【欧州】【自動車】

Road/Railways - Environmentally friendly vehicles: European Environment Agency (EEA)'s 2019 final data shows continuation of upward trend of CO_2 emissions for passenger cars and stagnation for vans

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【概要：Summary】

GHG emissions from transport account for about one quarter of the EU's total GHG emissions. This makes the transport sector's GHG emissions a potential obstacle for achieving the EU's climate targets, including the 2050 net-zero CO_2 emission target and the EU's commitments under the 2015 Paris Agreement.

Therefore, the European Green Deal calls for a 90% reduction in GHG emissions from transport by 2050, compared with 1990 levels. In particular the CO_2 emission in road transport need to be reduced, as road transport contributed 21% of the EU's total CO_2, emissions and about 72% of all CO_2 emissions in the transport sector in 2017.

Over the past decade, the EU has introduced key policy measures for reducing the transport sector's CO_2 emissions. The Regulation (EC) No 443/2009 for the passenger cars and the Regulation (EU) No 510/2011 (EU, 2011) for the light commercial vehicles (vans) set EU fleet wide CO_2 emission targets for the period 2015 to 2019 and 2017 to 2019, respectively.

As of 1 January 2020, Regulation (EU) 2019/631 replaced Regulation (EU) 443/2009 on passenger cars' CO_2 emission targets and Regulation (EU) 510/2011 on light commercial vehicles.

The European Environment Agency (EEA)'s final results show 122.3g CO_2/km for the average CO_2 emissions of new passenger cars registered in the EU, Iceland, Norway and the United Kingdom in 2019. This result confirms the tendency that while the CO_2 emissions steadily declined until 2016, thereafter, the CO_2 emissions of these vehicles continue to rise again. Regarding the average CO_2 emissions of new vans registered in the EU, Iceland, Norway and the United Kingdom, the EEA's data show in 2019 an average of 158g CO_2/km, which is the same level as in 2018 and below the target of 175g CO_2/km that applied until 2019. The average CO2 emissions of new light commercial vehicles stagnate with 158.0 g CO_2/km for both consecutive years 2018 and 2019. This stagnation followed a period of steady decline until 2017 and a slight increase in 2018.

However, to reach CO_2 emissions reduction target of -55% the 2030, it will require additional measures of GHG emissions reduction in road transport. Therefore, the Regulation (EU) 2019/631 could be part of the Commission's "Fit for 55 Package". The need for this step is confirmed by the EEA's final results for average CO_2 emissions of new passenger cars and light commercial vehicles in 2019.

【記事：Article】

1. Legal background to reduce CO_2 emissions in the transport sector

1.1. The European Green Deal targets and the transport sector's GHG emissions

The EU transport sector's continuously increasing GHG emissions are of major concern as they are seen as major obstacle for the EU to achieving its climate targets, including the 2050 goal of net-zero GHG emissions of the European Green Deal (COM/2019/640 final). The European Green Deal expects the sector to deliver on the 90% GHG emission reduction target, which should be reached by 2050. To achieve this target, the EU will have to introduce a more ambitious 2030 GHG emission reduction target of 55% compared to 1990 levels.

In the EU, the transport sector remains the only main European economic sector, which continues to show increasing GHG emissions, according to the European Environment Agency (EEA). In particular, the GHG emissions of road transport need to be reduced, as they alone accounted for around 72% of the transport sector's total GHG emissions and 21% of the EU's total GHG emissions in 2018. Passenger cars and light commercial vehicles (vans) are responsible for around 12% and 2.5% of the EU's total CO_2 emissions respectively.

1.2. Legislation on reducing CO_2 emissions of passenger cars and vans

To reduce CO_2 emissions in the road transport sector, Regulation (EC) 443/2009 set the CO_2 reduction framework for passenger cars with a target of 130 grams of CO_2 per kilometre (g/km) by 2015 and 95g CO_2/km by 2021, phased in from 2020 for the EU fleet-wide average emission target for new passenger cars. The Regulation gives manufacturers also additional incentives to produce vehicles with extremely low emissions (below 50g/km) among others.

