

## 【欧州】 【自動車】

Road/Railways - Environmentally friendly vehicles: European Environment Agency' s 2022 provisional data on CO<sub>2</sub> emissions from newly registered passenger cars and vans confirms positive influence of electromobility on CO<sub>2</sub> emission levels

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### 【概要 : Summary】

Based on the commitments under the Paris Agreement and the European Green Deal' s target to reach climate neutrality by 2050, the EU' s GHG emissions will have to be significantly reduced. This also includes a 90% GHG emissions reduction in the transport sector by 2050, based on 1990 figures.

However, since road transport represents about 77% of all GHG emissions in the transport sector, to achieve the Green Deal' s target, also the CO<sub>2</sub> emissions of newly registered passenger cars and vans must be significantly reduced. Consequently, the amendments in Regulation (EU) 2023/851 require an average CO<sub>2</sub> emission reduction of 55% for new passenger cars and 50% for vans in the period 2030–2034 and then a 100% reduction by 2035. This will require a transformation towards the utilisation of exclusively zero emission vehicles in future.

To monitor the trends of the average CO<sub>2</sub> emission levels of newly registered passenger cars and vans, the European Environment Agency (EEA) publishes annually the data of those CO<sub>2</sub> emissions in the EU-27, Iceland and Norway and the UK (until 2020).

Until 2019, the electrification of the vehicle fleet did not play any significant role in reducing CO<sub>2</sub> emissions from road transport. However, in 2020, the share of new EVs registrations in the fleet more than tripled from 3.5% in 2019 to 11.6%, supporting a 12% decrease of the average CO<sub>2</sub> emissions level of newly registered passenger cars in 2020. In 2021, new registrations of electric passenger cars further increased to a share of 17.8% of all new registrations. The uptake of electric vans also increased, from 2.1% of total new registrations in 2020 to 3.1% in 2021.

As results of the EEA' s provisional data on newly registered passenger cars and vans in the EU, Iceland, and Norway in 2022 show, electric cars including battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs) are gradually and continuously increasing their market shares. The EEA' s 2022 provisional data of newly registered passenger cars and vans underlines that meanwhile the continuously growing number of EVs on European roads has become the main driver of the overall progress in reducing the CO<sub>2</sub> emissions of newly registered passenger cars and this could also extend to vans in the future.

**【記事 : Article】****1. Legislative background of dealing with the transport sector's GHG emissions**

The transport sector is responsible for 25.9% of the EU's total GHG emissions, and passenger cars and vans alone account for 15% of the EU's total CO<sub>2</sub> emissions (EEA 2022a). In 2019, Regulation (EU) 2019/631 set new CO<sub>2</sub> emission performance standards beyond the year 2020 and replaced the first legislation on GHG emissions reduction from road transport, including Regulation (EU) 443/2009 for passenger cars and Regulation (EU) 510/2011 for light commercial vehicles (vans) (European Commission n.d.).

Regulation (EU) 2019/631 set new CO<sub>2</sub> emission reduction targets for new passenger cars and for new light commercial vehicles (vans) in the EU from 2025 and introduced a 15% fleet-wide reduction target based on the 2021 target for new passenger cars and the new light commercial vehicles. From 2030, the EU fleet-wide target for CO<sub>2</sub> emissions of the new passenger cars was set to a reduction of 37.5%, and for light commercial vehicles (vans), it set an EU fleet-wide reduction target of 31%, both based on the 2021 target (Regulation (EU) 2019/631).

However, based on the EU's commitments under the Paris Agreement and to reach the 2050 climate neutrality target under the European Green Deal ((COM/2019/640 final), the GHG emissions will have to be further reduced. Furthermore, the European Green Deal also set a 90% reduction in GHG emissions from transport with respect to 1990 figures. The introduction of this 2050 targets required an alignment of existing laws to achieve a new 2030 mid-term GHG emission reduction target of 55% under the "Fit for 55" package (EEA 2022b).

To achieve the EU's new 2030 target of reducing net GHG emissions by at least 55%, also the limit of average CO<sub>2</sub> emissions for new passenger cars and new light commercial vehicles' (vans) had to be further strengthened (Council of the EU 2023a).

