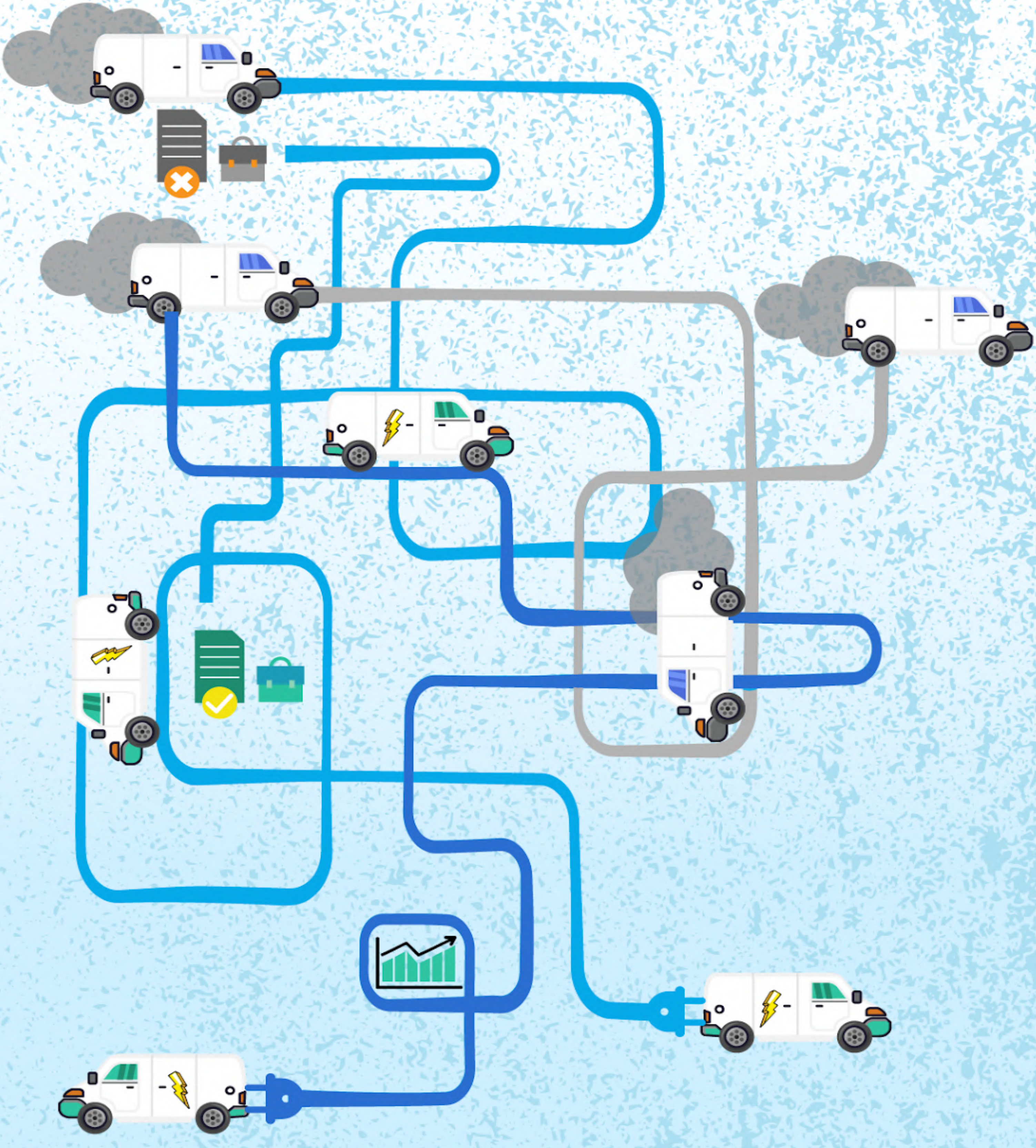

European van market unplugged: how weak regulation is failing electrification

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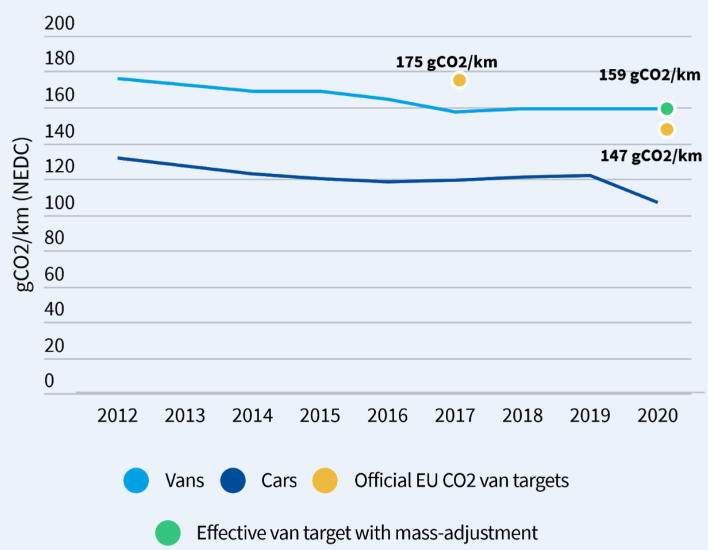
Executive Summary

Light commercial vehicles, or vans, account for 13% of road transport CO_2 emissions and have been the **fastest growing road transport sector** in the EU, where **CO_2 emissions have grown 58% since 1990** and sales have risen by 57% between 2012 and 2019. For comparison, CO_2 emissions from cars and trucks have both increased by around 20% since 1990. With a surge in e-commerce post-Covid, the van CO_2 problem will only get worse. As with cars, the new 2020 van CO_2 emission target entered into force in January 2020. With EU van standards up for review this summer, T&E analyses the van makers' performance in the year 2020 and looks into what this means for Europe's van market and its electrification ambitions.

The analysis shows that **van CO_2 emissions of new registrations have stagnated since 2017, and the 2020 CO_2 targets did not have any impact on CO_2 emissions from new vans.** This is mainly caused by weak CO_2 targets as well as generous flexibilities which have increased the official 147 gCO_2/km target to an effective target of 159 gCO_2/km. Preliminary data analysed by T&E suggest that two van-makers - Ford-Volkswagen and Iveco - may still have exceeded the EU's weak 2020 CO_2 van standards, while all others were barely compliant. Despite much economic potential to electrify vans and a strong demand from cities and fleets, this highlights that the automotive industry currently supplies the minimum amount of electric vans required by the van CO_2 regulation.

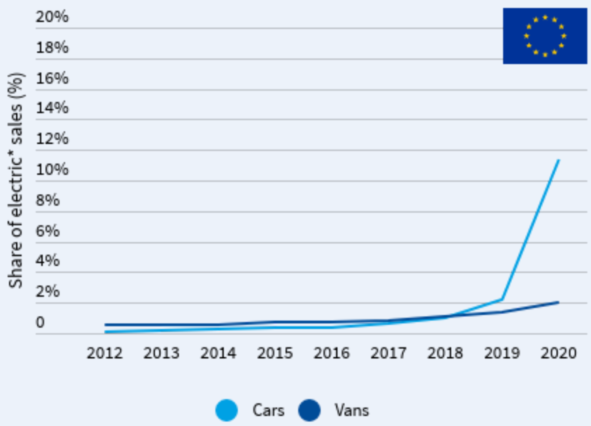


Source: T&E analysis, 2012-2019 data from the EEA monitoring of CO2 emissions from vans, 2020 preliminary data from Dataforce

Emissions from new vans and official CO_2 targets (EU27+UK+NO)

Current van CO_2 standards are too weak to drive electric van sales

The weak target is not compelling OEMs to sell electric vans: **only 2% of van sales were electric in 2020 (compared to almost 11% for cars**, also including plug-in hybrids**)**, and results in an inadequate electric van offer: only 6 models with more than 1,000 sales, and 17 models with more than 100 sales were available in 2020. This despite the business case and industry demand already there. The **total cost of ownership (TCO) of the vehicles is already favourable** for smaller vans, and TCO parity will be reached at the latest in 2022 and 2023 for medium and large vans.



Source: T&E analysis, 2012-2019 data from the EEA monitoring of emissions from cars and vans, 2020 preliminary data from Dataforce

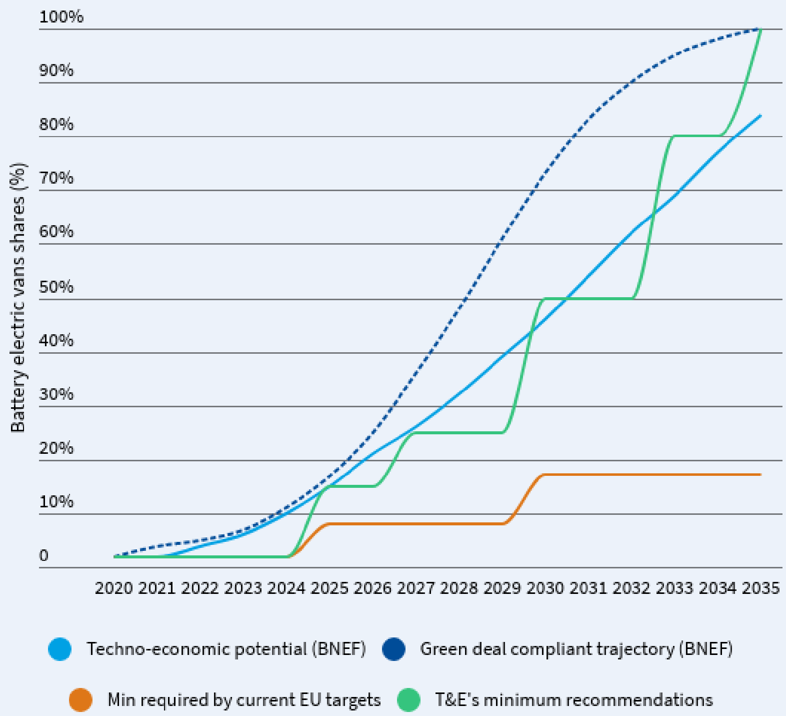
*electric sales include both battery electric and plug-in hybrid sales

Electric van sales vs electric car sales (EU27+UK+NO)

Weak post-2020 CO_2 regulation will not drive any e-van uptake

Because of weak 2020 targets (and therefore weak baseline for future targets), there remains much untapped potential to reduce combustion van emissions. Without change, the low penetration of zero-emission vans is set to continue in the 2020s, with little prospect of any real impact from EU regulation until 2029.

In the worst case, **the current -31% CO_2 reduction target for 2030 could be reached without selling any electric vans** by just exhausting cost efficient fuel efficiency improvements. Future revised van CO_2 targets should take the weak baseline into account and should be ambitious enough to push van makers to rapidly exhaust the remaining diesel van efficiency improvement (more than 20% based on the best in class models), while kick-starting the electric van revolution as soon as possible. T&E calculates that, under the current CO_2 targets, electric van sales would be between 2% and 8% up to 2029, with van makers only selling small numbers of e-vans at the last minute to comply with their targets. This is despite the recent Bloomberg NEF report showing that electric vans would hit purchase price parity in 2026 at the latest, and the market potential of 15% to 17% e-van sales in 2025 and 46% to 73% in 2030.



Source: T&E modelling of current policies, and Bloomberg NEF forecasts from *Hitting the EV inflection point*, 2021

Bloomberg NEF e-van forecasts and T&E's recommendations vs current targets

Because of the high amount of untapped efficiency improvements due to the weak 2020 starting point, and the need to drive electric van investments without further delay, an electric van target should be proposed alongside the CO_2 reduction target. Indeed, a CO_2 target alone simply will not sufficiently accelerate ZEV deployment in the 2020s and a ZEV target is the most effective mechanism given the weak starting point.

For effective climate and industrial strategies - as well as to meet Europe's zero-pollution ambition and clean up cities' air - **ambitious post-2020 van CO_2 standards**, complemented by an **effective zero-emission vehicle sales target** are needed. Reaching climate neutrality by 2050 means that the last conventional vans must be sold by 2035 at the latest. The upcoming review of the van CO_2 standards is a unique opportunity to strengthen the targets, drive the uptake of zero-emission vans, enable zero-emission cities, and align the sector with Europe's broader climate ambitions.

Recommendations for the 2021 review of the vans CO_2 regulation

The CO_2 targets should be revised as follows:

- **2025:** drive the e-van market in the 2020s by replacing the current -15% 2025 target with -20%.
- **2027:** bring the current 2030 target (-31%) forward to 2027.
- **2030:** increase the **2030 CO_2 target to at least -60%**, thereby ensuring timely investment in zero-emission van manufacturing. An additional target for 2033 of at least -86% would then support a steady rise in e-van supply.
- **2035: phase-out sales of vans with an internal combustion engine by 2035** by setting a 100% CO_2 reduction target (0 gCO_2/km) in order to reach zero-emission road transport by 2050 and meet the climate neutrality goal of the European Green Deal.

The current zero- and low- emission vehicle benchmark should be converted into:

- A **zero-emission vehicle target of 15% of van sales in 2025, 25% in 2027, at least 50% in 2030 and 80% in 2033**.

Turning to the regulatory design, it will be necessary to:

- Avoid creating any **PHEV loophole.** PHEV vans are **not expected to play a real role**, comprising 2.5% of van production in 2030. Regulation is best focused on the solution - BEVs, and steer away from mechanisms with strong potential to be used to avoid real-world compliance, i.e. PHEVs.
- **Distinguish two N1 van categories**, with the **dividing line drawn at 1,760kg** reference mass (RM)[1], and then apply **emissions reduction and ZEV supply targets separately to both categories**. This should **replace the mass-adjustment factor,** which has weakened the 2020-2024 target by incentivising heavier and more polluting vehicles.
- Consider a time-limited **extra weight allowance of up to 300 kg for zero emission vans until 2030** to support the electrification of heavier vans (above 1,760 kg RM).

