[14] Commission (JRC), The difference between reported and real-world CO_2 emissions: How much improvement can be expected by WLTP introduction?, 2017.

[15] Commission (JRC), How much difference in type-approval CO_2 emissions from passenger cars in Europe can be expected from changing to the new test procedure (NEDC vs. WLTP)?, 2018.

[16] Article 1 of Regulation (EU) 2018/1832.

must collect these data, either remotely or during regular service checks, which take place every 15 000 to 30 000 kilometres driven. The Commission's preliminary analysis of real-world data for new vehicles registered in 2021 indicates that the gap was lower for cars with diesel engines (18.1 %) than for cars with petrol engines (23.7 %). For plug-in hybrid vehicles, the average gap was around 250 %.

52 According to the Commission, data on real-world emissions were submitted by manufacturers in 2023 for about four million vehicles registered in 2021 and 2022. From May 2023, member state authorities started collecting the same information during periodical technical inspections. Article 12 of the Cars CO_2 Regulation[17] gives the Commission time (until the end of 2026) to use real-world fuel consumption data for developing a methodology to adjust manufacturers' average laboratory CO_2 emissions from 2030 onwards. In practice, such analysis ought to be feasible, since by 2026 the Commission should have real-world emission data from member state authorities for the majority of vehicles registered in 2021, and similar information from manufacturers for cars registered over the 2021-2023 period.

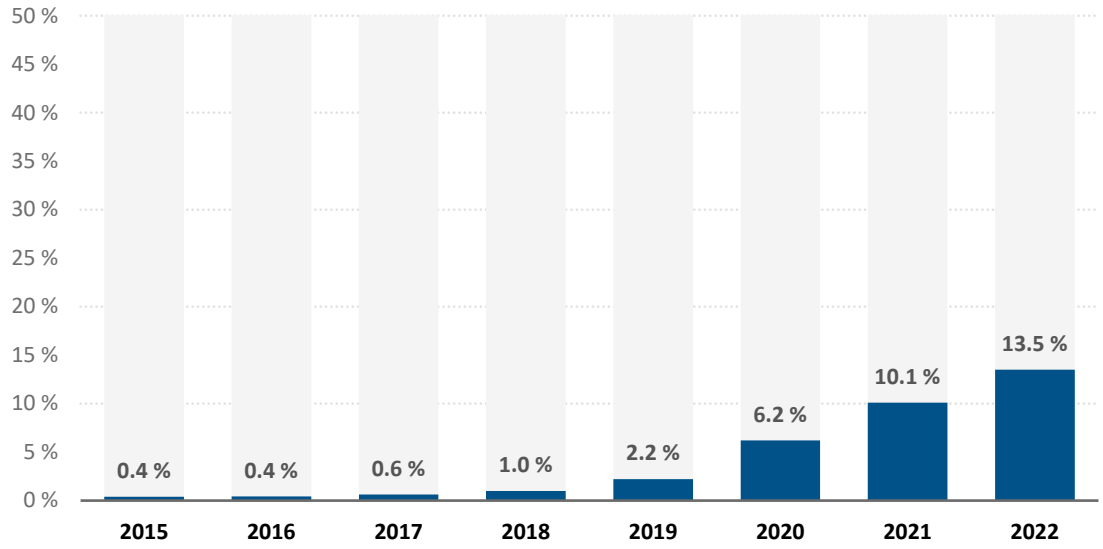
Electric cars drive the drop in average on the road CO_2 emissions

53 As shown in ***Figure 12***, although the 2020 EU fleet-wide target was not met, from this point on average real-world CO_2 emissions from newly registered cars did begin to decrease steadily. This was due to a significant increase in the uptake of electric vehicles (***Figure 13***), which are, according to the Cars CO_2 Regulation, considered to have zero emissions. The key reasons for the increase in the uptake of electric vehicles can be summarised as follows:

- along with the more stringent targets, the Cars CO_2 Regulation strongly incentivised manufacturers to produce low-emission vehicles (electric or plug-in hybrids) with super-credits available for the 2020-2022 period; and
- buyers were offered various incentives to stimulate demand for low-emission vehicles, e.g., purchase subsidies, zero road tax, or free parking in city centres.

[17] Regulation (EU) 2019/631 of the European Parliament and of the Council of 17 April 2019 (amended).

Figure 13 – Share of electric vehicles in new car registrations (2015-2022)



Note: EU-27 plus Iceland, Norway, and the UK (included until 2020).

Source: ECA based on the EEA data on newly registered passenger cars.

54 While electric vehicles do not produce any CO_2 on the road, plug-in hybrid emissions depend on the way that individual drivers use the vehicle's two powertrains: electric and combustion (diesel or petrol). The more the electric powertrain is used, the better it is for the climate because emissions are lower. In order to establish emission values for plug-in hybrids in a laboratory setting, experts had to determine the proportion that were driven electrically and the proportion driven using a combustion engine. The assumption was that drivers would use the former more than the latter, which meant that most plug-in hybrids were classified as low-emission vehicles (below 50 CO_2 g/km) for the purposes of the Cars CO_2 Regulation.