For new vans, limits were introduced with Regulation (EU) No 510/2011 in 2011, with an EU fleet wide CO_2 target of 175g CO_2/km for the period 2014-2019 and 147g CO_2/km for the period 2020-2024, as well as specific CO_2 emission targets for each manufacturer (or pool of manufacturers). In 2019, Regulation (EU) 2019/631 was introduced repealing and replacing Regulation (EC) No 443/2009 and Regulation (EU) No 510/2011. On 1 January 2020, Regulation (EU) 2019/632 entered into force, and its standards will apply from 2025 and 2030. From 2030 onwards new cars will emit on average 37.5% less CO2 and new vans will emit on average 31% less CO_2 compared to 2021 levels. For the period 2020-2024, Regulation (EU) 2019/631 confirms the EU fleet-wide CO_2 emission targets set under Regulations (EC) No 443/2009 and (EU) No 510/2011, (95g CO_2/km for passenger cars and 147g CO_2/km for vans). Between 2025 and 2029, both cars and vans will be required to emit 15% less CO_2 of the EU fleet-wide target in 2021. Fleet-wide performance standards mean that the average emissions of all cars registered in the European Union in a year must not exceed the allowed value. In other words, not every new car has to be in line with the fleet-wide target.

From 2030, the EU fleet-wide target for CO_2 emissions of the new passenger cars is set to be reduced by 37,5%, based on the 2021 target. For the new vans, an EU fleet-wide target of 31% below the 2021 target was determined for 2030. The annual emission targets of each manufacturer will be based on these EU fleet-wide targets.

From 1 January 2025, a zero-emission and low-emission vehicles' benchmark equal to a 15% share of each of the new passenger cars and new light commercial vehicles fleets will apply. From 1 January 2030, a zero-emission and low-emission vehicles' benchmark of 35% for the fleet of new passenger cars and a benchmark of a 30% share of the fleet of new light commercial vehicles will apply. The target levels still refer to the NEDC emission test procedure. However, from 2021 onwards, the emission targets for manufacturers will be based on the WLTP emission test procedure.

1.3. Heavy-duty vehicles‘ Regulation (EU) 2019/1242

Regarding the CO_2 emissions of heavy-duty vehicles, they represent around 6% of the EU’s total CO_2 emissions and about 25% of total road transport CO2 emissions. Without further action, the share of CO_2 emissions from heavy-duty vehicles is expected to grow by around 9% between 2010 and 2030.

In 2019, first legislation, Regulation (EU) 2019/1242, to stipulate fleet-wide CO_2 emission standards for these vehicles was approved. Its standards will become effective in two stages from 2025 and 2030. Regulation (EU) 2019/1242 of the European Parliament and of the Council of 20 June 2019 sets CO_2 emission performance standards for new heavy-duty vehicles and amending Regulations (EC) No 595/2009 and (EU) 2018/956 of the European Parliament and of the Council and Council Directive 96/53/EC.

For the time being, they will apply to all heavy goods vehicles with a total permissible laden weight of more than 16 tonnes. Additional regulations (for instance for lighter commercial vehicles, truck trailers and semi-trailers, buses) could still follow.

For the reporting periods of the year 2025 onwards the CO_2 emissions should be reduced by 15% and for the reporting periods of the year 2030 onwards by 30%, unless decided otherwise. The reference CO_2 emission shall be based on the monitoring data reported pursuant to Regulation (EU) 2018/956 for the period from 1 July 2019 to 30 June 2020 (“the reference period“). Starting from 1 July 2020 and for each subsequent reporting period, the Commission shall determine for each manufacturer the zero- and low-emission factor for the preceding reporting period. The zero- and low-emission factor shall take into account the number and the CO2 emissions of zero- and low-emission heavy-duty vehicles in the manufacturer’s fleet in a reporting period.