Therefore, in line with the Union's increased climate ambitions" (European Commission n.d.). Accordingly, the European Commission presented the proposal COM (2021) 556 final "amending Regulation (EU) 2019/631 as regards strengthening the CO<sub>2</sub> emission performance standards for new passenger cars and new light commercial vehicles. The resulting new Regulation (EU) 2023/851, which entered into force on 15 May 2023, amends "Regulation (EU) 2019/631 as Regards Strengthening the CO<sub>2</sub> Emission Performance Standards for New Passenger Cars and Light Commercial Vehicles in Line with the Union's Increased Climate Ambition". It sets targets to cut CO<sub>2</sub> emissions from cars by 55% and vans by 50% by 2030 and introduces a 100% CO<sub>2</sub> emission reduction target for both, passenger cars and vans, by 2035 (Regulation (EU) 2019/631, Regulation (EU) 2023/851). Accordingly, the new Regulation (EU) 2023/851 can be expected to require a significant increase in the uptake of electric vehicles to achieve the set goals (EEA 2022d).

Furthermore, to also reduce the GHG emissions of the existing fleet of passenger cars and vans, a new separate EU-ETS II for other sectors like road transport, among others will be introduced, based on the new Directive (EU) 2023/959. This Directive amends Directive 2003/87/EC and the system for trading GHG emission allowances within the EU and the new EU-ETS II (Directive (EU) 2023/959). It includes the provisions to start emission trading for road transport emissions in 2027, with monitoring and reporting beginning in 2025 (Directive (EU) 2023/959).

Considering this legislative background to deal with the road transport's GHG emissions and the necessity to significantly reduce them in the years to come, it is important to monitor the trends in the road transport's GHG emissions. The European Environment Agency (EEA) publishes on an annual basis the data on the GHG emissions from the road transport sector, among others.

## 2. EEA's data on trends of the transport sector's GHG emissions

According to the EEA's report "Transport and environment report 2022", the transport sector is a major contributor to GHG emissions in the EU-27 because of its continuously strong dependence on fossil fuels (EEA 2022b). In 2019, the transport sector was responsible for 25.9% of the total GHG emissions in the EU-27 (EEA 2022b). Furthermore, while the overall GHG emissions have fallen by 24% over time, those of the transport sector have risen by 33% compared to 1990 figures (EEA 2022b).

According to the European Commission's "EU Reference Scenario 2020" (2021a), the projections show that, based on the impact of the COVID-19 pandemic, intra-EU passenger transport activity (in pkm) were 24% lower in 2020 compared to 2019, with public road transport, passenger cars and two-wheelers accounting for about 2/3 of the reduction. In fact, due to the COVID-19 pandemic, the EU's overall GHG emissions and transport's GHG emissions were substantially lower in 2020 than in 2019.

In 2020, the CO<sub>2</sub>e (CO<sub>2</sub> equivalent) emissions from transport including international aviation and maritime bunkers were 18.6% lower than in 2019, with the largest reduction in aviation (-56.8%), due to the COVID-19 pandemic (EEA 2022b, EEA 2022c). The GHG emissions from passenger car transport fell by 15.4%. For the other modes the reductions were -12% for light-duty trucks, -10.8% for navigation, -7.7% for heavy-duty trucks and -15.2% for the other modes (EEA 2022b).

According to the EEA report "Trends and projections in Europe 2022" (EEA 2022c), the most notable changes in CO<sub>2</sub> emissions in 2021 occurred in the transport sector, with an estimated increase of 8% compared to 2020, but a decrease of 7% compared to 2019 (EEA 2022c).

Considering the trend of the average CO<sub>2</sub> emissions from new passenger cars, after a steady decline of emissions between 2010 and 2016, by almost

22g CO<sub>2</sub>/km, the average CO<sub>2</sub> emissions from new passenger cars increased again in 2017, 2018 and 2019 (EEA 2021b). Although the CO<sub>2</sub>/km average emissions from new passenger cars reached 122.3g CO<sub>2</sub>/km in 2019 and remained below the 2015-2019 target of 130g CO<sub>2</sub>/km, it was still well above the next target for the years 2020 to 2024, at 95g CO<sub>2</sub>/km (EEA 2021b, 2021c).