55 However, several studies have highlighted the fact that on average, real-world plug-in hybrid emissions are three to five times higher than those measured in the laboratory[18]. The Commission's preliminary analysis of the 2021 data obtained from on-board fuel consumption monitoring meters for around 122 000 plug-in hybrid cars indicate that on average, real-world CO_2 emissions (139.4 g/km) were 3.5 times higher than those determined in the laboratory (39.6 g/km). These data also indicate that on average, plug-in hybrids emit less CO_2 than cars with combustion engines (180.3 g/km). The huge gap between plug-in hybrids' real-world and laboratory emissions can be explained by more frequent combustion engine use than expected, in particular for

[18] ICCT, Real-world usage of plug-in hybrid vehicles in Europe, 2022.

company-owned plug-in hybrids[19]. In this type of situation, companies usually pay for the fuel, so there is no financial incentive for employees to recharge the batteries.

56 In response to these considerably higher emissions from plug-in hybrids on the road, some member states have started to reduce the number of incentives for such vehicles. In an attempt to better reflect reality, the Commission also decided to change the method for establishing laboratory CO_2 values for plug-in hybrids, by adjusting the proportional use of electric and combustion engines[20]. However, this adjustment will only apply from 2025. This means that until then, plug-in hybrids may still be an attractive option for manufacturers to produce, because they will continue to be treated as low-emission vehicles.

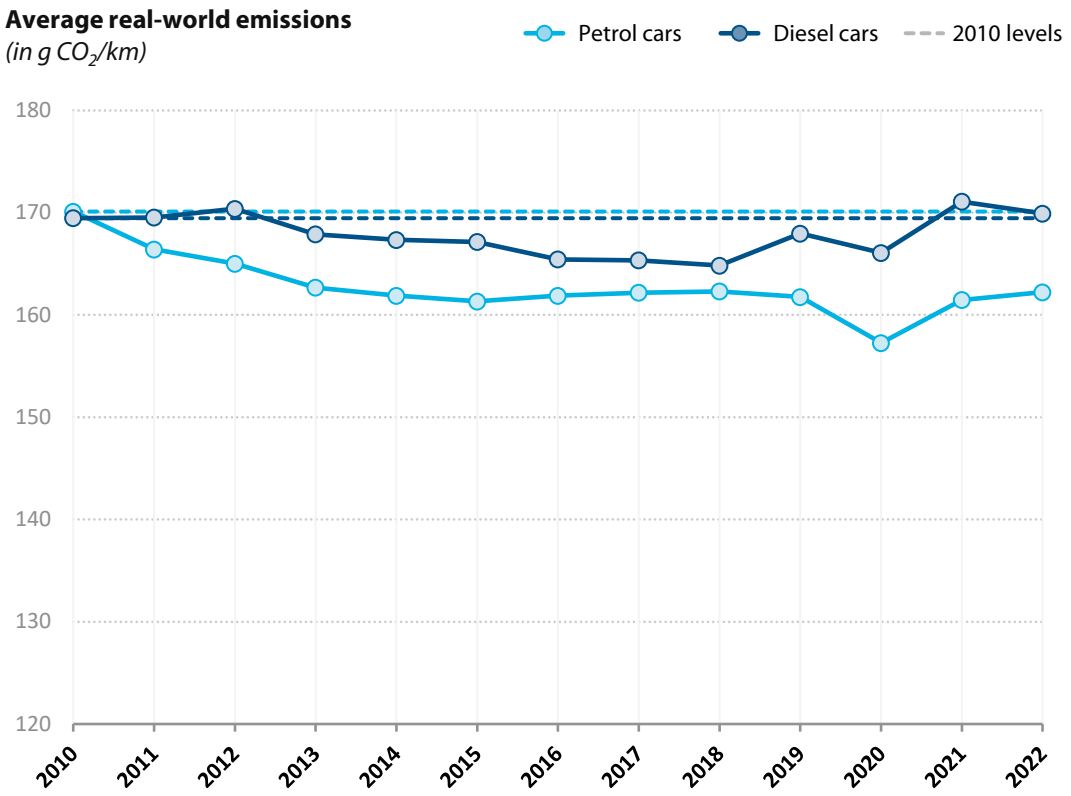
57 Data on combustion engine vehicles show that average real-world emissions have not dropped for this type of vehicle. For diesel cars, emissions remained constant over the period, while for petrol cars there was a marginal decrease of 4.6 % (***Figure 14***). Continuous improvements in engine technology and the introduction of hybrid powertrains have made engines more efficient, but the increased vehicle mass coupled with more powerful engines outweighs the technological progress made[21]. Between 2011 and 2022, according to our calculations, average car mass increased by around 10 %. Over the same period, engine power grew by 25 %. Despite the introduction of the Cars CO_2 Regulation, CO_2 emissions from combustion engine vehicles, which still account for the majority of new vehicle registrations (around 74 % in 2022), have not dropped.

[19] ICCT, Real-world usage of plug-in hybrid vehicles in Europe, 2022.

[20] Revision of the Utility Factor calculation described in Annex XIV of Regulation (EU) 2023/443.

[21] IEA, Cars and Vans – Tracking Report, September 2022.

Figure 14 – Average combustion engine car emissions (2010-2022)



Source: ECA based on the average laboratory CO_2 emissions of newly registered passenger cars, adjusted for 2010-2020 with real world gap factors provided by the ICCT. For 2021-2022, the real-world data on consumption from on-board fuel consumption meters were used to calculate the real-world gap.