1.4. Revision of legislation to reach the 55% net reduction of CO2 emissions by 2030

The GHG emission reduction of at least 55% net reduction in the revised proposal on a European Climate Law (COM (2020)563 final in GHG emissions should make it possible to reach the climate neutrality target in the EU by 2050. Since there has been little to no success in the decarbonisation in the road transport sector, the introduction of a 55% GHG emission reduction target for 2030 is an important mod-term target. On 21 April 2021, the EU Member States’ and the European Parliament’s negotiators reached a provisional political agreement to improve the CO2 emission reduction in the transport sector. By 30 June 2021, the Commission is expected to present revised regulations regarding the GHG emissions in the transport sector as part of a “Fit for 55%” package to deliver on the additional GHG emission reduction by 2030.

1.5. Change from NEDC to WLTP

Regarding the CO2 emission measuring procedures, the New European Driving Cycle (NEDC) is replaced by the World Harmonised Light Vehicle Test Procedure (WLTP) to apply real-world values for measuring the CO2 emissions. While the NEDC was still fully applicable in 2015 and 2016, in September 2017, the WLTP became mandatory for all new vehicle types. Although since September 2018 the WLTP became applicable to all newly registered passenger cars and vans, and the NEDC test procedure-based CO_2 emission measuring is phased out, it will still be necessary to determine NEDC-based CO_2 emission figures for some time. Therefore, for 2018, there was still a very limited number of records of CO_2 emissions measured by using WLTP and the average CO_2 emissions and the targets until 2020 will still be calculated using the NEDC values.

However, according to European Environment Agency (EEA), from 2021 onwards, the CO_2 emission targets

will be expressed in WLTP values and compliance will be checked using WLTP only.

2. Changes in the average CO2 emissions from new passenger cars and vans 2017-2019

In accordance with Regulation (EC) No 443/2009 and (EU) No 510/2011, and Regulation (EU) 2019/631, the EEA collects annually the CO_2 emissions results and other parameters of new passenger cars since 2010. Since 2013, the EEA collects also data about new vans. In its reports, the EEA evaluates the annual performance of the new vehicles and their progress toward meeting the CO_2 emission reduction targets. For compliance purpose, NEDC emissions values are still used in 2019. The EEA collects and regularly publishes data on the CO_2 emissions of new passenger cars and vans registered in Europe, based on the data reported by all EU Member States, United Kingdom, Iceland (since 1st January 2018) and Norway (since 1st January 2019). On this basis, EEA evaluates the efficiency of the new vehicle fleet includes information on CO_2 emissions and vehicle mass.

The EU transport sector's CO_2 emissions were 29% above 1990 levels despite a decline between 2008 and 2013. In 2015, an evaluation of Regulations (EC) No 443/2009 and (EU) No 510/2011 concluded that those Regulations have generated GHG emissions savings in the first years, but in 2018 and 2019, there was an increasing discrepancy between the vehicles' CO_2 emissions measured under the NEDC and their real-world CO_2 emissions. Under the NEDC, the gap between type approval and real-world emissions grew in the end to almost 40%. This was one of the reasons for the replacing the NEDC by the WLTP in 2017.

The data on real-world CO_2 emissions and fuel or energy consumption of those vehicles placed on the EU market from 2021 onwards will be collected based on a new Implementing Regulation (EU) 2021/392. The first data will be collected from new vehicles sold in 2021 and results will be reported to the EEA as of April 2022. From December 2022 onwards, the Commission will publish the real-world data every year with the aim of showing the difference between the average type-approval and real-world CO_2 emissions for each manufacturer's fleet of new vehicles. This data will make it possible to monitor the gap between type-approval and actual real-world CO_2 emissions.

According to EEA (2021b) analysis, in 2019, almost 15.5 million of new cars were registered in the EU, Iceland, Norway and the UK and 59% of passenger cars registrations were petrol cars. Diesel vehicles constituted 31%, marking a decrease of 4% points from 2018 and a 23% reduction compared to 2011, the year when diesel cars peaked with a 55% share of new registrations. In 2019, about 38% of new car registrations were SUVs. Sales of plug-in hybrid electric vehicles (PHEV) and battery-electric vehicles (BEV) continued to increase to about 3.5%, compared with 2% in 2018. About half of the BEVs were registered in Norway, Germany, and the Netherlands. The combined shares of PHEV and BEV registrations were highest in Norway (56%), Iceland (19%), the Netherlands (16%) and Sweden (12%). These were also some of the few countries where the average emissions of new cars decreased from 2018 to 2019.