Vans are often the neglected area of EU road transport policy despite their disproportionate impact, especially in urban areas. The Commission can address the current van legislative loophole, and deliver on the potential for electrification by making vans a big priority in the upcoming review of the cars and vans CO_2 emission standards.

[1] Reference mass is essentially unladen mass with standard allowances for a driver and fuel. 1,760 kg reference mass (RM) is the weight level which today separates Class II and III vans. T&E proposes 1,760 kg as the dividing line to form two van categories for future CO_2 regulatory purposes, i.e. all vans up to 1,760 kg RM fall into the first category, and all vans with a greater RM in the second category.

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Abbreviations

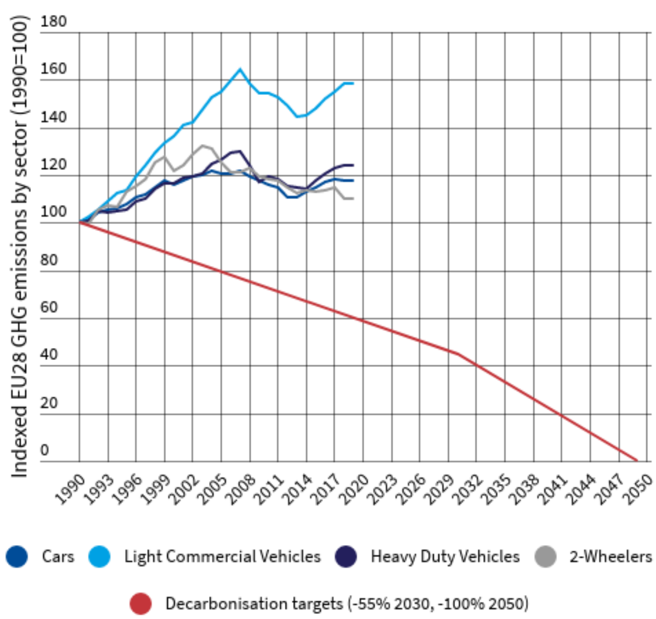
BEV	Battery Electric Vehicle
FCEV	Fuel Cell Electric Vehicle
ICE	Internal Combustion Vehicle
OEM	Original Equipment Manufacturer
PHEV	Plug-in Hybrid Electric Vehicle
TCO	Total Cost of Ownership
ZEV	Zero Emission Vehicle

Introduction

Light commercial vehicles, or vans, often slip through the passenger car and heavy duty vehicle gap of European legislation in terms of securing emissions reduction. Vans are a somewhat neglected area of EU road transport policy and are often exempt from safety and environmental policy, such as driving regulations or tolls, compared to trucks. This enhances the attractiveness of vans and, combined with the surging demand for e-commerce and other services[2], explains why their sales and emissions are growing.

Rising CO_2 emissions

Vans accounted for 13% of road transport CO_2 emissions in 2019 and van emissions are now 58% higher than they were in 1990 (see Figure 1), which makes them by far the road transport sector with the biggest emission increase [2]. For comparison, car and truck emissions have increased by around 20% since 1990. In absolute values, CO_2 emissions from vans in the EU27+UK were 113.2 Mt in 2019 (vs. 71.5 Mt in 1990) and 103.3 Mt in 2013 (lowest post-financial crisis point). This is a 10% increase in CO_2 emissions in six years.



Source: T&E analysis, data from Member States reporting to the UNFCCC

Figure 1: Evolution of CO_2 emissions from road transport in the EU27+UK (1990-2019)

[2] Total activity in terms of total LCV kilometres is projected to increase by 12% between 2020 and 2030, based on the EU Reference scenario 2016 [1].

Section 1 of this report gives an analysis of the historical trend in van sales and emissions and looks at 2020 compliance targets for major van makers. Then, Section 2 investigates the e-vans uptake in Europe, looking at sales, van makers and models. Section 3 presents an analysis of van production projections up to 2030 according to IHS Markit. Section 4 details T&E's modelling of current van policies and proposes trajectories for higher CO_2 reduction targets and higher zero-emissions vans uptake. Finally, Section 5 lays out T&E's policy recommendations to accelerate the deployment of electric vans across the EU focusing on the revision of CO_2 standards. Additional methodological details are presented in Section 6, including national findings for 6 countries.

1. Van emissions

In this section, T&E presents its analysis of van emissions between 2012 and 2020 based on historical data from the EEA monitoring of CO_2 (2012 to 2019) [3] and on 2020 preliminary van registration data from Dataforce [4]. As defined in the EU regulation, this analysis has been broken down per van class (see info box below).

Category N1 vehicles and weight classes I - III

EU Regulation 2019/631 [5] on CO_2 emission performance standards applies to all motor vehicles of category N1 with a reference mass not exceeding 2,610 kg and to those vehicles of category N1 to which type-approval is extended in accordance with Article 2(2) of Regulation (EC) No 715/2007 [6].[3]

Regulation 715/2007 on type-approval defines the category N1 classes I to III based on their reference mass (RM) as follows:[4]

Class I	Class II	Class III
RM ≤ 1,305 kg	1,305 kg < RM ≤ 1,760 kg	RM > 1,760 kg

Table 1: Van classes according to the EU Regulation

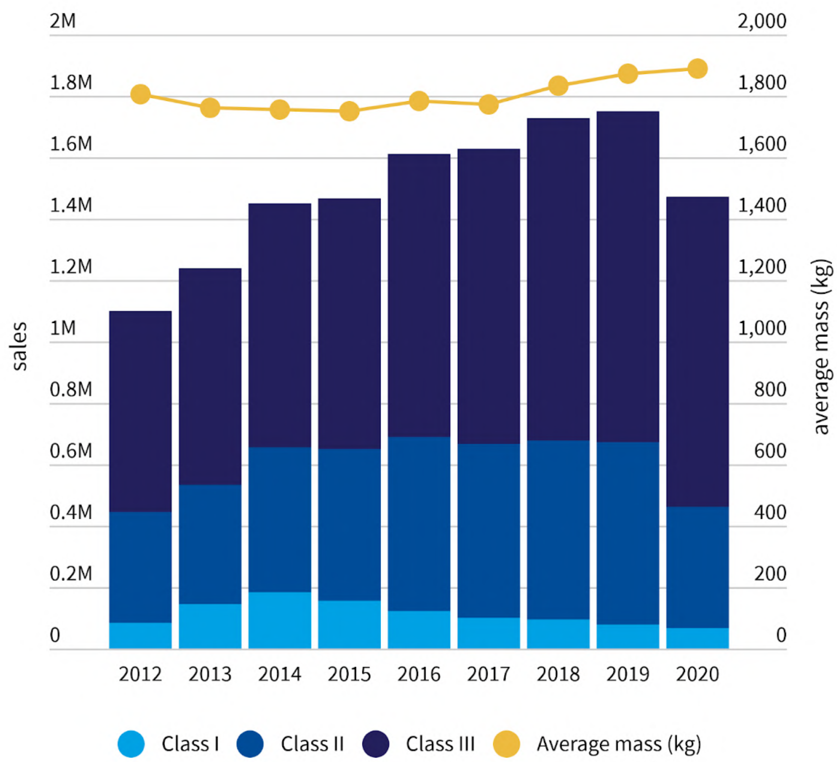
[3] Extension to vehicles which are registered in the Union for the first time and which have not previously been registered outside the Union.
[4] The classes are used today for the purposes of regulating air pollutant emissions. Reference mass is essentially unladen mass with standard allowances for a driver and fuel.

1.1. Sales and emissions trends

More heavy vans

Between 2012 and 2019, van sales increased by more than 57% from 1.1 to 1.7 million vehicles sold each year. This increase in sales has not been homogeneous among all van classes: while representing just 56% of sales in 2015, Class III vans, the heaviest, accounted for about 61% of all sales in 2019 and 69% in 2020 (Figure 2).

Given the higher average reference mass (2,131 kg) in Class III compared to other classes (1,495 kg for Class II, and 1,205 kg for Class I), the higher share of sales from Class III has driven an increase in the mass of the average van sold from 1,748 kg in 2015 to 1,870 kg in 2019, and, based on preliminary data, 1,886 kg in 2020. That's an 8% increase in 5 years.[5]



Source: T&E analysis, 2012-2019 data from the EEA monitoring of CO2 emissions from vans, 2020 data from Dataforce

Figure 2: Van sales per class (EU27+UK+NO)

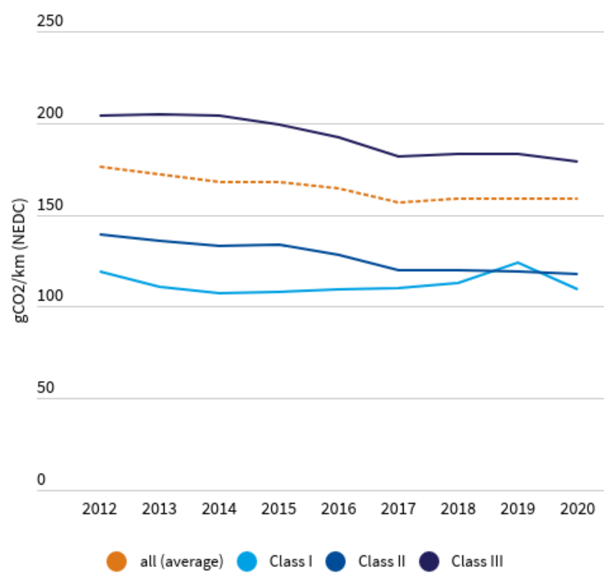
[5] For comparison the average reference mass within each class has been much more constant: +1% for Class I, +0% for Class II and +3% for Class III

Looking at 2020 preliminary figures, van sales decreased by 15% compared to 2019 while car and truck sales dropped by 21% and 26% respectively [7]. While sales of Class I fell 17% in 2020, and sales of Class II dropped by one-third (-34%), sales of Class III hardly fell at all, slipping only 6% - in spite of the COVID-19 pandemic. Which means that sales of the heaviest vans weathered the crisis almost entirely, with very little impact on sales numbers.

CO_2 emissions are stagnating

After having slightly decreased from 2012 to 2017 (-10%), average CO_2 emissions from new vans increased slowly between 2017 and 2019 from 157.6 gCO_2/km in 2017 to 159.3 gCO_2/km (NEDC) in 2019, mainly due to an increase in sales of large vans. Looking at emissions from ICE vans only, emissions have increased from 159.1 gCO_2/km in 2017 to 161.8 gCO_2/km in 2019.

Preliminary data from 2020 suggest that van emissions slightly decreased to around 158.8 gCO_2/km[6], which represents a 0.3% emission reduction compared to 2019. However, emissions from ICE vans kept increasing with an average of 162.4 gCO_2/km (NEDC) in 2020 (+0.4% compared to 2019).



Source: T&E analysis, 2012-2019 data from EEA monitoring of CO2 emissions from vans, 2020 data from Dataforce

Figure 3: Emissions from new vans (2012-2020, EU27+UK+NO)

As it can be seen in Figure 3, Class I emissions increased significantly between 2015 and 2019, and even surpassed Class II emissions in 2019. This is due to a major shift from diesel vans to petrol vans

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[6] Dataforce only provided NEDC or WLTP emissions values. That's why a specific NEDC-WLTP uplift per model has been applied to convert all values to NEDC. This uplift has been calculated from 2019 EEA registrations having both NEDC and WLTP values (approximately 30% of 2019 registrations). See Annex 6.1 for more information.

(from 89% in 2015 to 57% in 2019) following the Dieselgate scandal in 2015, with Class I petrol vans emitting about 30% more gCO_2/km than diesel vans in 2019.

Heavier vans, higher emissions

Compared to 2019, 2020 van emissions decreased in all classes, reaching 109 gCO_2/km in Class I (-12%), 124 gCO_2/km in Class II (-1.7%) and 180 gCO_2/km (-2.6%), but only slightly decreasing by 0.3% overall. This very small decrease can be mainly attributed to the continued relative increase in the share of Class III vans sales following the COVID-19 crisis (more than 2 out of 3, or 69% of all new vans).

This is even more explicit looking at ICE emissions per class. Class I ICE emissions decreased by 13%, Class II ICE vans remained at the same level and Class III ICE declined by 2%[7], but overall ICE emissions increased from 162 to 164 gCO_2/km. This follows the trend observed in previous years, with 2020 emissions from ICE vans being the highest emissions since 2017.

Shift back from petrol to diesel

The emission decrease per class could be partly explained by a shift back from petrol vans to diesel vans: across all 3 van classes, diesel vans represented 96.5% of new ICE vans in 2019, but around 97.5% in 2020. Looking at sales, petrol-powered vans have indeed been hit the hardest by the COVID-19 crisis, with a 40% drop compared to a 15% drop for diesel-powered vans.

The noticeable drop in Class I emissions can also be attributed to a major change in diesel vs petrol shares, with 79% of Class I ICE vans being diesel in 2020 compared to 57% in 2019. Indeed, while Class I diesel van emissions were on average 102 gCO_2/km in 2020, petrol van emissions were on average 117 gCO_2/km.