According to EEA there were various reasons responsible for the increase in CO<sub>2</sub> emissions, including the increasing number of sport utility vehicles (SUVs) in the road transport sector (EEA 2021b). SUVs reached 38% of all newly registered passenger cars in the EU, Iceland, Norway, and the UK in 2019. Since SUVs had an average emission level of 134g CO<sub>2</sub>/km, significantly higher than the CO<sub>2</sub>/km average of 122.3g CO<sub>2</sub>/km in 2019, also the total CO<sub>2</sub> emissions for all new passenger cars increased (EEA 2021b).

Regarding the average CO<sub>2</sub> emissions from newly registered passenger cars and vans in the EU, Iceland, Norway, and the United Kingdom in 2020, they decreased by 12% compared with 2019. An additional 12% decrease was observed in 2021, compared with 2020. This decrease was largely attributed to the increase in the number of registrations of zero- and low-emission vehicles, with the share of battery electric cars rising to 10% in 2021 (EEA 2022d).

Furthermore, EEA (2022c) projects that, with existing policies and based on considerations regarding the developments of the COVID-19 pandemic and before the Russian invasion of Ukraine, CO<sub>2</sub> emissions from transport will decrease by 22% by 2050 compared to 1990. This underlines that there exists a huge gap to the European Green Deal's 90% GHG emission reduction target (EEA 2022b, 2022c). Therefore, only resolute GHG emission reduction measures especially in the segment of road transport will lead to the achievement of the 90% GHG emission reduction target in the transport sector.

### 3. The impact of new registrations of electric vehicles on average GHG emission levels from new passenger cars and vans

As mentioned before, the transport sector is the second largest source of GHG emissions in the EU-27 and the distance to the envisaged 2050 transport target of reducing the GHG by -90% compared to 1990 is still huge, as the EEA projections have shown (EEA 2022b). Passenger cars and vans alone are respectively responsible for around 12% and 2.5% of the EU's total CO<sub>2</sub> emissions (European Commission n.d.).

Therefore, reducing the GHG emission from the transport sector is key to meeting the EU's 2050 climate neutrality objective and a significant increase in the uptake of electric vehicles will be necessary (EEA 2022d).

Considering the EEA's data on the trend in the uptake of EVs including battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs), non-plug-in hybrid electric cars vehicles which are exclusively fuelled by conventional fuels are not included in the EEA's electric cars data (EEA 2022d).

According to the EEA, there has been a steady increase in the number of new electric car registrations of BEVs and PHEVs annually, from 600 in 2010 to about 1,061,000 sold in 2020, when they accounted for 11% of new registrations (EEA 2022d). However, until 2019, the electrification of the vehicle fleet did not play a significant role in reducing CO<sub>2</sub> emissions from road transport (EEA 2021b, EEA 2022f). Sales of plug-in hybrid electric vehicles and battery-electric vehicles did continue to increase, but they reached only about 3.5% in 2019, compared with 2% in 2018 (EEA 2022f). However, in 2020, a surge in zero and low-emitting vehicle registrations was observed, reaching 11.6% of the entire fleet of new passenger car registries in 2020. At the same time the total number of registrations declined due to the COVID-19 pandemic (EEA 2023a). After average emissions from new passenger cars

registered in Europe slightly increased in 2017-2019 to 122.3 gCO<sub>2</sub>/km, 2020 saw a significant 12% decrease in the average CO<sub>2</sub> emissions in a single year, to 107.5 gCO<sub>2</sub>/km (EEA 2022h). The main reason for this significant decrease was the mentioned surge in the share of EV registrations, tripling from 3.5% in 2019 to 11.6% of all passenger car registrations in 2020 (EEA 2022h). Out of these, 6.2% were full battery electric vehicles (BEVs) and 5.4% were plug-in hybrid electric vehicles (PHEVs). The largest increases were observed in Norway, Iceland, and Sweden, which are also the countries with the highest percentage of electric vehicles in their new car fleets (75%, 46% and 33%, respectively) (EEA 2022h, EEA 2022d).