However, the total average CO_2 emissions from new passenger cars increased in 2019 for the third consecutive year, rising to 122.3g CO_2/km.

The average CO_2 emissions from new vans remained at 158.0g CO_2/km in 2018 and 2019. Therefore, as the 2018 and 2019 results suggest, the legislation and measures taken to reduce the CO_2 emissions from new cars and vans have not led to a sufficient reduction of CO_2 emissions.

Regarding new passenger cars, according to EEA results (2021b), after a steady decline of average CO_2 emissions from new cars from 2010 to 2016, by almost 22g CO_2/km, in 2017, the average CO_2 emissions from new cars increased by 0.4g CO_2/km to 118.5g CO_2/km, up from

118.1g CO_2/km in 2016. The upward trend continued with an additional increase of 2.3g CO_2 /km in 2018, with an average CO_2 emission for passenger cars of 120.8g CO2/km. In 2019, the final data of EEA (2021b) in the EU, Iceland, Norway, and the UK shows that the average CO_2 emissions of new passenger cars were 122.3g CO_2/km. This result is below the target of 130g CO_2/km that applied until 2019. However, the average CO_2 emissions increased by 1.5g CO_2/km compared to 2018.

Therefore, according to the latest EEA data (2021b), in 2019, the average CO_2 emissions of new cars increased for the third consecutive year, from 118.5g CO_2/km in 2017 to 120.8g CO_2/km in 2018, and to 122.3g CO_2/km in 2019.

Regarding new vans, for the first time in 2018, the average CO_2 emissions from new light commercial vehicles registered in the EU were higher 157.9g CO_2/km in 2018 than in the previous year (156.1g CO_2/km in 2017). The EU average CO_2 emissions are, however, still 10% below the EU target of 175g CO_2/km and only 7% above the 2020 target. In 2019, the average CO_2 emissions in 2019 in the former EU-28, plus Iceland and Norway, using the NEDC values, was 158.0g CO_2/km in case of light commercial vehicles.

Accordingly, this development in the average CO_2 emissions for vans in 2018 and 2019, data show a stagnation. Most registered vans are powered by diesel and in the majority of countries, the proportion of diesel vans is above 90%. The share of petrol vans is only 3.5%, but it has increased in the last years, up from 1.9% in 2016 and 2.4% in 2017. Gas fuelled vans constituted 1.1% of the new fleet. For vans, registrations of battery electric vehicles nearly doubled from 2018 (0.8%) to 2019 (1.4%), but overall, the share remains low. According to final data published by the EEA (2021b), the average CO_2 emissions of new cars and vans registered in the EU, Iceland, Norway, and the United Kingdom in 2019 stayed well below the applicable target of 130g CO_2/km that applied until 2019. However, this trend still leaves manufacturers with the significant challenge of reducing the average emissions of their fleet in 2020, when stricter EU fleet-wide targets of 95g CO_2/km for cars and 147g CO_2/km for vans were introduced. Therefore, manufacturers must improve the fuel efficiency of their fleets and accelerate the deployment of zero- and low-emission vehicles.

3. Reasons for increasing CO_2 emissions in passenger cars

According to the EEA reports (2021a, 2021b, 2021c), considering the reasons behind the increase of the average CO_2 emissions of passenger cars in the past years, a main factor contributing to this increase from 2017 to 2019 was the growing share not only of petrol cars in new registrations, but also the increase of sales in the sport utility vehicle (SUV) segment. In Europe, about 38% of new car registrations were SUVs, meaning that one out of three cars newly registered in 2018 was a SUV car. Compared to regular cars (as hatchback or sedan), SUVs are typically heavier and have more powerful engines and larger frontal areas. These are all features that increase their fuel consumption. Furthermore, most new SUVs registered were powered by petrol, with average emissions of 134g CO_2/km, which is around 13g CO_2/km higher than the average emissions of other new petrol cars.