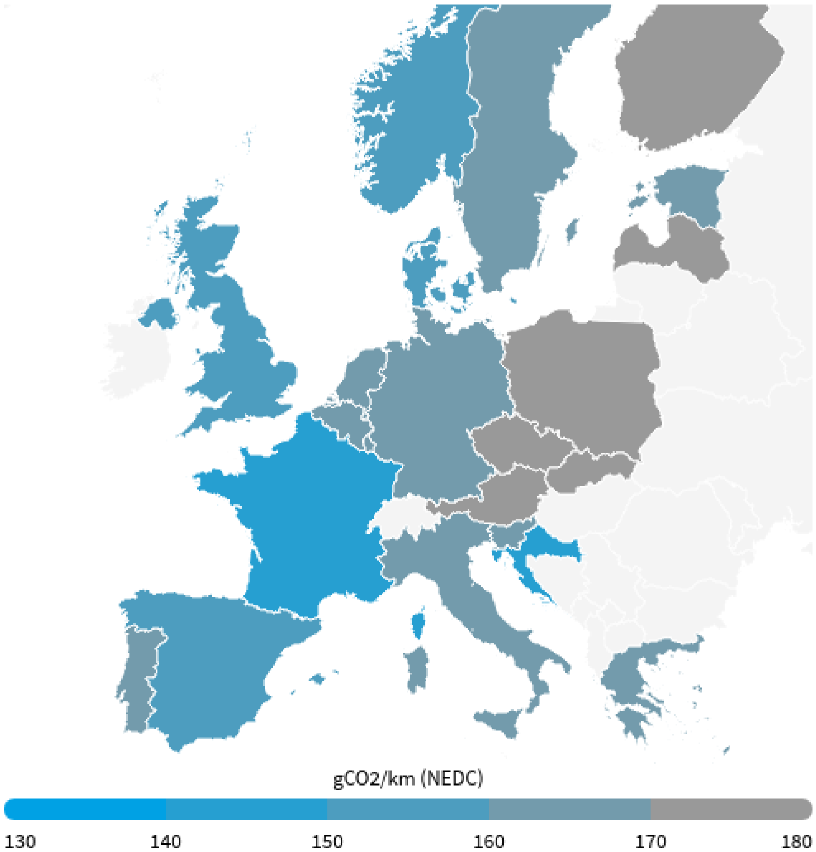
Finally, the slight overall emissions decrease (-0.5 gCO_2/km) between 2019 and 2020 can also be explained by the very few electric vans sold in 2020 (about 2% of all van sales). This will be described in greater detail in Section 2.

1.2. CO_2 emissions per country

Regarding the van emissions per country, 2020 preliminary data suggest that only 3 countries saw their emissions decrease compared to 2019: Germany, France and the United Kingdom with -1.6%, -3% and -3.1% emissions reductions respectively. As shown in Figure 4, the least emitting countries were in 2020: France (147 gCO_2/km), Croatia (149 gCO_2/km), Spain (153 gCO_2/km), Norway (154 gCO_2/km) and Denmark (156 gCO_2/km). On the other hand, Slovakia (175 gCO_2/km), Poland (174 gCO_2/km), Latvia (174 gCO_2/km), Austria (172 gCO_2/km) and Czech Republic (172 gCO_2/km) sold the most emitting vans in 2020. While the best performing countries have Class III shares between 50% and 60%, these heavy

[7] Class I ICE-only emissions decreased from 125 gCO_2/km to 109 gCO_2/km, Class II remained at 124 gCO_2/km and Class III emissions declined from 184 gCO_2/km to 180 gCO_2/km.

vans represent between 70% and 80% of sales in the least performing countries, showing again how Class III vans weigh heavily on new vans emissions.



Source: T&E analysis, data from Dataforce

Figure 4: Emissions per country from new vans sold in 2020

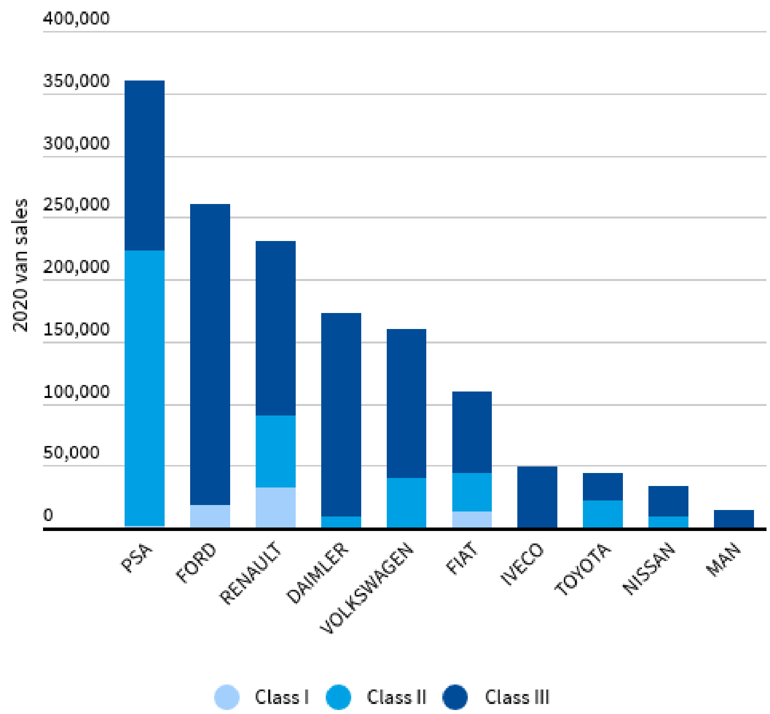
1.3. Sales and CO_2 emissions per van maker

Overall sales figures

Looking at the main van makers, Nissan's sales dropped the most following the COVID-19 crisis in 2020 (-27% compared to 2019), followed by Fiat (-24%) and Volkswagen (-20%). On the other hand, MAN, Toyota and Daimler saw their sales increase by 60%[8], 7% and 6%, while Iveco doubled its sales compared to 2019. Nevertheless, globally the top van sellers ranking did not change with PSA, Ford

[8] MAN only started to sell vans a few years ago and released its new TGE model (a rebadged version of Volkswagen's Crafter) at the end of 2019, which explains the high growth rate.

and Renault still leading the EU van market (even with -16%, -13% and -17% van sales respectively between 2019 and 2020). Announced at the end of 2020 and resulting from the merger of PSA and FCA, Stellantis would represent more than 30% of the 2020 van market.

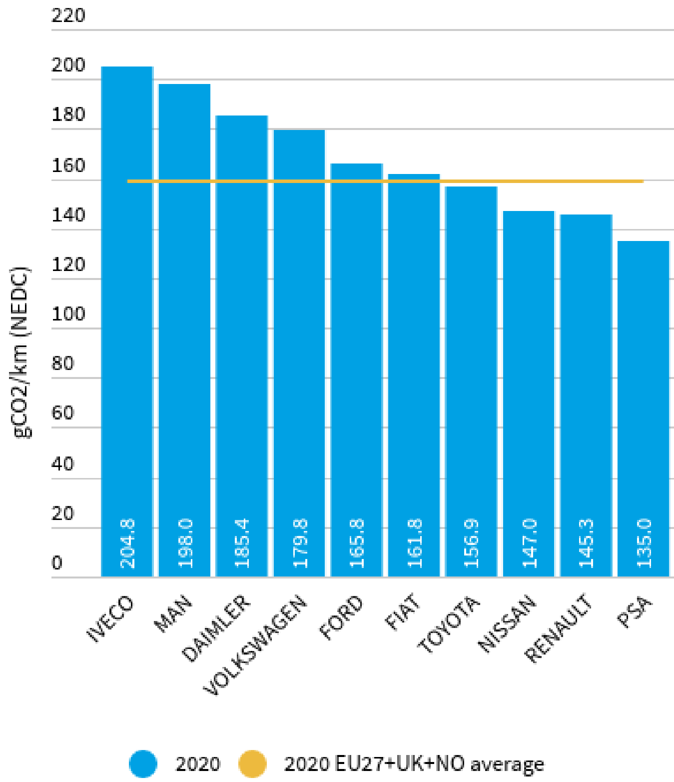


Source: T&E analysis, data from Dataforce

Figure 5: Top 10 van sellers in 2020 (EU27+UK+NO)

Preliminary data shows that Iveco, MAN, Daimler and Volkswagen sold the least Class I and Class II vans in 2020 (0% for Iveco and MAN, 5% for Daimler and 25% for Volkswagen), and thus they had the highest emission average with vehicles emitting respectively 205, 198, 185 and 180 gCO_2/km (NEDC). Ford, Fiat and Toyota are closer to the average emission per kilometer with respectively 166, 162 and 157 gCO_2/km (NEDC).

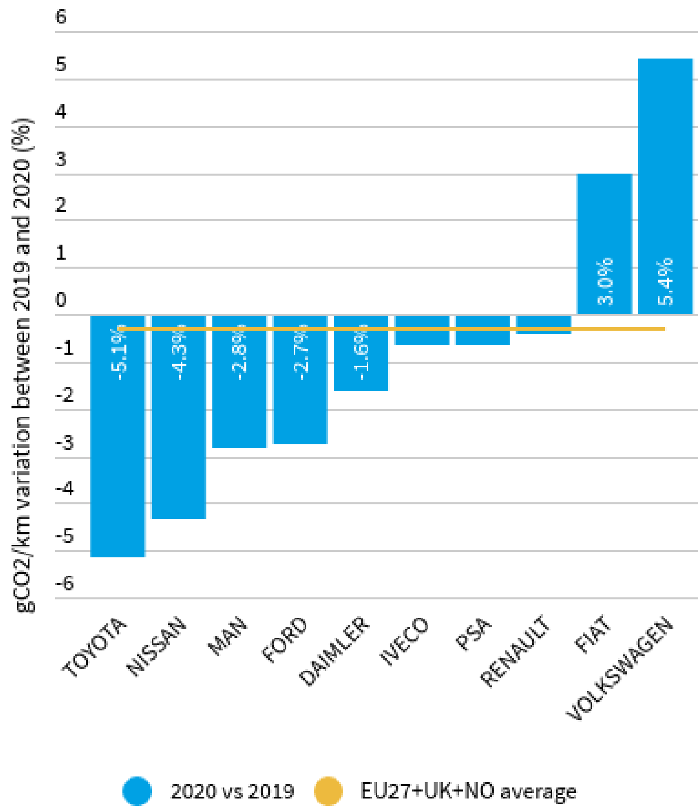
Finally, Nissan, Renault and PSA were the best performers with 147, 145 and 135 gCO_2/km (NEDC) respectively from their vans sold in 2020. This can be attributed to the fact that they sell lighter vans than the average (respectively 29%, 39% and 62% of vans sold by these OEMs were Class I or Class II) and by their higher electrification rate (this will be detailed further in the report).



Source: T&E analysis, data from Dataforce

Figure 6: 2020 average emissions per van maker (EU27+UK+NO)

Comparing 2020 to 2019 data for each OEM shows that average emissions decreased for most of them, with MAN, Nissan, Toyota and Ford having the highest decrease, as presented in Figure 7. Nevertheless, Volkswagen and Fiat saw their emissions increase. This increase seems to be mainly attributable to changes in the distribution of the different models sold by these OEMs. For instance, looking more closely at Volkswagen's sales, the Caddy, one of its least emitting vans with 133 gCO_2/km (NEDC), dropped from 29% of the OEM's sales in 2019 to 24%, giving space to heavier and more emitting vans such as the Crafter (which sales increased from 26% to 29% of all Volkswagen's sales) and the Transporter (from 37% in 2019 to 40% of sales in 2020). Similarly, Fiat saw its Class III Ducato sales increasing from 35% in 2019 to 45% in 2020, leading to Class III sales reaching 60% of the OEM's sales in 2020, compared to 50% in 2019. Sales of new larger vans are displacing small vans. Any emissions reductions within each class are being overshadowed by the shift to larger vans, with overall emissions rising as a result.



Source: T&E analysis, data from Dataforce

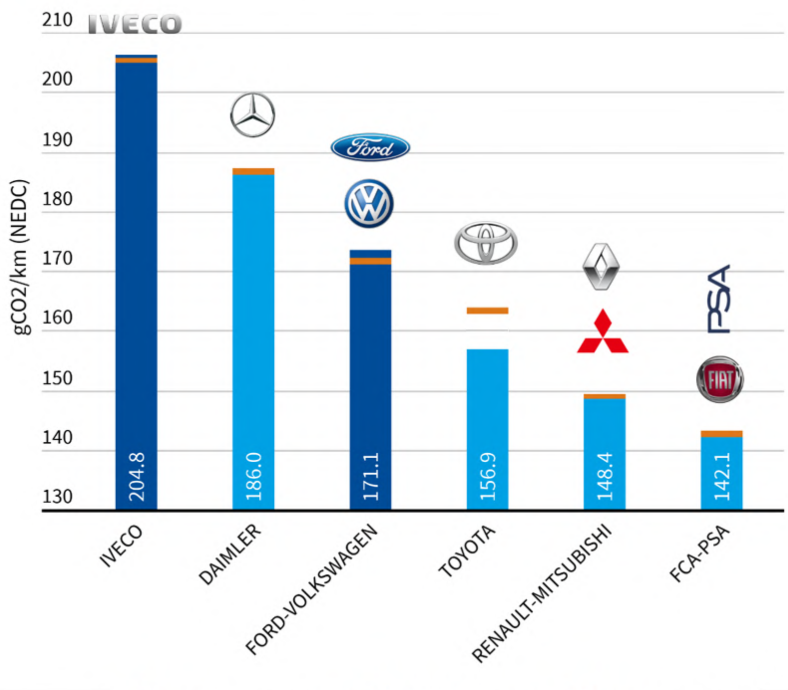
Figure 7: Emissions variation between 2019 and 2020

1.4. Compliance with the 2020 target

Ford-Volkswagen and Iveco fail EU van CO_2 standards

Thanks to 2020 preliminary data from Dataforce, it has been possible to estimate the 2020 target per van makers pools. These pools are based on the official N1 pooling list as described in Article 6 of Regulation (EU) 2019/631 [5] and are detailed in Annex 6.2.

Overall, 2020 preliminary data suggest that most OEMs were compliant with their 2020 target, as shown in Figure 8, apart from Ford-Volkswagen and Iveco. These two van makers were 2.4 and 1.5 gCO_2/km above their target respectively. While the other OEMs made it with less than 1 gCO_2/km, only Toyota significantly reduced its emissions and got 7 gCO_2/km below its own target.