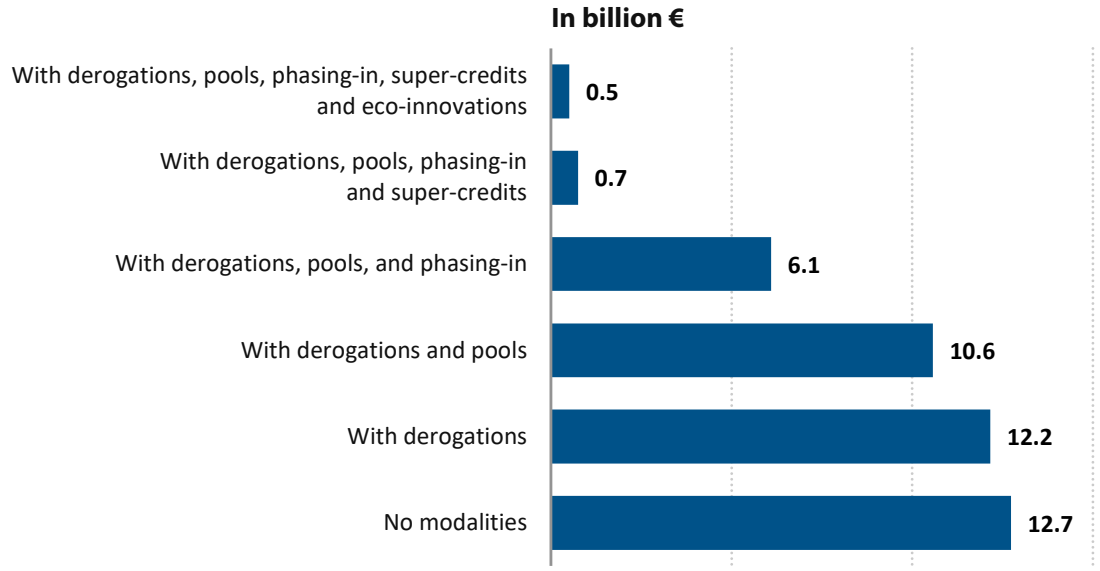
Modalities in the Regulation helped manufacturers to meet targets, but had an adverse impact on CO_2 emissions

58 The Cars CO_2 Regulation contains several modalities (see ***Figure 6***), which were supposed to help manufacturers to meet their specific emission targets, thus reducing the excess-emission premium payable.

59 For the 2013-2019 period, only a few manufacturers (mostly those of luxury sports cars) did not manage to reach their targets (two in 2013, one in 2014, two in 2015, three in 2017, one in 2018, and four in 2019), and altogether had to pay about €20 million in excess-emission premiums. For 2020, six individual manufacturers and two pools of manufacturers did not reach their specific emission targets and had to pay almost €0.5 billion in excess-emission premiums. In 2021, only four individual manufacturers, all of which had fewer than 2 000 registrations, exceeded their emission targets, with total excess-emission premiums amounting to €7.4 million.

60 We estimated that because of the Regulation's modalities, manufacturers may have avoided paying up to €13 billion in excess-emission premiums in 2020. ***Figure 15*** below shows the amounts of excess-emission premiums that were avoided because of applying the modalities in 2020. The greatest saving was achieved with super-credits, which incentivise the uptake of low-emission vehicles. The next largest saving was achieved with phasing-in (only available in 2020), which removed 5 % of the vehicles producing the highest emissions from the average emission value calculation.

Figure 15 – Amounts of excess-emission premiums avoided thanks to modalities



Source: ECA based on the 2020 final monitoring data.

61 Of all the modalities, only eco-innovations have the potential to lower CO_2 emissions. Despite an impressive increase in the number of cars equipped with eco-innovations (from only 5 vehicles in 2013 to more than 6 million vehicles in 2020), on average they only reduced emissions by 1 g CO_2/km in 2020, which represents less than 1 % of the average vehicle CO_2 emissions in that year. While super-credits contributed to the uptake of low-emission cars (see paragraph ***53***), they do not really reduce CO_2 emissions. This is because they only provide credits which the manufacturer can use to reduce their average emissions. These credits are capped at 7.5 g CO_2/km for the whole 2020-2022 period. Most manufacturers already exhausted this credit in 2020. Pooling, derogations and phasing-in are not intended to reduce CO_2 emissions.

62 ***Figure 16*** shows that the "Fit for 55" legislative package adopted in 2023 should significantly reduce the modalities' adverse impact on CO_2 emissions.