Furthermore, besides the surge in the numbers of SUVs, also the average mass of new cars increased by 30 kg from 2018 to 2019. The mass increase was observed for all vehicle segments (small, medium, large regular cars, and SUVs) and for both, petrol, and diesel cars. Moreover, the market penetration of zero- and low-emission vehicles, including electric cars, remained low in the past years. Therefore, the increase in average CO_2 emissions for new passenger cars in the years 2017-2019 was affected by three main market trends, the shift from diesel to petrol cars, which continued in 2019, the increase of sales of larger and heavier

SUVs, powered by petrol, and the general increase of weight of passenger cars.

Between 2018 and 2019 alone, the market share of SUVs increased from 35% up to 38%. At the same time, the new registrations of battery electric and plug-in hybrid electric cars continued to increase in 2019 but it remained at a low level with 3.5% of new registrations, compared to 2% in 2018. However, this development poses a major problem when considering the stricter EU fleet-wide targets of 95g CO_2/km for cars that apply since 2020. The CO_2 emission increase in the three consecutive years 2017, 2018 and 2019 is concerning since the average CO_2 emissions will still need to further decrease significantly to reach the target of 95g CO_2/km for passenger cars by 2021, but also the 147g CO_2/km target for vans by 2020. The automobile manufacturers need to take more decisive action to achieve the respective target and they will have to improve the fuel efficiency of their fleet, downsize the engine and uptake of electric vehicles, as these measures have a positive effect on reducing CO_2 emissions. However, if the manufacturers do not want to downsize their SUVs sales, they have to accelerate the deployment of zero- and low-emission SUV vehicles, to meet the future targets of significantly reduced CO2 emission limits. Manufacturers will also even more than before group together and form pools to act jointly to meet their emissions target. However, manufacturers must respect the rules of competition law and a pooling between car and van manufacturers is not possible.

To encourage eco-innovation, manufacturers may also obtain emission credits for vehicles equipped with innovative technologies for which it is not possible to demonstrate the full CO_2 savings during their type-approval. As of 2025, the efficiency improvements for air conditioning systems will become eligible as eco-innovation technologies.

4. Average specific CO_2 emissions of all new heavy-duty vehicles

Regulation (EU) 2018/956 requires EU Member States and manufacturers to report data related to heavy-duty vehicles. Member States report trucks, buses and trailers registered in their territory. Manufacturers report trucks of specific types that are subject to certification requirements. The reporting periods are annual and run from 1st July to 30th June the following year. One exception was the first reporting which covered 1st January 2019 to 30 June 2020. In addition, the dataset covers the United Kingdom and Norway which reported data in line with the Regulation (EU) 2018/956, and the UK was subject to the Regulation in the reporting period 2019-2020). The EEA (2021e) has also released a new data on the CO_2 emissions of new heavy-duty vehicles, such as buses and trucks. The average specific CO_2 emissions of all new heavy-duty vehicles registered in the EU from 2019 to mid-2020 was 53g CO_2/tkm (i.e., for the transport of one tone of goods over one kilometre).

5. Conclusion

The GHG emissions from road transport, regulated for passenger cars under Regulation (EU) 443/2009 and under Regulation (EU) 510/2011 for light commercial vehicles show a concerning development as the CO_2 emissions performance for new passenger cars and light commercial vehicles show a slight increase of emissions, respectively a stagnation in the aim to further reduce average CO_2 emissions. As of 1 January 2020, Regulation (EU) 2019/631 has replaced Regulation (EU) 443/2009 on cars and Regulation (EU) 510/2011 on light commercial vehicles. The new targets seem to be rather ambitious when considering the development in the CO_2 emissions of the past years. Considering the EEA's latest final results for passenger cars and vans, it will need additional CO_2 emission reduction measures also in the road transport sector if the overall GHG emission reduction

target of a 55% reduction has to be achieved by 2030. Therefore, the EU needs to revise the Regulation (EU) 2019/631 in June 2021, within its "Fit for 55 Package".