Source: T&E analysis, data from Dataforce

Figure 8: OEMs and their 2020 compliance targets (EU27+UK+NO)

In contrast to cars, the new 2020 CO_2 emission target for vans is too weak to drive either real CO_2 reduction or sales of electric vans. While the 2017 target of 175 gCO_2/km (NEDC) was reached EU-wide in 2013, most van makers have been close to the 2020 target for years, without making more efforts. These estimates of van makers' compliance with their 2020 targets may have some uncertainty as they are based on preliminary data and do not include eco-innovation factors.

A generous mass-adjustment

As defined in the EU regulation and as presented above, each OEM pool has a specific target for 2020 CO_2 van standards. These targets are calculated based on the average mass in running order[9] per pool and a factor commonly named "mass-adjustment":

$$CO2_{target\ per\ pool} = CO2_{overall\ target} + a \cdot (M - M_0)$$

Where:

$CO2_{overall\ target} = 147\ gCO_2/km\ (NEDC)$ is the 2020 overall van CO_2 target,

[9] The mass in running order is essentially unladen mass with standard allowances for a driver and fuel.

$a = 0.096\ gCO_2/kg$ is the mass-adjustment factor[10]

M is the average mass in running order for each pool

$M_0 = 1766.4\ kg$ is the mass in running order used as a reference to adjust the 2020 target for each pool

This methodology is meant to give less stringent targets for OEMs selling heavier vehicles than the others. This explains why Iveco and Daimler have for instance higher targets than other van makers.

Even though the overall target was meant to be 147 gCO_2/km (NEDC) for new vans sold in 2020, the actual target calculated according to the above methodology has been increasing because of a higher average van mass (see Figure 2 in Section 1.1). Thanks to a generous mass-adjustment, in reality the 2020 market average target is 158.5 gCO_2/km, or 8% higher than the official target of 147 gCO_2/km on paper in the regulation. This means that in current policies, the bigger and heavier vans get, the higher is the CO_2 target per van maker.

2. E-vans' laggard supply

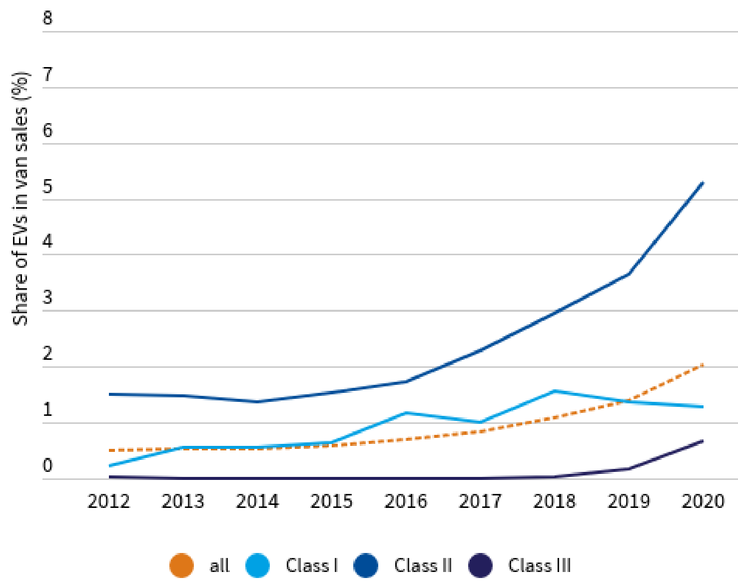
In this section, T&E investigates the battery-electric van market, looking at 2020 and historical sales per OEM, per member state and analysing e-van models sold.

2.1. E-vans trend analysis

While electric car sales soared from 2.2% of registrations in 2019 to 11.4% in 2020 [8][11], electric van sales only slightly increased from 1.4% of sales in 2019 to 2% in 2020, after a decade of very slow growth.

Looking at the 2020 absolute sales figures, e-vans survived the COVID-19 crisis better than their ICE counterparts with an overall 22% increase in EU27+UK+NO from 2019: 30,100 e-vans were sold in EU27+UK+NO in 2020 (23,100 e-vans in EU27) compared to 24,600 in 2019 (19,600 in EU27). Nevertheless, this increase in e-vans sales is not homogenous among classes: on one hand Class I and Class II e-van sales decreased by 22% and 3%, and on the other hand Class III e-vans increased by 250%.

[10] The mass adjustment factor and the reference mass are stated in the Regulation and are calculated every 3 years based on van sales, and will be updated every 2 years in the post-2020 Regulation.
[11] Including 5.2% battery-electric cars and 6.2% plug-in hybrid cars in 2020 in the EU27+UK+NO.



Source: T&E analysis, data from the EEA monitoring of CO2 emissions from vans, 2020 data from Dataforce

Figure 9: Battery-electric vans sales between 2012 and 2020 (EU27+UK+NO)

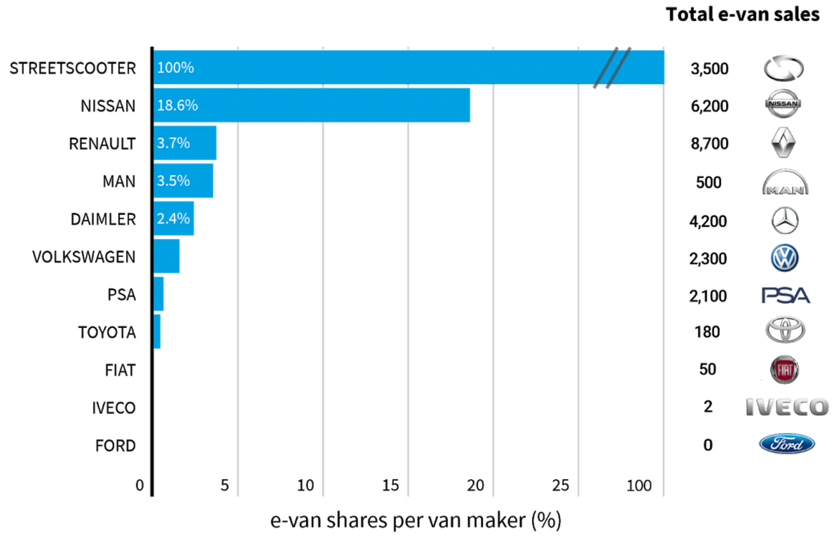
As shown in Figure 9, despite the decrease of Class I and Class II electric vans sales and because of the overall drop of vans sales, the share of Class I e-vans reached 1.3% of registrations in 2020 (from 1.4% in 2019) and e-van share of sales in Class II kept increasing and represented 5.3% of sales (from 3.6% in 2019). Class III shares reached 0.7% in 2020, a rise in heavier electric vans which only represented 0.2% of Class III sales in 2019. Put another way, these new Class III e-vans on the market now account for 22% of electric vans sales whereas they only represented 8% in 2019.

2.2. E-vans sales per OEM and model

While Renault and Nissan were leading the e-van european market in 2019, accounting for 65% battery-electric vans sales, they represented a bit less than half of e-vans sold in 2020 (49%, or 14,900 e-vans in EU27+UK+NO). Indeed, Renault and Nissan are being challenged by other van makers such as Daimler and Volkswagen which respectively multiplied their e-van sales by 5 and 9 between 2019 and 2020.

Nevertheless, looking at e-van shares per OEM puts these high growth rates into perspective: While about 1 out of 5 vans sold by Nissan was electric in 2020, 4% of Renault's sales were electric. PSA, Daimler and Volskwagen sold respectively 370,000, 170,000 and 160,000 vans in 2020 but only 2,100, 4,200 and 2,400 e-vans, representing 0.6%, 2.4% and 1.5% of their sales. On the other hand, while

Toyota and Fiat sold a few battery-electric vans in 2020 (having respectively 0.4%, 0.04% of e-van shares), Iveco and Ford did not sell any e-vans at all.

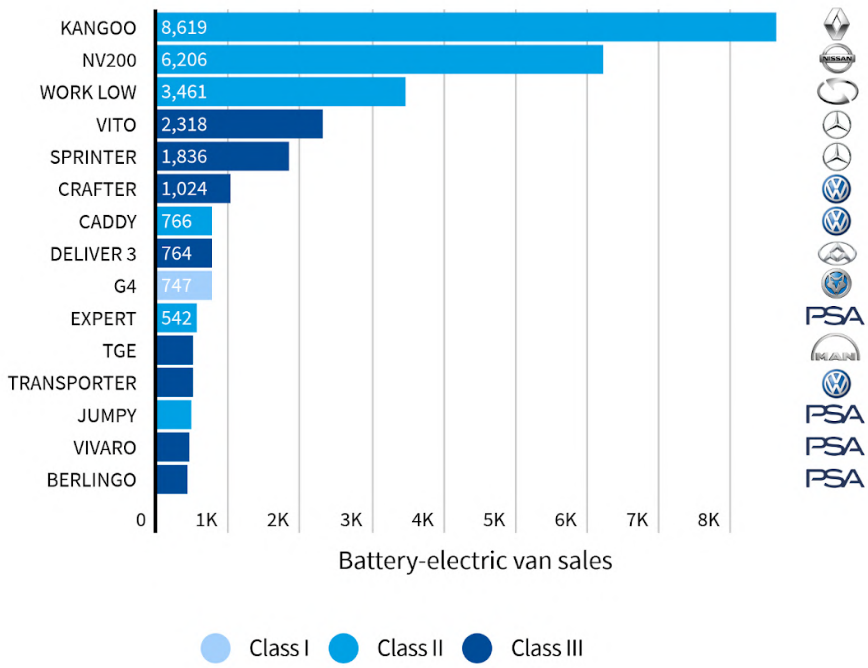


Notes: While 2020 preliminary data suggest that Ford-Volkswagen and Iveco were not compliant with their CO2 target, e-vans only represented 0.6% and 0% of their van sales respectively.

Source: T&E analysis, data from Dataforce

Figure 10: Battery-electric van sales per OEM in 2020 (EU27+UK+NO)

From the model perspective, about 30 e-vans models could be identified in the 2020 preliminary data. Among these models, only 6 made it above 1,000 sales: Renault's Kangoo (8,600 sales), Nissan's NV200 (6,200), Streetscooter's Work low (3,500), Daimler's Vito (2,300) and Sprinter (1,800) and Volkswagen's Crafter (1,000). Furthermore, 13 of these models were identified as Class III, 12 as Class II and 3 as Class I, but only 3 Class III models totalled more than 1,000 sales as shown in Figure 11.



Source: T&E analysis, data from Dataforce

Figure 11: Top e-vans sold in 2020 (EU27+UK+NO)

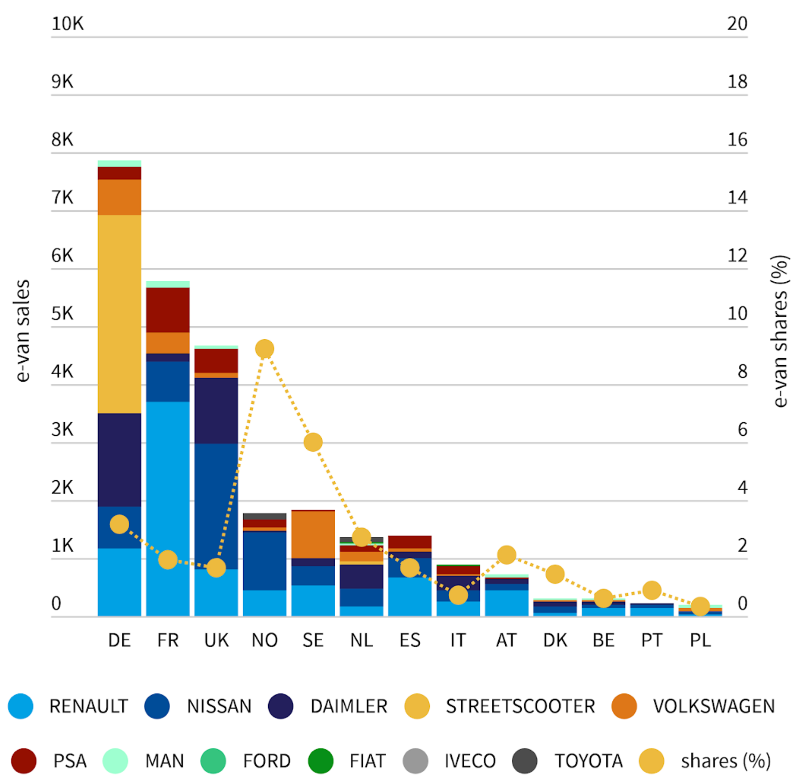
StreetScooter: an exception to the traditional OEMs

StreetScooter is an electric vehicle manufacturer located in Aachen, Germany and owned by Deutsche Post DHL Group since 2014. StreetScooter's Work e-vans were first produced to progressively replace DHL's delivery vans in Germany, since none of the traditional van makers were selling enough e-vans. Since 2014, approximately 13k e-vans have been produced and sold, mostly in Germany. In 2020, StreetScooter accounted for 40% of all battery-electric vans sold in Germany, thus challenging the traditional OEMs. The previous year DHL announced its intention to move away from manufacturing and thus to sell StreetScooter, but finally extended the StreetScooter production until at least the end of 2022 because of the high demand for electric delivery vehicles within the group [9] [10] .

2.3. E-vans sales per country

With about 8,300 battery-electric vans sold in 2020, Germany is leading the European e-van market, followed by France and the United-Kingdom with respectively about 6,400 and 4,700 e-vans sold the same year. However, Germany has been leading the e-van market thanks to StreetScooter which made 40% of its e-van sales (see Info box above), doing far better than traditional van makers.

Looking at sales shares, Norway and Sweden are far ahead of other countries with e-vans representing 9.2% and 6% of their sales in 2020, while Germany had 3.1%, France 1.9% and the UK 1.7%. On the other hand, countries such as Portugal, Belgium or Poland only sold a couple of hundred e-vans, making 0.9%, 0.6% and 0.4% of their 2020 sales.