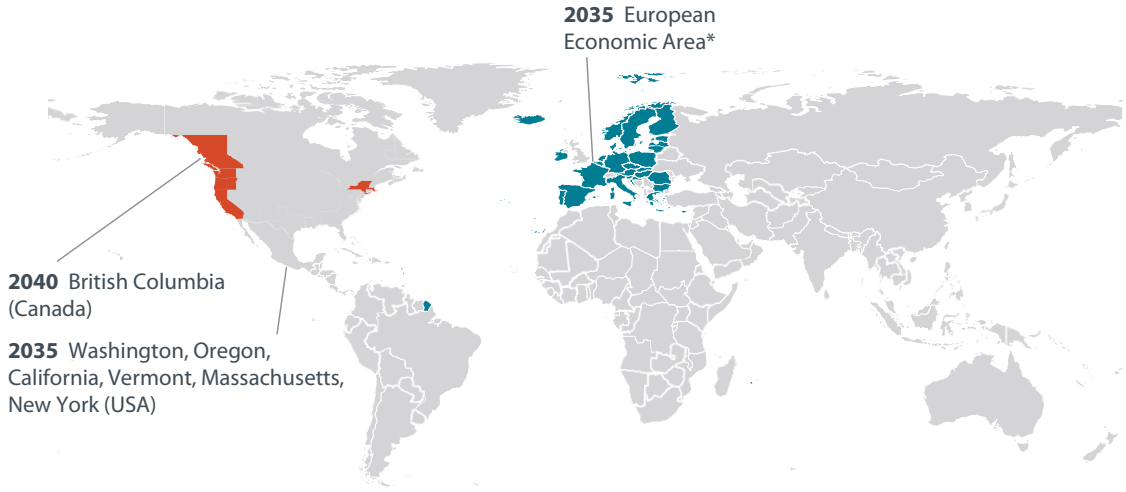
Figure 16 – Changes to the Regulation's modalities from 2020

Source: ECA based on Regulations (EU) 2019/631 and 2023/851.

Challenges in meeting the EU's climate targets

63 We expected the implementation of the Cars CO_2 Regulation to lead to emission reductions in line with the EU's climate ambitions. During legislative negotiations in 2019, two member states expressed concerns that the EU fleet-wide targets for new passenger cars included in the Cars CO_2 Regulation did not match the EU's climate commitments[22]. In 2023, the "Fit for 55" package introduced more ambitious targets[23] from 2030. With a zero-emissions target from 2035, the EU is the leading world region in terms of targets to reduce CO_2 emissions for passenger cars (see ***Figure 17***).

Figure 17 – Global regions with binding targets for fully zero or close to zero CO_2 emissions for new passenger cars



Source: ICCT, CO_2 emission standards for new passenger cars and vans in the European Union, May 2023.

[22] See Joint statement by Belgium and Luxembourg.

[23] Regulation (EU) 2023/851 of the European Parliament and of the Council of 19 April 2023.

64 Authorities responsible for climate and the environment in Germany and the Netherlands have expressed concerns, pointing out that implementing the Cars CO_2 Regulation would not manage to deliver significant reductions in CO_2 emissions from the transport sector by 2030. These member states may therefore face challenges in terms of meeting their new 2030 climate targets under the Effort Sharing Regulation – see ***Box 1***. The ICCT's 2021 study[24] also pointed out at the need for better alignment between Cars CO_2 Regulation targets and the EU's climate commitments.

Box 1

EU targets under the Cars CO_2 Regulation are considered insufficient to help reach 2030 national targets for the transport sector

The German environment agency's 2021 report estimated that Germany will exceed its 2030 Effort Sharing Regulation target for the transport sector (set at 85 million tonnes of CO_2) by 41 million tonnes of CO_2, i.e. by 50 %. According to the agency, setting the EU's Cars CO_2 Regulation reduction target at -30 % instead of -15 % for 2025-2029 would help Germany to meet the national reduction target for the transport sector's CO_2 emissions.

The view of the Dutch authorities is that to reach climate neutrality by 2050, sales of combustion engine cars should cease in 2030, rather than in 2035. Depending on the scenario, it may be possible for the Netherlands to reduce its transport sector CO_2 emissions by 25 to 46 % between 2019 and 2030, which still falls short of the 55 % reduction target.

[24] ICCT, Fit for 55: A review and evaluation of the European Commission proposal for amending the CO_2 targets for new cars and vans, 2021, p. 23.

65 Many studies have identified electric cars as the best currently available technology for reducing the total emissions produced by passenger cars[25]. In 2021, there were about 1.9 million electric cars in circulation, approximately 0.76 % of the entire EU car fleet[26]. As explained in paragraph ***53***, super-credits were one of the modalities provided by the Cars CO_2 Regulation between 2020 and 2022, with the purpose of incentivising the manufacture of low-emission vehicles, including electric cars. For the 2025-2029 period, the Regulation offers another incentive: increasing the manufacturer's annual emission target by a maximum of 5 % if more than 25 % of the cars they register are low-emission vehicles in any given year. As the share of low-emission vehicles already reached 23 % in 2022, it is questionable whether this provision will play a significant role in further increasing the uptake of electric vehicles.

66 Our interviews with stakeholders and reviews of various studies highlighted other key challenges when it comes to increasing the uptake of electric vehicles. The first is battery availability. We pointed out in our 2023 report[27] that access to raw materials remains a major strategic challenge for the EU's battery value chain.