Considering the 2030 target, the CO_2 emissions performance standards for new passenger cars and light commercial vehicles in Regulation (EU) 2019/631 seem not to be ambitious enough. The automobile manufacturers will need to take more decisive action to even achieve their 2020 CO_2 emission target for vans (147g CO2/km) and their target of 95g CO_2/km for new passenger cars in 2021. The recent surge in SUV sales is one of the key factors that also contributed to the rise of new passenger cars' CO_2 emissions in 2018, while at the same time the number of full electric cars remained small. Besides the surge in the numbers of SUVs and their higher average of 134g CO_2/km, also the increase in the average mass of new cars for SUV and both, petrol and diesel cars, needs to be reversed. Moreover, the market penetration of zero- and low-emission vehicles, including electric cars, remains still too low to correct the increases in the CO_2 emissions in 2018 and also in 2019.

At the Transport Council on 3 June 2021, the Danish delegation, supported by the Greek, Irish, Luxembourg, Maltese, the Netherlands, and Austrian delegations, shared its views on the transition to zero-emission cars as part of the European ambition to reach a net-zero emission target of GHG emissions by 2050. Regarding the transition to zero-emission light-duty vehicles, the delegations underlined that as legislators, they must give clear signals and provide predictability for car manufacturers and consumers across the EU towards zero-emission vehicles, including a clear phase-out date for petrol and diesel cars and vans among others. Aiming for climate neutrality by 2050 at the latest, zero emission vehicles such as electric vehicles must be at the forefront of the transition, according to the Danish delegation, supported by the Greek, Irish, Luxembourg, Maltese, the Netherlands, and Austrian delegations.

References

COMMISSION IMPLEMENTING DECISION (EU) 2021/781 of 10 May 2021on the publication of a list indicating certain CO2 emissions values per manufacturer as well as average specific CO2 emissions of all new heavy-duty vehicles registered in the Union and reference CO2 emissions pursuant to Regulation (EU) 2019/1242 of the European Parliament and of the Council for the reporting period of the year 2019 (notified under document C(2021) 3109) (Only the Dutch, English, French, German, Italian and Swedish text are authentic). In: Official Journal of the European Union, 12.5.2021, in: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021D0781&rid=1, retrieved 9 June 2021

Consolidated text: Regulation (EU) 2019/631 of the European Parliament and of the Council of 17 April 2019 setting CO2 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 (recast) (Text with EEA relevance)Text with EEA relevance. In:https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02019R0631-20210301, retrieved 8 June 2021

Council of the European Union: Cutting emissions: Council adopts CO2 standards for trucks. In: https://www.consilium.europa.eu/en/press/press-releases/2019/06/13/cutting-emissions-council-adopts-co2-standards-for-trucks/, 13 June 2019, retrieved 8 June 2021

Council of the European Union: Transition to zero-emission light-duty vehicles. Information from the Danish delegation, supported by the Greek, Irish, Luxembourg, Maltese, the Netherlands, and Austrian delegations. In: https://data.consilium.europa.eu/doc/document/ST

-9006-2021-INIT/en/pdf, 21 May 2021, retrieved 9 June 20201

Council of the European Union: Stricter CO2 emission standards for cars and vans signed off by the Council. In: https://www.consilium.europa.eu/en/press/press-releases/2019/04/15/stricter-co2-emission-standards-for-cars-and-vans-signed-off-by-the-council/, 15 April 2019 retrieved 8 June 2021

European Commission: Average CO2 emissions from new cars increased in 2019 ahead of stricter 2020 targets. In: https://ec.europa.eu/clima/news/average-co2-emissions-new-light-duty-vehicles-registered-europe-2019_en, 01/06/2021, retrieved 8 June 2021