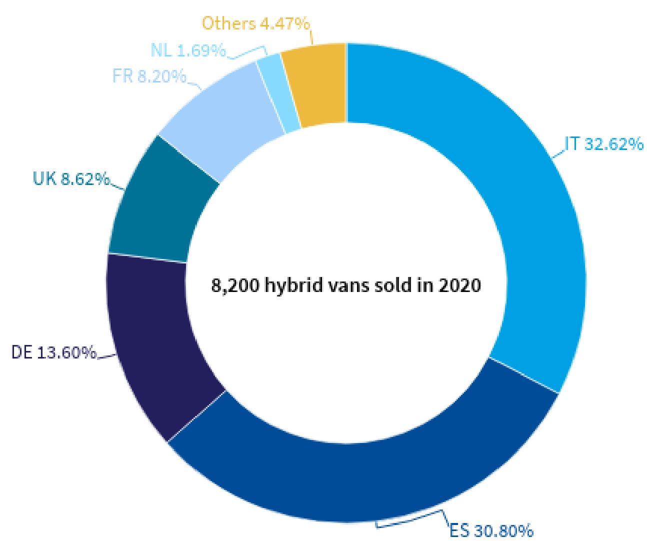
Source: T&E analysis, 2020 data from Dataforce

Figure 12: Battery-electric vans per country and main OEMs

2.4. Hybrid vans

While battery-electric vans appeared some years ago on the European market, hybrid vans only accounted for a few hundred vehicles in total in 2019. From less than 0.01% of all sales in 2019, plug-in hybrid sales jumped to 0.06% of sales in 2020 with about 800 vehicles sold. Looking at all hybrid types (not only plug-in) 8,200 hybrid vans have been sold in 2020 making 0.6% of sales, with only 10% of these being plug-in hybrids. This means that 90% of hybrid vans currently sold are full hybrids which cannot be plugged in and have their battery recharged by an internal combustion engine (petrol or diesel powered).

Looking at emissions, hybrid vans emit on average 140 gCO_2/km in 2020, which is 14% better than the average ICE van. Plug-in hybrids have much lower test emissions with on average 63 gCO_2/km (NEDC), but still far from zero-emissions vehicles (and this although PHEV cars and vans benefit from generous accounting methods under NEDC and WLTP test, namely on the assumed share of electric driven kilometers).



Source: T&E analysis, data from Dataforce

Figure 13: Hybrid van sales distribution per European country

Furthermore, looking at geographical distribution of hybrid vans, it can be seen in Figure 13 that more than half of these vans have been sold in Italy and Spain in 2020 (making 2% of Italy's sales and 3% of Spain's sales), the same countries where battery-electric vans appear to be below the European average (0.7% in Italy and 1.7% in Spain).

Finally, preliminary data from 2020 shows that only two main OEMs are selling these hybrid vans: Ford and Fiat, with Ford making 88% of the hybrid van sales and Fiat 7%. This represented 2.8% of Ford's sales and 0.5% of Fiat's sales, while both these van makers almost did not sell any battery-electric vans at all. Looking at hybrid models, they are mostly Class III vans given that Ford's Transit made 87% of all hybrid sales and 98% of plug-in hybrid sales. While this Class III van was the most sold van in 2020 with about 170,000 models sold, these 7,100 hybrid versions only accounted for 4.2% of all Transit vans sold. In addition, these Transit hybrids can reduce emissions from 235 gCO_2/km to 146 gCO_2/km (NEDC), far from zero-emissions needed.

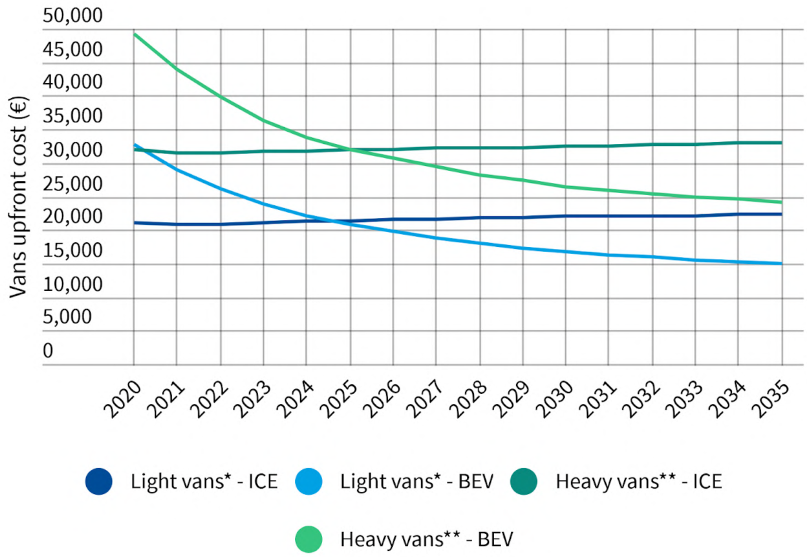
2.5. E-vans' total cost of ownership

A study commissioned by T&E and undertaken by consultancy CE Delft in 2017 [11] analysed the European van market and quantified the potential total cost of ownership (TCO) of battery electric vans. As vans are predominantly owned or operated by businesses (see analysis of van uses in Annex 6.3), they tend to act as more economically rational operators than passenger car buyers. Therefore, as TCO affects the bottom line of a business, it plays an important role in van purchase decisions.

The CE Delft analysis looked at the van market as well as emission reduction technologies and their costs. Amid rapidly decreasing battery costs, CE Delft showed that electric vans in the smaller segment reached cost parity with diesel models in 2018. The TCO parity would be reached at the latest in 2022 and 2023 for medium and large vans[12]. Already today there is evidence of e-van leasing contracts offered for less than the cost of the equivalent diesel van [12] [13]. This means that electric vans have huge potential to be purchased in large numbers now, or very soon, but the key barrier remains a lack of appropriate supply. The update of the total cost of ownership of e-vans will be the focus of a forthcoming publication by T&E.

Finally, a recent study by Bloomberg NEF [14] quantified the (pre-tax) upfront costs of both ICE vans and e-vans, with a split between light and heavy vans[13]. As shown in Figure 14, this analysis resulted in upfront costs parity between ICE vans and e-vans in 2025 for light vans and 2026 for heavy vans. This can be mainly explained by economies of scale associated with electric vans production and by expected battery technology improvements. As upfront costs correspond to purchase costs before taxation, these results seem to be aligned with CE Delft's TCO results presented above: first the TCO parity will be reached, while the upfront cost parity will come slightly later (3 years later for heavy vans).

[12] Given strong reduction of battery costs since 2017, the low battery cost scenario was considered.
[13] In this study, light vans' weight was 1,300 kg for ICEs and 1,500 kg for BEVs (e.g. Renault's Kangoo) and heavy vans' weight was 2,000 kg for ICEs and 2,300 kg for BEVs (e.g. Ford's Transit) to account for the additional battery weight



Source: *Hitting the EV inflecting point*, Bloomberg NEF, 2021

* light vans are considered to be 1,300 kg for ICE and 1,500 for BEV (e.g. Renault's Kangoo)

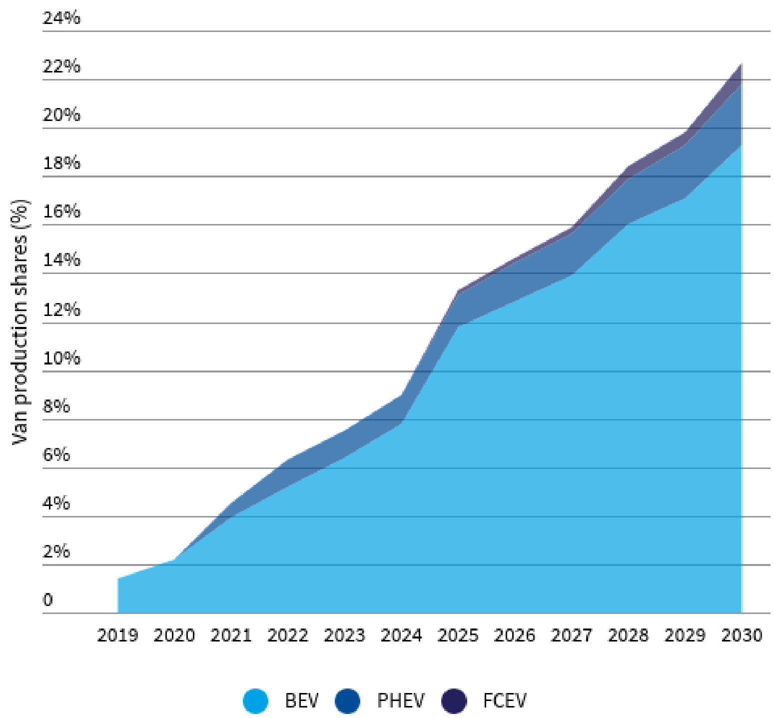
**heavy vans are considered to be 2,000 kg for ICE and 2,300 for BEV (e.g. Ford's Transit)

Figure 14: Bloomberg NEF's upfront costs forecasts for light and heavy vans

3. Van market forecasts (IHS Markit)

Thanks to production forecasts produced by IHS Markit [15], an analysis of the expected van production in the decade has been conducted. These projections are based on current OEMs' production plans and reflect what type of vehicles van makers are planning today with the policies currently in place. Given the weakness of these current policies, these projections are considered to be conservative.

First of all, according to IHS Markit's projections, 11.8% of vans produced in the EU27+UK+NO would be battery-electric in 2025 and 19.3% in 2030. Looking at the van electrification rate per class in 2030, Class I e-vans are estimated to reach 10%, Class II 26% and Class III 14%. Compared to IHS Markit's projections for cars (23% battery-electric cars in 2025 and 48% in 2030), the above e-van production seems very low. As shown in Figure 15, plug-in hybrids (PHEV) and fuel-cell electric vans (FCEV) are expected to play a minor role in the next decade with 2.5% of vans produced in 2030 being PHEV and 0.9% FCEV, with the first models available in 2025.

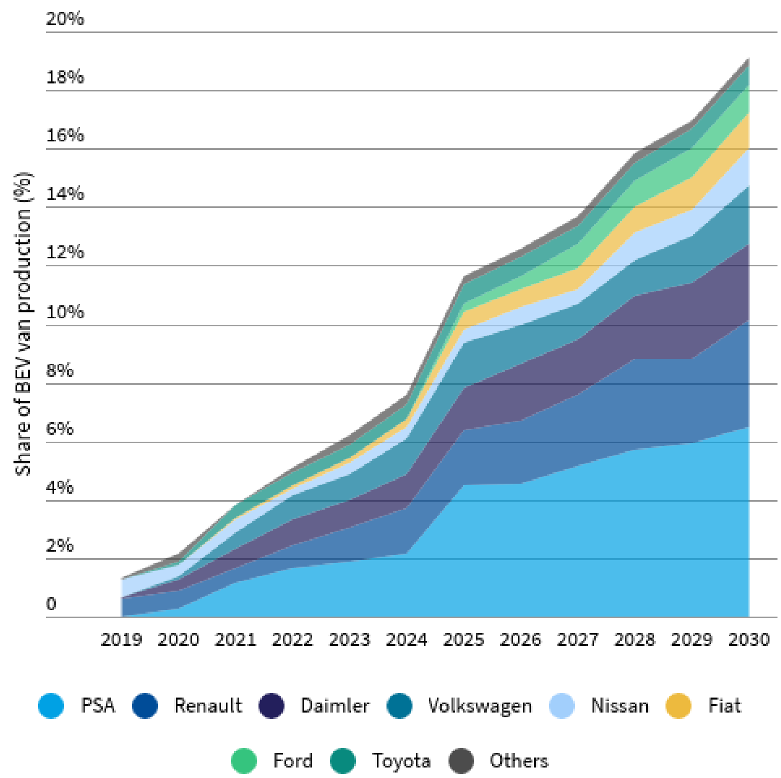


Source: T&E analysis, data from IHS Markit light duty vehicle production forecast, January 2021 update

Figure 15: Production shares of battery-electric, plug-in hybrid and fuel-cell electric vans in 2030 (EU27+UK+NO)

3.1. Evolution of e-van sales per van maker

Most OEMs are expected to produce between 14% and 25% of e-vans in 2030. Nissan is the exception with almost 7 vans out of 10 being battery-electric. According to these projections, PSA would lead the e-van market accounting for 33% of all production (the newly formed Stellantis would account for 40%), followed by Renault with 19% and Daimler with 14%.