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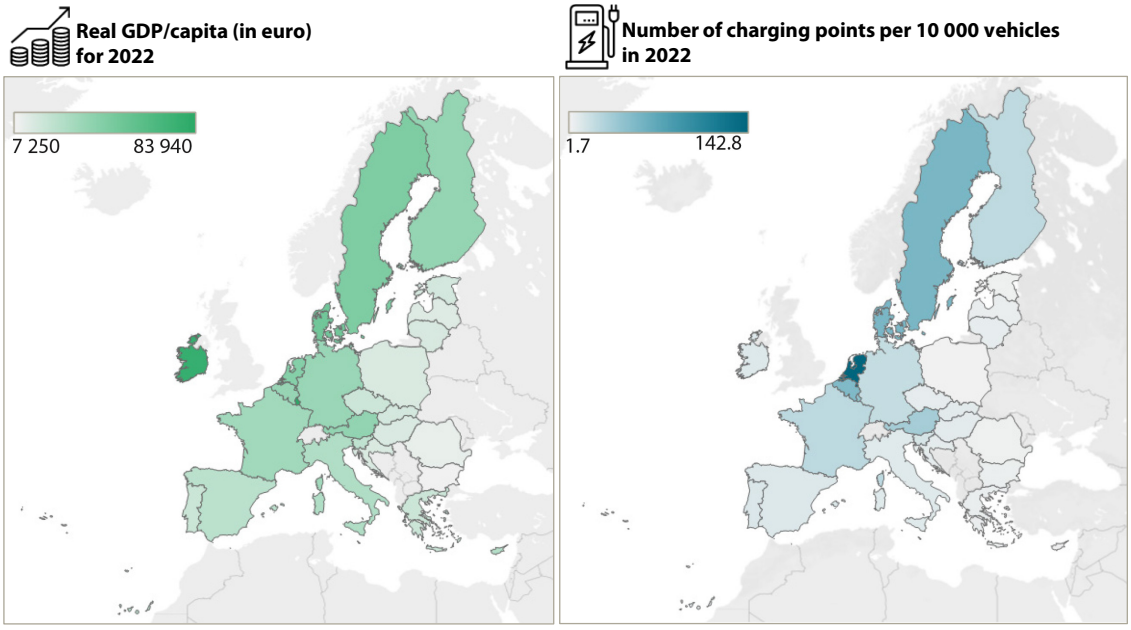
[25] ICCT, A global comparison of the life-cycle greenhouse gas emissions of combustion engine and electric passenger cars, July 2021.

[26] Eurostat, Passenger cars in the EU, March 2023.

[27] ECA, Special report 15/2023: The EU's industrial policy on batteries – New strategic impetus needed.

67 Another obstacle is the lack of adequate charging infrastructure, as highlighted in our 2021 report[28]. ***Figure 18*** shows that member states with lower gross domestic product (GDP) per capita struggle when it comes to expanding their electric vehicle charging infrastructure. The European Automobile Manufacturers' Association also highlighted that insufficient charging infrastructure will make it difficult for manufacturers to meet the reduction targets from 2030 onwards[29]. It also pointed out that 70 % of all car battery chargers in the EU are concentrated in just three member states (the Netherlands, France, and Germany), which make up 23 % of the EU's total surface area combined.

Figure 18 – GDP per capita and density of car charging points (2022)



Note: Electric cars include both passenger cars and light vans.

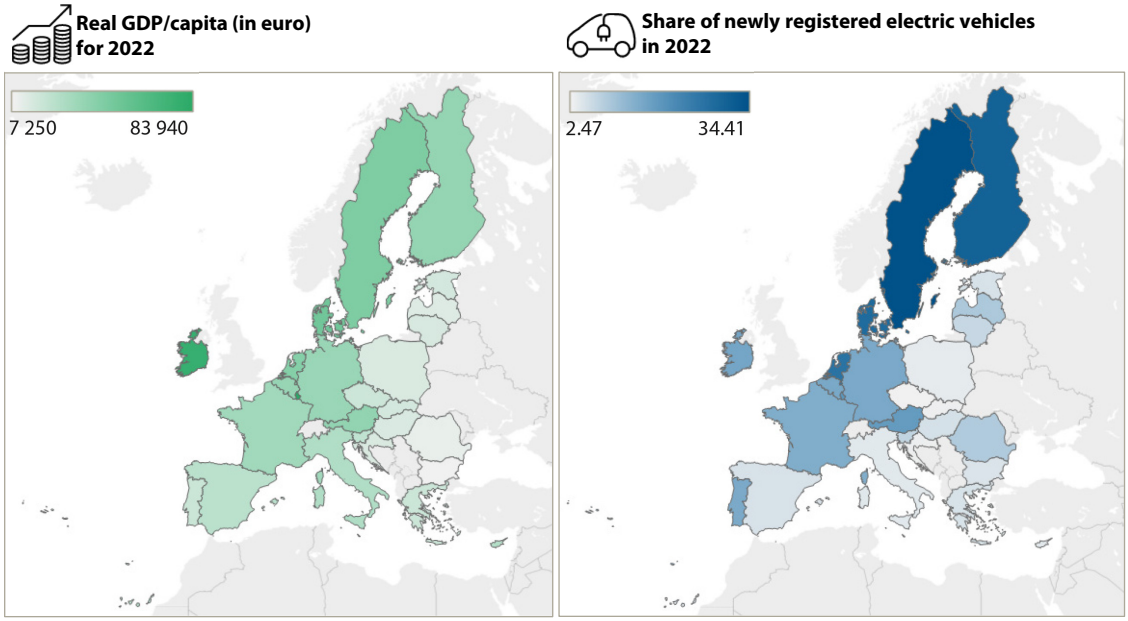
Source: ECA based on Eurostat and European Alternative Fuels Observatory. Maps created with Tableau.

[28] ECA, Special report 05/2021: Infrastructure for charging electric vehicles: more charging stations but uneven deployment makes travel across the EU complicated.

[29] ACEA, Fit for 55: a much-needed reality check for EU policy and decision makers to keep mobility accessible, 2021.