European Commission: CO_2 emission performance standards for cars and vans. In: https://ec.europa.eu/clima/policies/transport/vehicles/regulation_en, 26 May 2021, retrieved 8 June 2021

European Commission: Road transport: Reducing CO2 emissions from vehicles. In: https://ec.europa.eu/clima/policies/transport/vehicles_en retrieved 7 June 2021

EEA: Average CO2 emissions from new cars and new vans increased in 2018, 24 Jun 2019 last modified 24 Jun 2019. In: https://www.eea.europa.eu/highlights/average-co2-emissions-from-new, retrieved 26 June 2020

EEA: Average CO2 emissions from new cars and new vans increased in 2018. In: https://www.eea.europa.eu/downloads/d1474c4b84cb435287f2a092ec07b37d/1561367883/average-co2-emissions-from-new.pdf, 24 Jun 2019, retrieved 28 June 2020

EEA: Average CO2 emissions from new cars and new vans increased again in 2019. In: https://www.eea.europa.eu/highlights/average-co2-emissions-from-new-cars-vans-2019, 26 June 2020, retrieved 7 June 2021

EEA (2021a): Average car emissions kept increasing in 2019, final data show. In: https://www.eea.europa.eu/highlights/average-car-emissions-kept-increasing, 1 June 2021, retrieved 7 June 2021

EEA (2021b): CO2 performance of new passenger cars in Europe. In: https://www.eea.europa.eu/data-and-maps/indicators/average-co2-emissions-from-motor-vehicles-1/assessment, 01 Jun 2021, retrieved 7 June 2021

EEA (2021 c): CO2 performance emissions of new vans in Europe. In: https://www.eea.europa.eu/data-and-maps/indicators/co2-performance-emissions-of-new-vans/assessment, 01 Jun 2021, retrieved 9 June 2021

EEA (2021e): Monitoring of CO2 emissions from heavy-duty vehicles. In: https://www.eea.europa.eu/data-and-maps/data/co2-emission-hdv, 26 April 2021, retrieved 9 June 2021

EEA (2021d): Monitoring of CO2 emissions from passenger cars - Regulation (EU) 2019/631. In: https://www.eea.europa.eu/data-and-maps/data/co2-cars-emission-19, 26 April 2021, retrieved 8 June 2021

EEA: Monitoring of CO2 emissions from passenger cars - Regulation (EU) 2019/631. In: https://www.eea.europa.eu/data-and-maps/data/co2-cars-emission-17, 03 Jun 2020, last modified 08 Jun 2020, retrieved 26 June 2020

EEA Monitoring CO2 emissions from passenger cars and vans in 2018. In: https://www.eea.europa.eu/publications/co2-emissions-from-cars-and-vans-2018, Report No 02/2020, retrieved 9 June 2020

European Environment Agency: Monitoring CO2 emissions from new passenger cars and vans in 2017. EEA Report No 15/2018. 04 Apr 2019. In: https://www.eea.europa.eu/publications/monitoring-co2-emissions-from-new-2, retrieved 2 July 2020

European Environment Agency: Monitoring CO2 emissions from passenger cars and vans in 2018 EEA Report No 2/2020. In: https://www.eea.europa.eu//publications/co2-

emissions-from-cars-and-vans-2018, 18 Mar 2020, retrieved 8 June 2021

Regulation (EU) 2019/631 of the European Parliament and of the Council of 17 April 2019 setting CO2 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 (Text with EEA relevance.). In: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019R0631, 17 April 2019, retrieved 7 June 2021

Regulation (EU) 2019/1242 of the European Parliament and of the Council of 20 June 2019 setting CO2 emission performance standards for new heavy-duty vehicles and amending Regulations (EC) No 595/2009 and (EU) 2018/956 of the European Parliament and of the Council and Council Directive 96/53/EC. In: https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32019R1242, 20 June 2019, retrieved 8 June 2021

Update Date: 07.05.2020 https://www.bmu.de/en/law/the-eu-regulations-on-reducing-co2-emissions-from-road-vehicles/, retrieved 7 June 2021