Source: T&E analysis, data from IHS Markit light duty vehicle production forecast, January 2021 update

Figure 16: E-vans production forecasts per OEM in 2030 (EU27+UK+NO)

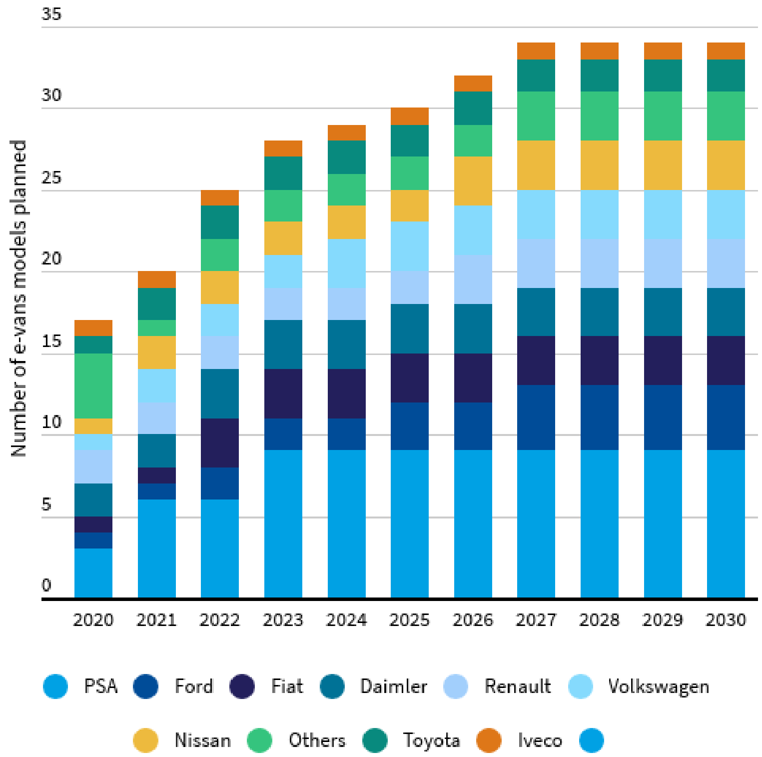
Furthermore, PHEVs are expected to be almost completely produced by three OEMs: Volkswagen, Daimler and Ford, each of them producing respectively 48%, 42% and 8% of all plug-in hybrid vans in 2030. These plug-in hybrid vans would account for 11% of Volkswagen's vans, 8% of Daimler's vans and 4% of Ford's vans in 2030.

Finally, in 2030, hydrogen-powered vans would only represent about 20,000 vehicles out of the 2 million vans being produced in Europe each year. More precisely, these few fuel-cell electric vans would be mainly produced by PSA[14] (54%) and Daimler (24%), followed by Renault (12%) and Fiat (10%) for which they would respectively account for 1.5% of Daimler's production, 1.4% of PSA's, 0.6% of Renault's and 1% of Fiat's production.

[14] As announced by Stellantis recently, it could be an hybrid between battery and fuel-cell technologies [16]

3.2. E-van models availability

Looking at the evolution of e-van models, according to IHS Markit the number of battery electric van models produced in Europe is expected to increase from 17 in 2020[15] to 30 in 2025 and 35 in 2030 (Figure 17). In comparison, between 40 and 50 ICE van models are projected to be produced in Europe in 2030. Which means that most van models would be electrified at the end of the decade.



Source: T&E analysis, data from IHS Markit light duty vehicle production forecast, January 2021 update

Figure 17: Number of battery electric vans models produced in Europe

More specifically, Renault's Kangoo is expected to keep leading the e-van market with 62,000 vehicles produced in 2030, followed by Volkswagen's Caddy (44,000), Ford's Transit Custom (28,000), PSA's Vivaro and Expert (28,000 and 27,000 respectively) and Nissan's NV250 (27,000). On the other hand, newcomers such as Arrival are expected to produce some significant part of the overall e-vans market (about 7,000 e-vans would be produced by Arrival in 2030 according to IHS's forecasts).

[15] This number of models produced in 2020 appears lower than the actual number of models sold in 2020. It can be explained by several reasons, including the fact that IHS Markit's projections only look at production (not sales) and that some small van makers were not seen in these projections (e.g. Goupil).

On the other hand, 8 plug-in hybrids vans models are expected in 2030, according to IHS Markit's projections. Ford will be leading with 3 models (Transit, Transit Connect and Transit Custom), followed by Volkswagen with 3 models as well (Bulli, Caddy and Crafter) and Daimler with 2 models (Vito and Sprinter).

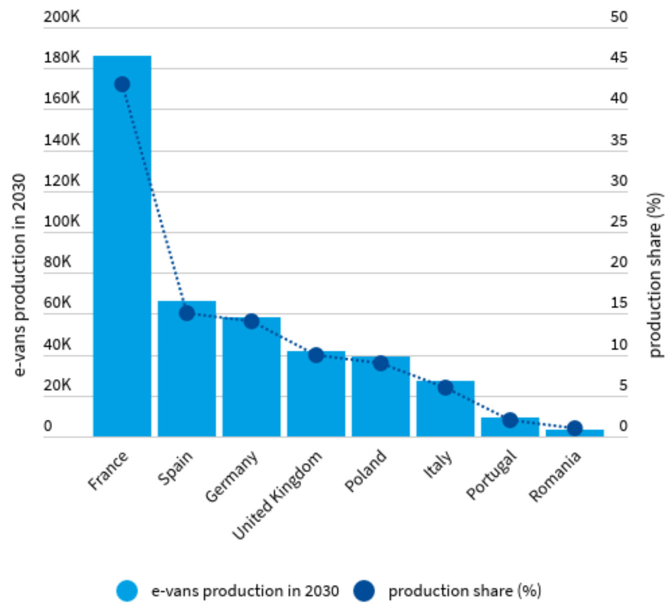
Finally, on the fuel-cell electric vans side, 7 models are planned to be produced in Europe in 2030. PSA will be first with 3 models (Boxer, Vivaro and Jumpy), followed by Daimler with 2 models (Sprinter and Vito), Renault with its Kangoo and Fiat with its Talento.

3.3. Producing countries

According to IHS Markit's projections, about 43% battery electric vans produced in Europe would be produced in France (186,000 e-vans produced in 2030), which can be explained by the fact that French van makers (PSA and Renault) are expected to produce 50% of e-vans in 2030. As shown in Figure 18, Spain follows with 15% of the production, Germany with 14% and then the United Kingdom with 9%. This means that 31% of the van production based in France would be battery-electric, and 13% of Spain's production, 24% of Germany's and 44% of the UK's.

On the PHEV side, only three countries would produce these vehicles: Germany would host 46% of the production (26,000 plug-in hybrid vehicles), Spain 27% (16,000) and Poland 26% (15,000).

Finally, three quarters of fuel-cell electric vans are expected to be produced in France in 2030 (15,000 vehicles), while Spain and Germany would produce the rest (13% and 11% respectively).



Source: T&E analysis, data from IHS Markit ligh duty vehicle production forecast, January 2021 update

Figure 18: Geographical distribution of e-van production in Europe in 2030

4. Post-2020 targets modelling

Under the current adopted van CO_2 target, the EU regulation will continue to fail to deliver electric vans up to the late 2020s. This is because the 2025 and 2030 targets are far too low to drive electrification. Without significant reform, the small amount of CO_2 reduction needed will be achieved through marginal ICE fuel efficiency improvements. In effect, vans will be used to write off old generation diesel technologies from the passenger car segment.

4.1. Targets can be achieved without any electrification at all

According to the 2016 ICCT study on cost curves for CO_2 reduction technology [17], van CO_2 emissions could be reduced to 100 gCO_2/km (NEDC) with no EV sales[16]. This would cost less than around €2,500 per van in 2025 (and less by 2030).

[16] This is under the lower bound scenario which includes the following assumption: eco-innovation credits, positive contribution of mass adjustment, test flexibility exploitation and performance-based CO_2 adjustment. Also includes technology co-benefits on performance, noise, durability, safety (ie split costs). Under the higher bound scenario, the CO_2 emissions of vans could go down to 120 gCO_2/km in 2025.

In other words, **the -31% CO_2 reduction target for 2030, can be reached without selling any electric vans and by exhausting cost-efficient fuel efficiency improvements for diesel vans** (the 2020 baseline is 147 gCO_2/km; reducing this by 31% gives an NEDC target of 101.4 gCO_2/km in 2030). This demonstrates that there is significant-to-high remaining cost-efficient potential to improve ICE vans.

Figure 19 shows the cost curve for van CO_2 emissions reduction where the cost-efficient potential to reduce CO_2 emissions from ICEs is first exhausted (ExhICE strategy), as calculated by ICCT. The solid lines show the costs associated with given levels of CO_2 reductions achieved in 2030 (y-axis on the left). The dotted lines show the share of EV sales linked with each level of CO_2 emissions (y-axis on the right). For each level of CO_2 emissions (x-axis), there is a corresponding cost (y-axis on the left) and EV sales (y-axis on the right).

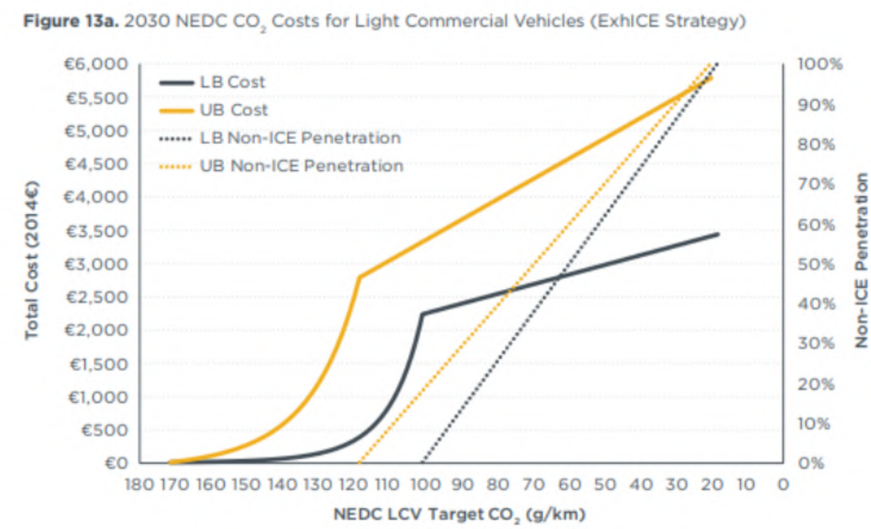


Figure 19: ICCT 2030 NEDC CO_2 cost curve for vans (ExhICE Strategy)

The lower bound (LB) costs should be considered instead of the upper bound (UB) costs, and this for several reasons:

- First, the ICCT underlines that the study "likely results in an underestimate of ICE CO_2 reduction potential and an overestimate of reduction costs" as it does not capture redesign and improvement of technologies, new technology developments, and emissions-reduction technology is evaluated on a constant performance basis. "Given these limitations, the cost curves presented in this paper are expected to be more reflective of the upper bound of actual future costs, and that the real costs for meeting potential CO_2 emission targets are likely to be lower."

- Second, only the lower bound scenario considered regulatory flexibilities, which play an important - and often underestimated - role in EU CO_2 regulation. For example, T&E has shown that in the car CO_2 regulation flexibilities close half of the 2020 CO_2 compliance gap [18].
- Thirdly, higher bound assumptions include high battery costs, which are not in line with strong market developments since 2016 and future cost reduction perspectives for the 2020s.
- Lastly, none of these scenarios consider the impact of the NEDC-WLTP uplift which is likely to reduce the stringency of the target further still.

Below 100 gCO_2/km (NEDC), EV sales are necessary to further reduce CO_2 emissions. **If the regulation prompts van makers to increase sales of electric vehicles - rather than exhaust all the cost efficient potential to reduce ICE emissions - then the overall compliance cost would be reduced.**

This is shown in the 'Non-ICE' strategy in the ICCT cost curve in Figure 20, where OEMs start selling electric vans as soon as they make sense to reduce compliance costs. For example, under this scenario, the 100 gCO_2/km (NEDC) is reached with an average additional cost of around €1,000. These differences **underline the need for a separate ZEV target** or benchmark to go hand in hand with the CO_2 reduction target (see Section 4.3).

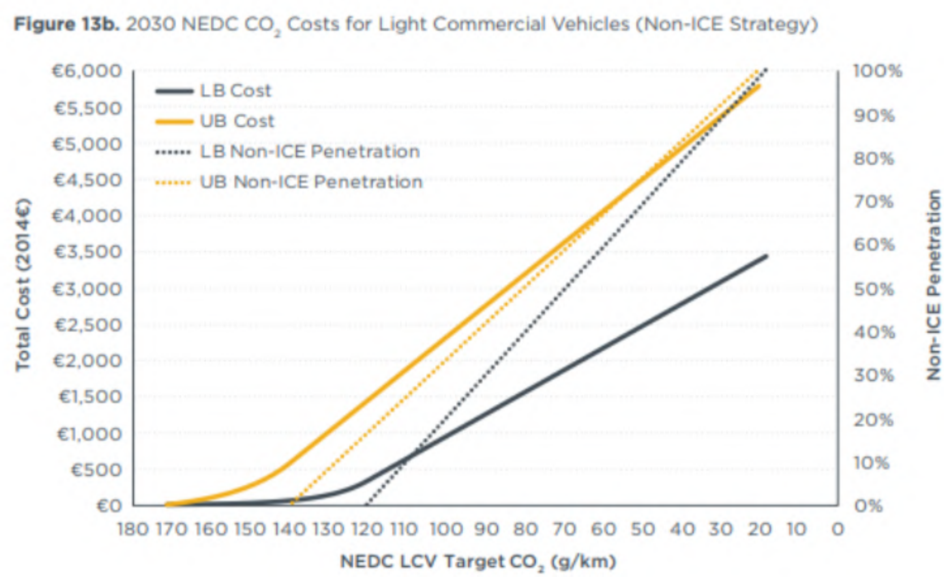


Figure 20: ICCT 2030 NEDC CO_2 cost curve for vans (Non-ICE Strategy)

Targets can be achieved with existing ICE vans

The OEM with the lowest 2020 ICE emissions was PSA, with 135.9 gCO_2/km, and with only 38% of its vans sold being Class III compared to 69% across all sales. Considering the best performing OEMs per class the results are: 91.1 gCO_2/km for Class I (PSA), 112.8 gCO_2/km for Class II (Volkswagen), and 161.7 gCO_2/km for Class III PSA). Combining these best-in-class averages gives a market weighted average of

145 gCO_2/km, which is 10% lower than the current ICE average. Looking at the best performing ICE models in each class, the weighted average decreases to 116.7 gCO_2/km[17], which is 28% lower than the current ICE average (or 27% lower than the overall average), and can already be reached today. This average is also 14% below the current 2025-2029 emissions target even though it excludes any contribution from e-vans. This indicates that with today's technology and low uptake of zero-emission vehicles, significantly lower fleet emissions can be obtained. This once again highlights the inadequacy of the current targets that are not driving any technology improvement or change, but are arguably years behind the market.