68 Another challenge is that electric vehicles are, on average, more expensive than combustion engine cars, so consumers may simply not be able to afford them. ***Figure 19*** shows that in those member states with higher GDP per capita, the uptake of electric vehicles is greater. Member states with lower GDP per capita are therefore likely to continue to encounter more problems in attempting to lowering passenger car emissions because their residents may keep their polluting cars for longer. This is already the case, as the average age of a car in the EU has increased from 7.4 years in 2014 to 12 years in 2021[30].

Figure 19 – GDP per capita and market share of electric vehicles (2022)



Note: Electric cars include both passenger cars and light vans.

Source: ECA based on Eurostat and European Alternative Fuels Observatory. Maps created with Tableau.

[30] ACEA, Average age of the EU vehicle fleet, by country, 2023.

Conclusions and recommendations

69 As of 2020, 11 years after the first Cars CO_2 Regulation entered into force, real-world CO_2 emissions from new passenger cars began to drop significantly. This is mainly due to a significant uptake of electric vehicles while CO_2 emissions from cars with combustion engines have not dropped. While the car CO_2 emissions data were collected and verified by the Commission in line with the Regulation, there is insufficient assurance on the accuracy of the CO_2 emissions declared by manufacturers on certificates of conformity at the start of the process. We consider that the EU's climate ambitions and the CO_2 emission reduction targets for new passenger cars up to 2029 are not sufficiently well aligned. For 2030 and beyond, the targets are aligned, but whether or not they are achieved will depend on the uptake of zero-emission vehicles.

70 We found shortcomings in the way that the EU Framework for vehicle type approval was implemented. In particular, type-approval authorities in two of the three visited member states did not carry out the required manufacturer checks. This limits the assurance that the vehicle CO_2 emissions declared by manufacturers on certificates of conformity are correct. The Commission only has limited information on the implementation of these checks by national authorities, since by mid-2023 the Commission itself had not carried out any assessment on the implementation of the new rules (paragraphs ***18***-***23***).

71 Another factor limited the assurance relating to the CO_2 values stated on certificates of conformity. This was that the Commission did not make use of the information on emissions from cars in circulation from air-polluting laboratory tests, to assess the risk that the CO_2 values on Certificates of Conformity might be incorrect. We note that there was no legal requirement to make use of such information. The proposed new methodology for testing vehicles in circulation for their CO_2 emissions further increases the sample size of vehicles that have to be tested, something that none of the type-approval authorities in any of the three visited member states was able to manage in the 2020-2022 period (paragraphs ***24***-***27***).

72 In line with the Cars CO_2 Regulation, the Commission is required to collect and publish aggregated information on the real-world fuel consumption of all new cars registered since 2021. Information tailored to consumers' specific needs would provide more useful information on vehicles' real-world fuel consumption (and CO_2 emissions), possibly influencing purchase decisions and thus motivating manufacturers to reduce the gap between laboratory and on-the-road emissions (paragraphs ***28***-***29***).

Recommendation 1 – Increase the level of assurance that vehicle emissions correspond to manufacturers' declared levels on Certificates of Conformity

The Commission should:

(a) follow up with member states to ensure that type-approval authorities carry out the required checks on manufacturers to provide assurance on the data included on Certificates of Conformity;

(b) assess the feasibility of providing consumers with information on real-world fuel consumption tailored to their specific needs;

(c) closely monitor the implementation of the proposed methodology for testing CO_2 emissions of vehicles already in circulation, where these tests are carried out by the type-approval authorities, taking corrective action if necessary.

Target implementation date: 2025

73 Member states are responsible for collecting, verifying, and sending CO_2-related data from passenger cars to the Commission in a timely manner, and are also responsible for ensuring that data are correct and complete. We observed delays in member states' submission of 2020 data and detected issues that affected their completeness and accuracy. The unavailability of electronic type-approval certificates created a burden for the member states that decided to use type-approved data for coherence checks when verifying the data on Certificates of Conformity. Clearing the data with member states has been a cumbersome process, due to the lack of fully operational electronic tools to be able to verify car data, and due to the many exchanges between the European Environment Agency and the member states. These exchanges, however, led to the timely publication of provisional data (paragraphs ***31***-***40***).

74 The Commission and the EEA subsequently cleared the provisional data with those manufacturers that had notified errors, which improved data completeness and accuracy. However, this clearing process also contributed to the increasing delays in publishing the final data. The data for 2020 were published almost a year after the regulatory deadline. We can confirm the Commission's calculations of EU-wide and manufacturers' average emissions, targets, and excess-emission premiums (paragraphs ***41***-***46***).

Recommendation 2 – Make better use of electronic tools for collecting and verifying car data

The Commission should:

(a) in the Forum for the Exchange of Information on Enforcement, support member state type-approval authorities in standardising and using an electronic type-approval certificate format and assess the possibility of introducing a legal requirement at EU level for only using an electronic format in the future;

(b) assess the possibility of streamlining the procedure for clearing the provisional data with member states and manufacturers.

The European Environment Agency should:

(c) make all of the reporting and checking features in the Reportnet3 tool available to reporting countries and manufacturers so that they can upload and test their data.