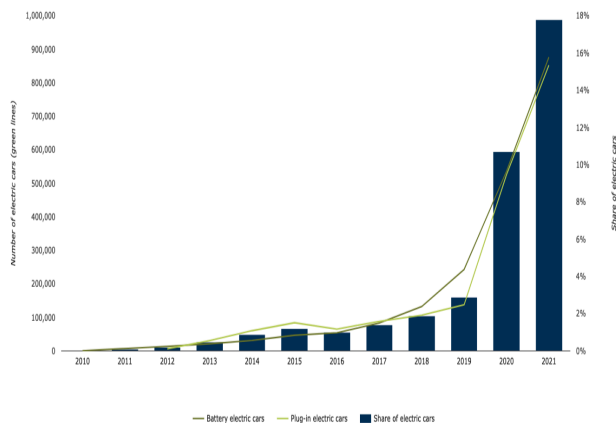
In 2021, electric car registrations reached around 1,729,000, up from 1,061,000 in 2020, representing a new increase, up from 11.6% in 2020 to 17.8% in 2021 in the share of total new passenger car registrations (EEA 2022d, EEA 2023a). BEVs accounted for 9.0% of total new passenger car registrations in 2021, while PHEVs represented 8.8% (EEA 2022d).

The share of newly registered electric vans also increased, from 2.1% out of total new registrations in 2020 to 3.1% in 2021 (EEA 2022c, EEA 2022d). In 2021, almost 38,000 electric vans were sold in the EU-27, an increase of around 1.0 percentage point compared to 2020. The majority of electric vans sold were BEVs (EEA 2022d).

Regarding the share of electric vehicles (BEVs and PHEVs) in the countries' national new car registrations covered by the EEA report in 2021, the share of BEVs and PHEVs increased in all countries, including EU-27, Iceland, and Norway compared with 2020. The highest shares of BEVs and PHEVs were found in Norway (86%), Iceland (64%), Sweden (46%) and Denmark (35%) (EEA 2022d). Instead, Germany, France and Norway accounted for about 63% of all BEV registrations in the EU-27 and non-EU EEA countries. Regarding the share of BEV, Norway showed the highest percentage of full

electric cars registrations in 2021 compared to all other countries covered, with BEVs accounting for 65% of all new passenger car sales in Norway (EEA 2022d). The PHEV percentage sales were highest in Iceland (36%), Sweden (25%) and Norway (22%) in 2021 (EEA 2022d).

Fig. 1: New registrations of electric cars, EU-27 (EEA 2022d)



Source: EEA 2022d

However, in some European countries, the percentage of BEV registrations remained very low at around 1% of the total fleet like in Cyprus, Poland, Czechia, and Slovakia (EEA 2022d).

It is expected that the implementation of additional policies and measures will be necessary to further reduce CO<sub>2</sub> emissions from transport and to reach the 2050 target (EEA 2022c).

#### 4. The EEA's provisional data on 2022 CO<sub>2</sub> emissions from newly registered passenger cars and vans

The further electrification of road transport and the deployment of other zero-emission vehicles for the mass market will be key elements to achieve the 90% reduction of the transport sector's GHG emissions by 2050.

Based on Regulation (EU) No 2019/631, countries record data on each newly registered passenger car and van in its territory and submit all the information to the Commission. The EEA collects

and makes available data on new passenger cars and vans registered in the EU-27, as well as Iceland since 2018 and Norway since 2019 (EEA 2023a). The UK was covered until 2020. This data includes manufacturer name, type approval number, type, variant, version, make and commercial name, specific emissions of CO<sub>2</sub> (NEDC and WLTP protocols), masses of the vehicle, wheelbase, track width, engine capacity and power, fuel type and mode, eco-innovations, and electricity consumption (EEA 2022e, EEA 2023a).

The vehicles must be tested to verify that they comply with the required environmental, climate, safety, and security standards. Since September 2017, the Worldwide Harmonised Light Vehicle Test Procedure (WLTP) is applied as the new type approval test procedure. From 2021 onwards, the WLTP fully replaced the New European Driving Cycle (NEDC) for the purpose of collecting data on the CO<sub>2</sub> emissions.