4.2. T&E modelling of current targets

Based on current policies, we modelled the battery electric van output in 2025 and 2030 with different scenarios: central scenario, high contribution of flexibilities, no flexibilities at all, and high ICE fuel efficiency improvements**.**

These flexibilities include eco-innovation credits for fitting technology that delivers emissions reductions on the road but not during the official test and mass-adjusted targets (a specific CO_2 target applies for each OEM, based on the average mass of new vans registered, see Section 1 for more information). The uplift between NEDC and WLTP test emissions can also be a source of flexibility for van makers: they can artificially inflate the NEDC-WLTP gap in order to reach more easily CO_2 targets by deflating this gap in the future.

The assumptions for each scenario are summarized below in Table 2.

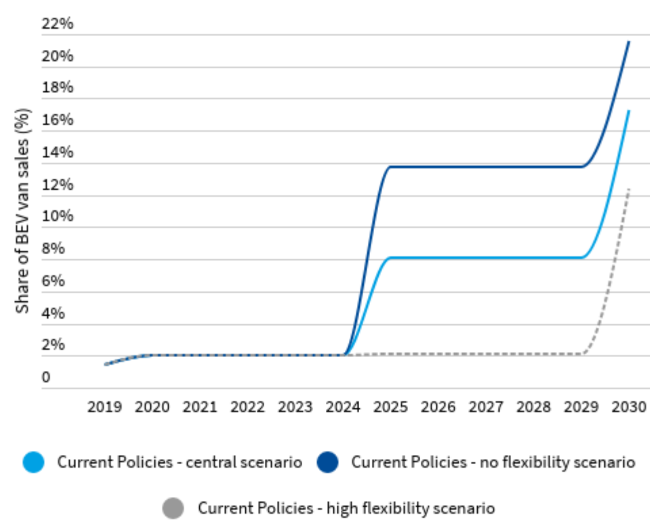
Scenario	ICE improvement	Flexibilities	ZEV shares
Central	2% per year	- 1.5 gCO_2/km eco-innovation credits in 2025 (2 gCO_2/km in 2030) - 3 g/km as the overall contribution of the mass-adjustment in 2025 (2 gCO_2/km in 2030) - WLTP-NEDC uplift reduced to 21% in 2025 from 27% in 2020[18]	8% in 2025 and 17% in 2030
High flexibility	Same as central	- 3 gCO_2/km eco-innovation credits in 2025 (4 gCO_2/km in 2030)	2% in 2025 and 12% in 2030

[17] Class I ICE 2020: Ford Fiesta van, 89.7 gCO_2/km; Class II ICE 2020: Citroen Berlingo, 109.1 gCO_2/km; Class III ICE 2020: Ford Connect, 121,4 gCO_2/km
[18] Based on 2019 value

		- 5 g/km as the overall contribution of the mass-adjustment in 2025 (2 gCO_2/km in 2030) - WLTP-NEDC uplift reduced to 16% in 2025 from 27% in 2020	
No flexibility	Same as central	No flexibilities (idealistic scenario for indicative purposes)	14% in 2025 and 22% in 2030
High ICE improvement	4% per year	Same as central	No ZEVs needed

Table 2: Assumptions used in T&E's modelling of current policies

As explained previously, the 2% annual improvement is realistic given the high potential to reduce ICE emissions. This assumption results in average ICE emissions of 147 gCO_2/km in 2025 and 133 gCO_2/km (NEDC) in 2030. The ICCT cost curves show this to be a reasonable assumption, as 133 gCO_2/km can be reached easily with no electrification and for approximately €250 per vehicle. The 4% annual ICE improvement scenario is less than what has been observed for most car OEMs from 2019 to 2020 [18] and leads to 131 gCO_2/km NEDC in 2025 and 106 gCO_2/km in 2030 without any e-vans. It should be noted here that ICEs also include hybrids (mild and full), which means that hybridisation is an important driver to increase ICE fuel efficiency in this scenario. The scenario variants are shown in Figure 21.



Source: T&E modelling

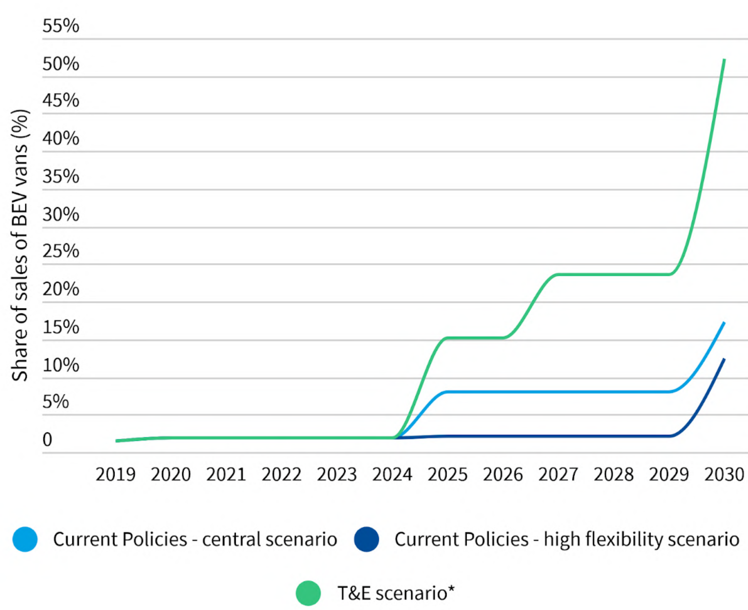
Figure 21: Minimum BEV van sales under EU Current Policies

As shown above, current van CO_2 targets do not increase e-van supply beyond business-as-usual market forecasts. In fact, **e-van output under the central scenario is limited to 8% BEVs in 2025 and 17% in 2030**, 2% behind the 19.3% forecasted 2030 e-van output from IHS Markit (see Section 4.1). Because of step-wise targets which are 5 years apart, van OEMs do not need to increase their sales of electric vans between 2021 and 2024 and between 2025 and 2029. As a consequence, the minimum e-van sales required are constant between the targeted periods. Indeed, CO_2 targets are typically reached thanks to last minute efforts, as it has been the case for cars with the 2020 car CO_2 target compliance.

4.3. T&E proposal for new post-2020 targets

Higher CO_2 targets

In its previous modelling of the EU -55% emissions reduction target in 2030 [19], T&E showed that at least 50% of new vans need to be zero-emissions in 2030, increasing to 100% in 2035. Assuming 2% ICE improvement per year and 2 gCO_2/km eco-innovation credits in 2030 as in the Central scenario described in the previous Section, **T&E calculates that 50% zero-emissions vans can only be achieved with a CO_2 target of -60% for new vans sold in 2030**. As shown in Figure 22, this is almost 3 times the expected e-van output under current policies in 2030.



Source: T&E modelling

*T&E scenario includes the following CO2 reduction targets: -20% in 2025, -31% in 2027, -60% in 2030

Figure 22: T&E modelling of e-van sales according to its proposal for new CO_2 targets

What Figure 23 shows most clearly is that e-van output can be increased in a more step-wise way with higher post-2020 targets. Without a step-by-step approach in the 2020s, very large production leaps would be needed in the period 2030 - 2035 for the EU to reach its decarbonisation objectives. In terms of effective emission reductions, a further delay of e-van deployment would also lead to increased accumulated emissions over time and would, thereby, make it more difficult to reach a more ambitious 2030 target. Clearly, it makes more sense, and is more realistic, to better spread e-van production growth over the 2021 to 2030/2035 period, with different intermediate targets in 2027 and 2033 in order to reach 0 gCO_2/km in 2035.

Notes: CO2 reduction targets are set versus a 2021 emission baseline.

Source: T&E modelling

Figure 23: Van CO_2 reduction targets in T&E scenario compared with current regulation

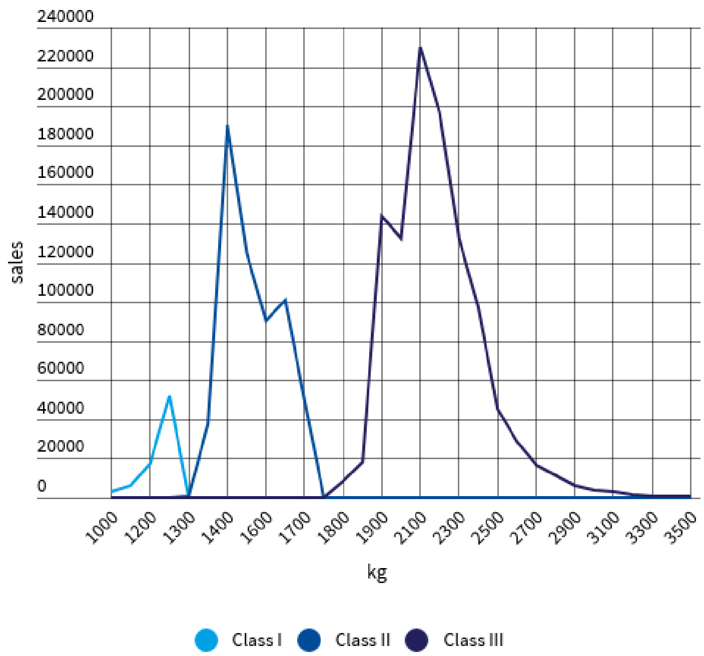
Two separate categories with no mass adjustment

As shown in Section 1, the average mass of vans sold in 2020 was 120 kg above the official reference mass (1886 kg vs. 1766 kg) used for the mass-adjusted CO_2 target. This means that the actual average target for 2020 is expected to be 11.5 gCO_2/km above the official target: **158.5 gCO_2/km vs 147 gCO_2/km.** If we extrapolate the increasing mass trend, the average mass would be 1914 kg in 2021[19], and be equivalent to an average target of **161 gCO_2/km (NEDC) in 2021**.

The distribution of the mass of vans sold in the EU shows three peaks, corresponding to the three van classes. Given the shape of the distribution (Figure 24), we see that two van categories are necessary to subdivide van sales and that most sales within one class have a similar mass. This supports the fact that there is no need to have a continuous mass-adjustment formula as if van sales were

[19] Linear interpolation based on 2015-2020 data.

homogeneously distributed (i.e. if the graph below would show horizontal lines). Therefore, van sales could be divided into two categories: Category 1 including Class I and Class II vans and Category 2 including Class III vans.



Source: T&E analysis, data from the EEA monitoring of CO2 emissions from vans

Figure 24: Mass distribution of vans in 2019 (EU27+UK+NO)

Finally, the analysis of the historic evolution of the average diesel van mass shows that the mass has stayed relatively constant for each class over time. Between 2012 and 2019, the dispersion (measuring the extent to which a distribution is stretched or squeezed) of average diesel mass values was 4% for the overall mass, but only 2%, 0% and 1% within each respective class, meaning that diesel van mass does not change much within one class over the years - but rather there is some movement in the split between classes.

4.4. Fleet-wide van emissions reductions

Based on T&E's European Transportation Roadmap Model (EUTRM) [20], the overall emission saving potential of current policies and T&E's recommendations have been calculated. This modelling looked at three scenarios : Current policies - central (same as above), Current policies with higher 2030 CO_2 target only and T&E's scenario[20].

As shown in Figure 25, these scenarios would lead to EU27 2030 van emissions of 75 $MtCO_2$ in the Current policies central scenario, 73 $MtCO_2$ in the Current policies higher 2030 CO_2 scenario and 69 $MtCO_2$ in T&E's scenario. Which means that in 2030 van emissions would be 21%, 23% and 27% below 2019 van emissions respectively, but still 25%, 22% and 16% above 1990 EU27 van emissions respectively. That's why, in order for vans to play their fair share towards reaching the EU 2030 climate objective, it is crucial to increase the CO_2 emissions reduction targets for vans before 2030: higher 2030 CO_2 only won't be enough.

These results slightly differ from T&E's previous modelling of the -55% CO_2 reduction target by 2030 as part of the official European Green Deal's climate ambition. That modelling also resulted in 69 $MtCO_2$ emissions in 2030 but for the EU28. This is because e-van sales were modelled with a progressive uptake, whereas here e-vans sales have been modelled with a step-wise uptake, following the CO_2 targets. This more realistic step-wise uptake results in less CO_2 potential savings as van makers wait for the last minute to reach their targets.