Target implementation date: 2025

75 In the 2009-2019 period, the average real-world emissions of new vehicles did not drop, mainly because manufacturers focused on reducing emissions measured in the laboratory rather than on the road. In 2017, a new laboratory test cycle that better reflected actual driving conditions became compulsory for new type-approved vehicles. This effectively closed many loopholes that had been created under the previous test cycle, and narrowed the gap between laboratory and real-world emissions. Since 2022, the Commission has been able to obtain information on real-world emissions from on-board fuel consumption meters installed in new vehicles. The Commission therefore now has information on the extent of the gap between laboratory and real-world emissions for new vehicles registered from 2021 onwards, and will easily be able to see if this gap starts to increase again (paragraphs ***48***-***52***).

76 From 2020, when more stringent emission targets started to apply, we could see that the Cars CO_2 Regulation contributed positively to reducing new vehicle real-world emissions, mainly due to the significant uptake of electric vehicles. At the same time, emissions from new combustion vehicles and plug-in hybrids remain an area of concern (paragraphs ***53***-***57***).

77 We found that the Regulation's modalities fulfilled their expected objective, i.e. they made it cost effective for manufacturers to meet their specific emission targets. The modalities saved manufacturers almost €13 billion in excess-emission premiums in 2020. Most modalities, however, had an adverse impact on CO_2 emissions, but these will either be discontinued or modified from 2025 as part of the "Fit for 55" package, adopted in 2023 (paragraphs ***58***-***62***).

78 We consider that the CO_2 emission reduction targets for new passenger cars and the EU's climate ambitions between now and 2029 are not sufficiently well-aligned. The key challenge for meeting emission reduction targets for 2030 and beyond will be to ensure a sufficient uptake of zero-emission vehicles. In particular, it will be important to address electric vehicle affordability, provide sufficient electric vehicle charging infrastructure, and secure the supply of raw materials to produce batteries (paragraphs ***63***-***68***).

Recommendation 3 – Refocus CO_2 emission reduction targets on key elements that affect CO_2 emissions from new passenger cars

The Commission should assess the feasibility, costs, and benefits of the following changes to the Cars CO_2 Regulation:

(a) replacing the current EU and manufacturer level targets (which are based on average CO_2 reductions) with targets based instead on a minimum share of zero-emission vehicles;

(b) introducing a CO_2 "real-world emissions" cap at manufacturer level, one that should not be exceeded for combustion engine cars, and including all types of hybrid.

Target implementation date: 2026

This report was adopted by Chamber I, headed by Mrs Joëlle Elvinger, Member of the Court of Auditors, in Luxembourg at its meeting of 6 December 2023.

For the Court of Auditors

Tony Murphy
President

Annexes

Annex I – Cars CO2 Regulation key legislative acts

Regulation (EC) No 443/2009 of the European Parliament and of the Council of 23 April 2009, setting emission performance standards for new passenger cars as part of the Community's integrated approach to reduce CO_2 emissions from light-duty vehicles

Key elements:

- sets the EU-wide and manufacturer specific targets for average car CO_2 emissions for 2010-2024
- provides modalities for manufacturers to be used for calculating the specific manufacturers' targets
- introduces incentives for manufacturers to produce zero- and low-emission vehicles

Regulation (EU) No 333/2014 of the European Parliament and of the Council of 11 March 2014, amending Regulation (EC) No 443/2009 to define the modalities for reaching the 2020 target to reduce CO_2 emissions from new passenger cars

Introduces changes following an impact assessment of the implementation of Regulation (EC) No 443/2009 and confirms the target for 2020-2024

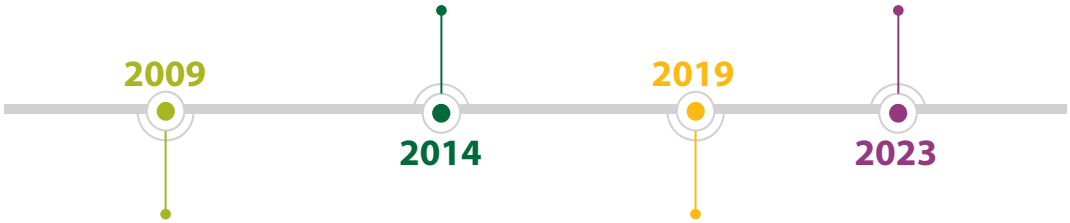
Regulation (EU) No 2019/631 of the European Parliament and of the Council of 17 April 2019, setting CO_2 emission performance standards for new passenger cars and for new light commercial vehicles, and repealing Regulations (EC) No 443/2009 and (EU) No 510/2011

Key changes:

- sets targets for average CO_2 emissions for 2025-2034
- re-introduces incentives for manufacturers to produce zero- and low-emission vehicles
- introduces the requirement for manufacturers and member states to report data on real-world consumption from 2021

Regulation (EU) No 2023/851 of the European Parliament and of the Council of 19 April 2023, amending Regulation (EU) 2019/631 as regards strengthening the CO_2 emission performance standards for new passenger cars and new light commercial vehicles in line with the EU's increased climate ambition

Increases the EU-wide and specific manufacturers' targets from 2030 onwards to better align them with the EU's climate ambitions as part of the 'Fit for 55' legislative package



Annex II – Overview of air-polluting tests for vehicles in circulation in the three member states visited during 2020-2022