According to EEA, the development for sales of new passenger cars in 2020 shows that petrol cars were the most sold passenger vehicles, constituting nearly half of all new registrations, followed by diesel vehicles with 27% of new registrations, marking a decrease of 4 percentage points from 2019 (EEA 2022g, EEA 2022b). Furthermore, the growth in the sport utility vehicle (SUV) segment continued in 2020. Already in 2018 and 2019, the market share of SUVs increased from 35% up to 38% and in 2020, SUVs represented about 42% of new passenger cars registered in the countries covered by the EEA survey (EEA 2022h). Furthermore, besides the surge in the numbers of SUVs, also the average mass of new passenger cars increased by 30kg from 2018 to 2019 (EEA 2022h). Accordingly, after a steady decline from 2010 to 2016, by almost 22 grams of CO<sub>2</sub> per kilometre (g CO<sub>2</sub>/km), average emissions from new passenger cars increased in 2017 and again in 2018 by 2.8g CO<sub>2</sub>/km in total (EEA 2020a). It further increased from 0.8% in 2018 to 1.6% in 2019, reaching 122.3 grams of



CO<sub>2</sub>/km (EEA 2022a, 2022b). This increase in average CO<sub>2</sub> emissions for new passenger cars in the years 2017–2019 was affected by three main market trends, including the shift from diesel to petrol cars, the increase of sales of larger and heavier SUVs, powered by petrol, and the general increase of weight of passenger cars. At the same time, the new registrations of battery electric (BEV) and plug-in hybrid electric cars (PHEV) remained low, with 3.5% of new registrations, compared to 2% in 2018 (EEA 2022h). In fact, until 2019, the electrification of the vehicle fleet did not play any significant role in reducing CO<sub>2</sub> emissions from road transport. However, this changed significantly in 2020.

With stricter CO<sub>2</sub> emission targets in force since 2020, the average CO<sub>2</sub> emissions measured during type-approval from all new passenger cars registered in Europe fell to 107.5g CO<sub>2</sub>/km or by -12% between 2019 and 2020, and further fell by -12.5% between 2020 and 2021, representing the greatest annual emission reductions since monitoring began in 2010 (EEA 2022a). This significant decrease of average average CO<sub>2</sub> emissions for newly registered passenger cars was mainly driven by a surge in new EVs registrations, which more than tripled from 3.5% in 2019 to 11.6% of all registrations of passenger cars in 2020 (EEA 2022h, European Commission 2022). At the same time the overall passenger cars market in 2020 shrunk due to the COVID-19 pandemic.

Out of these new passenger car registrations, 6.2% were full electric vehicles and 5.4% were plug-in hybrid electric vehicles. The largest increases took place in Norway, Iceland, and Sweden, which are also the countries with the highest percentage of electric vehicles in the new car fleets, with 75%, 46% and 33%, respectively (EEA 2022h). Furthermore, in 2021, electric car registrations increased to a share of 17.8% of all new registrations. (EEA 2022d, EEA 2023a).

Among individual manufacturers with more than 300,000 registrations in 2020, PSA AUTOMOBILES SA achieved the lowest average CO<sub>2</sub> emissions at 81gCO<sub>2</sub>/km, closely followed by Renault SAS, TOYOTA MOTOR EUROPE NV SA and AUTOMOBILES PEUGEOT, with average CO<sub>2</sub> emissions ranging from 88 to 95gCO<sub>2</sub>/km ((EEA 2022h).

The uptake of electric vans also increased, from 2.1% of total new registrations in 2020 to 3.1% in 2021 (EEA 2023a).

Regarding the CO<sub>2</sub> emissions from newly registered vans, in 2019, vans registered in the EU, Iceland, Norway and the UK emitted on average 158.4g CO<sub>2</sub>/km, which was 0.5 grams more than in 2018 and 11 grams higher than the EU target of 147g CO<sub>2</sub>/km set for 2020 (EEA 2020b). The majority of new vans sold in 2019 were diesel vehicles (94%), while the market share of petrol vans decreased from 3.6% in 2018 to 3.4% in 2019 (EEA 2020b). In 2020, about 1.4 million new vans were registered in Europe with average emissions 1.9% lower than in 2019. At the same time, the share of electric vans increased from 1.4% in 2019 to 2.3% in 2020 (EEA 2023a).

Regarding the CO<sub>2</sub> emissions of newly registered passenger cars and vans in 2022, the EEA's dashboard shows the provisional data of new passenger cars and vans registered in 2022 across EU-27, Iceland, and Norway (EEA 2023b).

The EEA's provisional data shows that of the 9,442,384 new passenger cars registered across EU-27, Iceland, and Norway in 2022, the average CO<sub>2</sub> emission was 108.2 g CO<sub>2</sub>/km, which represents a slight increase compared to the results in 2020, when an average CO<sub>2</sub> emissions of newly registered passenger cars in Europe reached 107.5 gCO<sub>2</sub>/km. However, compared to the average emissions of 114.1g CO<sub>2</sub>/km in 2021, 108.2g CO<sub>2</sub>/km in 2022 represents a decrease of around 6g CO<sub>2</sub>/km compared to 2021 (EEA 2022e, EEA 2023b). According to the European Commission, the average CO<sub>2</sub> emissions of new passenger cars registered in Europe in 2022 decreased by 5.2% compared to 2021 results

(European Commission 2023). The main driver of this significant reduction of CO<sub>2</sub> emissions of newly registered passenger cars was a continued growth in the share of electric car registrations, reaching 23% in 2022, out of which 13.4% were full electric cars (EEA 2023b). In 2022, almost one out of four new passenger cars registered in Europe was electric (EEA 2023b).

According to EEA's 2022 provisional data, the average CO<sub>2</sub> emissions of newly registered vans have also seen a similar downward trend. The EEA's provisional data shows that 1,049,815 new vans were registered in Europe in 2022. Their average CO<sub>2</sub> emissions were 185.3g CO<sub>2</sub>/km, which is around 8g CO<sub>2</sub>/km or 4.1% lower than 2021 levels and 9% below 2019 levels (EEA 2023b, European Commission 2023). Furthermore, the share of electric vans increased from 3.5% in 2021 to 6.1% in 2022 (European Commission 2023). According to the European Commission, this year-by-year progress in reducing the CO<sub>2</sub> emissions trends for passenger cars and vans can be attributed to the further surge in the number of electric cars registered, and because of the stricter emission targets that came into force in 2020 (European Commission 2023).

The Commission will notify all automobile manufacturers of the provisional calculation of their passenger cars and vans' average specific CO<sub>2</sub> emissions in 2022.

## 5. Conclusion

The European Green Deal aims to achieve net-zero GHG emissions by 2050 and to reduce GHG emissions in the transport sector by 90%. Since road transport is responsible for 77% of the transport sector's CO<sub>2</sub> emissions, the electrification of road transport and the deployment of zero-emission electric vehicles are considered being fundamental factors to achieve the 2050 targets. Electric and other zero emission vehicles will have to become a major part of the fleet of vehicles to make the road transport sector

adequately contribute to the European Green Deal's targets. Based on the new Regulation (EU) 2023/851, all new passenger cars registered will have to be zero-emission vehicles as of 2035. This would mainly imply to opt for electric vehicles or require the introduction of other zero-emission vehicles based on synthetic fuels. The EEA's provisional data on the CO<sub>2</sub> emission of newly registered passenger cars and vans in 2022 shows a positive development towards a further decrease of CO<sub>2</sub> emission levels. The average CO<sub>2</sub> emissions of passenger cars stood at 108.2g CO<sub>2</sub>/km in 2022, which is 5.2% below the average emissions of 2021 (114.1 g CO<sub>2</sub>/km).

The main driver of the overall progress in reducing CO<sub>2</sub> emissions of newly registered passenger cars and vans is the continued growth of the share of electric vehicles registrations. This development shows that electromobility is currently the most important factor for reducing CO<sub>2</sub> in the road transport sector. However, at the same time, it must be ensured that the electricity used by EVs is generated from carbon-neutral sources such as renewables or other GHG emission neutral sources to achieve the 2050 net-zero GHG emission target.

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