	The Netherlands			Germany			Italy		
Year	***2020***	***2021***	***2022***	***2020***	***2021***	***2022***	***2020***	***2021***	***2022***
Number of vehicle families reported by manufacturers	Information was not provided by the type-approval authority in the Netherlands			309	476	618	34	63	34
Minimum **required** number of families to be tested by manufacturers				62	47	38	22	38	19
Number of families **tested** by manufacturers				62	47	38	17	16	13
Minimum number of vehicles that **must** be tested by manufacturers				186	141	117	51	48	57
Number of vehicles actually **tested** by manufacturers				186	144	113	39	31	37
Type-approval authority requirement for the minimum number of families to be tested				21	24	36	6	6	5
Number of families actually **tested** by the type-approval authority	0	9	9	9	16	29	0	0	0
Minimum number of vehicles that **must** be tested by the type-approval authority	n/a	27	27	63	72	108	18	18	15
Number of vehicles actually **tested** by the type-approval authority	0	30	16	27	42	69	0	0	0

Source: Data provided by the type-approval authorities in the three visited member states.

Annex III – Main differences between the NEDC and the WLTP test procedures

NEDC		WLTP
Single test cycle	**Test cycle**	Dynamic cycle more representative of real driving
20 minutes	**Cycle time**	30 minutes
11 kilometres	**Cycle distance**	23.25 kilometres
2 phases, 66 % urban and 34 % non-urban driving	**Driving phases**	4 more dynamic phases, 52 % urban and 48 % non-urban driving
34 kilometres per hour	**Average speed**	46.5 kilometres per hour
120 kilometres per hour	**Maximum speed**	131 kilometres per hour
Impact on CO_2 and fuel performance not considered under NEDC	**Influence of optional equipment**	Additional features (which can differ per car) are taken into account

Source: ECA review 01/2019: The EU's response to the "dieselgate" scandal (Briefing Paper).

Abbreviations

ACEA: European Automobile Manufacturers Association

CO_2: Carbon dioxide

CoC: Certificate of conformity

EEA: European Environment Agency

GHG: Greenhouse gas

ICCT: International Council on Clean Transportation

ICE: Internal combustion engine

JRC: Joint Research Centre (European Commission Directorate-General)

KBA: Kraftfahrt-Bundesamt (German type-approval authority)

MIT: Direzione Generale della motorizzazione civile presso il Ministero delle infrastrutture e dei trasporti (Italian type-approval authority)

NEDC: New European Driving Cycle

RDW: Rijksdienst voor het Wegverkeer (Dutch type-approval authority)

WLTP: Worldwide Harmonised Light Vehicles Test Procedure

Glossary

Certificate of conformity: Document issued by manufacturers for each new vehicle produced, containing technical information such as the vehicle's identification number, weight and CO_2 emissions.

Euro standards: Light vehicle air pollutant emissions standards defined through a series of EU regulations (Euro 1 to Euro 6).

Fit for 55: EU legislative package for meeting climate goals, and in particular reducing the EU's greenhouse gas emissions by at least 55 % by 2030.

Greenhouse gas: Gas in the atmosphere – such as carbon dioxide or methane – that absorbs and emits radiation, trapping heat and so warming the Earth's surface through what is known as the greenhouse effect.

Gross Domestic Product (GDP): Standard measure of a country's wealth, based on the total value of goods and services produced there (usually during one year).

New European Driving Cycle: Test used in the EU until 2018 to measure exhaust emissions as part of the type approval of cars.

Type approval: Process by which member state authorities certify that new vehicle types meet all EU safety, environmental and production standards before they are placed on the market.

Worldwide Harmonised Light Vehicles Test Procedure: Test used since 2017 to measure exhaust emissions as part of the type approval of cars.

Replies of the Commission and the EEA

https://www.eca.europa.eu/en/publications/sr-2024-01

Timeline

https://www.eca.europa.eu/en/publications/sr-2024-01

Audit team

The ECA's special reports set out the results of its audits of EU policies and programmes, or of management-related topics from specific budgetary areas. The ECA selects and designs these audit tasks to be of maximum impact by considering the risks to performance or compliance, the level of income or spending involved, forthcoming developments and political and public interest.

This performance audit was carried out by Audit Chamber I Sustainable use of natural resources, headed by ECA Member Joëlle Elvinger. The audit was led by ECA Member Pietro Russo, supported by Chiara Cipriani, Head of Private Office and Benjamin Jakob, Private Office Attaché; Florence Fornaroli, Principal Manager; Jindřich Doležal, Head of Task; Viktor Popov, Dirk Neumeister, Stamatis Kalogirou, Ioannis Hartoutsios, Dominik Skotarczak, Ioanna Topa and Lucia Rosca, Auditors. Marika Meisenzahl provided graphical support. Laura McMillan provided linguistic support.

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As of 2020, 11 years after the first Cars CO_2 Regulation entered into force, CO_2 emissions from new passenger cars began to drop significantly. This was mainly due to a significant uptake of electric vehicles, while real-world CO_2 emissions from cars with combustion engines have not dropped. Although the Commission collected and verified the car CO_2 emissions data in line with the Regulation, there is insufficient assurance on the accuracy of CO_2 emissions declared by manufacturers on new car certificates of conformity. We recommend the Commission make better use of electronic tools for collecting and verifying car data and refocus the CO_2 emission reduction targets to address key elements that affect CO_2 emissions from new passenger cars.

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