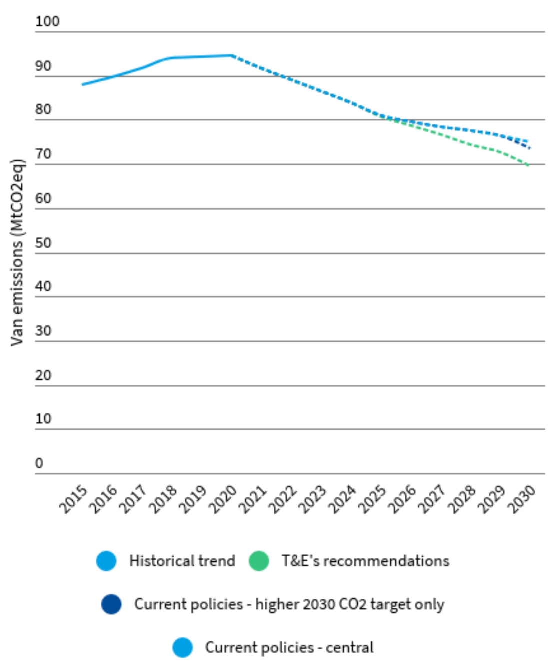


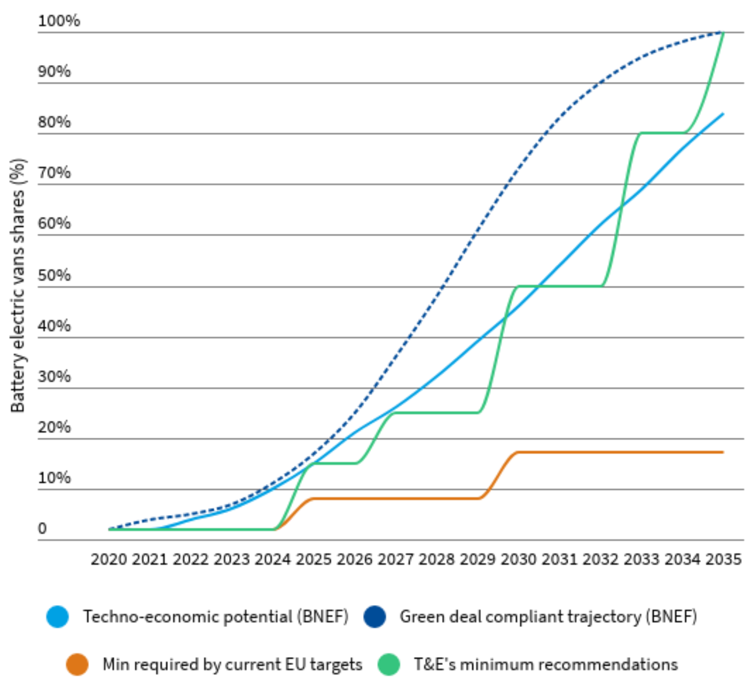
Figure 25: Overall potential CO_2 savings based on the EUTRM (EU27)

[20] Current policies - central: 8% e-van sales in 2025, 17% in 2030, Current policies - higher 2030 CO_2 target: 8.1% in 2025 and 50% in 2030, T&E's scenario: 15% in 2025, 25% in 2027 and 50% in 2030.

4.5. Comparison with Bloomberg NEF forecasts

A recent techno-economic analysis of the battery electric vans uptake in Europe published by Bloomberg NEF and commissioned by T&E [14] shows that the business-as-usual electric van sales trajectory (only driven by the market and the economics of the technology) would be 15% in 2025, 26% in 2027 and 46% in 2030 (Figure 26), which is in line with T&E recommendations to reduce emissions by 20% from 2025, 31% from 2027 and 60% from 2030.

However, BNEF analysis shows we should be going even faster for an optimal 2035 phase-out trajectory with average electric van sales reaching 17% in 2025, 36% in 2027, 73% in 2030, 95% in 2033 and finally 100% in 2035. The corresponding CO_2 reduction targets would therefore also be slightly higher than the ones presented above. Indeed, to follow BNEF's ICE phase-out trajectory, the following van CO_2 reduction targets should be set: 22% reduction from 2025, 42% reduction from 2027 and 78% in 2030 before going for 100% emission reduction in 2035.



Source: T&E modelling of current policies, and Bloomberg NEF forecasts from *Hitting the EV inflection point*, 2021

Figure 26: E-vans uptake: comparison between Bloomberg NEF's techno-economic forecasts, T&E's recommendations and current policies

5. Policy recommendations

To reach the European Green Deal's climate ambition of carbon neutrality in 2050 and contribute as much as possible to the overall -55% CO_2 reduction target by 2030, **T&E modelling shows that at least 50% of vans sold in 2030 need to be zero-emission, rising to 100% in 2035** [19] [21]. This would lead to van emissions of 69 Mt CO_{2e} in 2030, compared to 95 Mt CO_{2e} in 2019 in the EU27.

More ambitious CO_2 van standards alongside the implementation of ZEV sales targets are essential to put vans back on track and deliver the needed emission reductions.

5.1. Higher CO_2 reduction ambition

As shown in Section 1, the 2021 starting point (i.e. baseline) for vans is very high compared to cars, where the 2020 target has been strong enough to significantly increase EV sales. In order to correct and compensate for this, the relative CO_2 emission reduction target must be significantly higher to deliver e-vans to the market and reduce emissions quickly.

Increase 2030 CO_2 target to -60%
Based on T&E calculations, a **60% CO_2 reduction target is needed for 2030, alongside a 50% ZEV sales target** (see Section 5.2 below)**.** The two go hand-in-hand: the CO_2-specific target means the stated reduction must be achieved, while the ZEV sales target ensures a proportional allocation of effort between more efficient ICEs on the one hand, and higher supply of e-vans on the other. This to ensure the EU can reach 100% ZEV sales by 2035.

Driving the e-van market faster in the 2020s
There is a great potential for OEMs to reduce van CO_2 emissions in the 2020s, in particular given the weak baseline, which leaves ample room for improvement of ICE emissions, and e-van cost effectiveness. Thus **it is possible to drive the electric van market faster in the 2020s, and it is crucial to do so with higher intermediate CO_2 targets**. Regulation should push the market, not follow it.

If the level of ambition is not significantly raised in the 2020s, van makers will be able to keep e-van sales as low as 8% up to 2029 and would wait until the last minute to ramp up the sales of electric vans for the 2030 target even though this brings many risks (see Section 4.3). This has indeed been witnessed with cars where carmakers like Ford, JLR and Volkswagen waited for the second half of 2020 to push the sales of PHEVs but unexpected last-minute technical problems on these models exposed them to risks of non-compliance, or pushed them to form pools with better-performing OEMs. Furthermore, from a climate, air pollution and techno-economic perspective, early action should be preferred over delayed and more risky last-minute action.

Increase 2025 CO_2 target to -20%
To compensate for the very weak 2021 baseline and the existing untapped potential for ICE improvements, the 2025 target should be increased from -15% to -20%. As shown in Section 4.3, the current 2025 target of -15% CO_2 can be achieved by only selling around 8% BEVs, whereas with a -20% reduction target, 15% BEV sales should be seen. To ensure certainty, the 15% ZEV sales target should be legislated separately to guarantee that stepwise increase in e-van output, as outlined above and in Section 4.3

Current -31% CO_2 reduction target brought forward to 2027
To plan most effectively for the phase-in of the 2030 CO_2 reduction target, intermediate targets must be set between the -20% CO_2 reduction target proposed for 2025 and the -60% target for 2030.

T&E recommends that the previous -31% 2030 target should be brought forward to 2027, and an intermediate target of -45% should be set for the average over 2028 and 2029.

5.2. ZEV sales target

A ZEV target is the most effective mechanism to build up an output of ZEVs in Europe and ensure the transition to e-mobility is made swiftly and effectively, while guaranteeing the international competitiveness of European van makers. For historic reasons outlined in this paper (i.e. weak targets, and the NEDC-WLTP uplift) the baseline is elevated leaving much untapped potential for CO_2 emission reduction.

CO_2 targets alone simply would not drive e-van roll-out at a rate that comes close to the deployment potential - unless these targets were set at a level that would not be politically palatable (e.g. a CO_2 reduction greater than 70% by 2030). Therefore, both robust CO_2 targets on the one hand, and ZEV targets on the other, are needed to ensure a stepwise increase in the supply of e-vans over the next 15 years, and critically, ensure that all output is fully electric by 2035. Put another way, ZEV sales targets, in addition to CO_2 reduction targets, guard against the risk of van-makers leaving themselves too much to do coming up to 2035.

This ZEV target can take the form of a **binding minimum ZEV target to be reached**, or can convert the existing EU ZLEV benchmark into a target by adding a malus to the existing bonus and increasing the ambition level. If the malus is not added, the benchmark is a mere voluntary one, with the bonus mechanism only creating additional risks to weaken the CO_2 reduction target, without anything in return. Importantly, a ZEV target should be **focused exclusively on zero-emission vehicles**, thus excluding hybrids from the scope; see also Section 5.6 *'Avoid the hybrid loophole'*.

The overall ambition of the **ZEV target should be at least 15% in 2025, 25% in 2027, 50% in 2030, 80% in 2033, and reach 100% in 2035**.

Both T&E's CO_2 and ZEV targets for the decade to come are summarized in Table 3 below:

	CO2 reduction targets	ZEV sales targets
2025	20%	15%
2027	31%	25%
2030	60%	50%
2033	86%	80%
2035	100%	100%

Table 3: T&E CO_2 and ZEV targets vs current policies

Addressing the regulatory van gap

Vans with a reference mass of more than 2,610 kg and a TPMLM of less than 3,500 kg fall outside the scope of the current van CO_2 regulation and therefore pose a risk of shifting emissions, as van makers could be incentivised to make heavier, high polluting vans which would not be regulated.

Vans (Category N1, i.e. below 3,500kg TPMLM), are covered by the chassis dynamometer test or WLTP under Regulation 715/2007 when the reference mass (of the completed vehicle) is below 2,610 kg. Above this reference mass limit, the vehicles are approved based on the engine test (Regulation 595/2009 [22])[21]. Given that the certification regulation for new heavy-duty vehicles is currently limited to vehicles with a TPMLM above 3,500 kg, vehicles with a reference mass above 2,610 kg and a TPMLM below 3,500 kg are currently neither covered by the light- nor heavy-duty regulations.

To address part of this gap, the van ZEV target or benchmark should include vehicles above 2,610 kg (reference mass) and below 3,500 kg (TPMLM) in the scope of the Category 2 for the ZEV target. In other words, for the purpose of the ZEV sales target, Category 2 vans are vans from 1,760 kg to 2,610 kg reference mass and the vans which are more than 2,610 reference mass and less than 3,500 kg TPMLM.

5.3. Phase-out the sales of ICE vans by 2035

To reach zero emission transport by 2050 and meet the goals of the European Green Deal, which promises a path "towards zero emissions mobility from 2025 onwards" for light-duty vehicles, the pace of CO_2 reduction needs to be maintained after 2030. For the entire van fleet to be zero emission in 2050, **the last new van with any CO_2 emitting engine must be sold no later than 2035**. This means

[21] Some extensions of the chassis dyno test to variants below 2,840 kg reference mass exist at the request of manufacturers. Some extension of engine testing can be done for variants of completed vehicles above 2,380 kg at the request of the manufacturer.

that not only diesel and petrol cars, but gas-powered, hybrid and plug-in hybrid models need to be phased-out.

In other words, the revised van CO_2 regulation should set a phase-out date for the sales of vans with an internal combustion engine by 2035 which means setting a 100% CO_2 reduction target in 2035, along with an intermediate 2033 target of 86% CO_2 emissions reduction (corresponding to 80% BEV sales in 2033, in line with a linear trajectory from 2030 and 2035). Such post-2030 targets are crucial to provide much needed investment certainty to manufacturers, transport companies, alongside local, national and international authorities.

This is aligned with recent techno-economic analysis of the battery electric vans uptake in Europe published by Bloomberg NEF and commissioned by T&E [14]. As shown in Section 4.5, BNEF forecasts at least 15% e-van sales in 2025, 26% in 2027 and 46% in 2030 in its base-case scenario, but also highlights that for an optimal 2035 phase-out trajectory, average electric van sales should reach 17% in 2025, 36% in 2027, 73% in 2030, 95% in 2033 and finally 100% in 2035. The corresponding CO_2 reduction targets would therefore also be slightly higher than the ones presented above.

If EU van CO_2 targets are left untouched in the 2020s, van makers would choose to delay the investment and introduction of new electric models leading to suboptimal electric technology deployment and adoption. As a result the electric van market would not reach the necessary scale to kick start a wider market adoption, costs would remain high and ICE phase-out within the 2035 timeframe would slip out of reach, thus seriously jeopardising climate targets. On the other hand if the van CO_2 reduction targets are made more ambitious in the 2020s, the market would take the right direction and follow the most cost-effective market uptake trajectory.

As shown by BNEF, ICE phase-out for vans is feasible and desirable, but early action is needed to achieve later volume. This is all the more important for the uptake of electric vans given that van makers are currently not planning any effective electrification strategy and there is risk that the transition to electric vans would be delayed beyond what would be most effective from a techno-economic point of view without stringent CO_2 targets.

Because of the smaller scale in van production compared to cars, the transition to electric vans can happen much more rapidly. Indeed it will likely be costly to maintain a flexible platform manufacturing approach (i.e. producing both diesel and electric vans on the same platform) which will eventually push van makers to transition the limited number of production platforms to dedicated electric van production (which would also greatly increase the performance and economics of electric vans).

5.4. Separate categories with no mass-adjustment

Initial observation

Under the current regulation, there is a damaging design flaw in the form of the mass-adjusted target as it disincentives lightweighting, and drives the market towards heavier vans given that OEMs have less stringent targets when they sell heavy vans.

Indeed, as shown in Section 1, because of the increasing average mass trend, the actual average 2020 mass-adjusted target is expected to be 11.5 gCO_2/km above the official target (158.5 gCO_2/km vs 147 gCO_2/km).

Solution: two separate categories with no mass-adjustment within each category

The sales of vans should be divided into two categories: Category 1 including small and medium vans (equivalent to category N1 Classes I and II), and Category 2 including large vans (Class III).[22] With regard to CO_2 targets, the post-2020 targets (-20% in 2025, -31% in 2027, and -60% in 2030, -86% in 2033, and -100% in 2035, as proposed here) should be applied to each of the two categories separately, working from a category-specific baseline in 2021.

The absence of mass adjustment within each category would incentivise OEMs to make light vans within each of those categories and prevent any ongoing increasing mass trends contributing to weakening the targets, as described above. This design ensures a more harmonised CO_2 reduction across van output, small/medium and large. But it also requires that the European Commission distinguishes the two category-specific baselines used for the targets from 2025.

5.5. Avoid hybrid loopholes

For the moment PHEV van sales are virtually non-existent while they make up around half of the EV sales for passenger cars where it's clear PHEVs are being exploited by car OEMs as a compliance tool, while having questionable benefits on the road (PHEV passenger car emissions are two to eight times higher in real world than in official laboratory tests [23]).

In contrast to BEVs, PHEV vans are not expected to play a role, **comprising 2.5% of van production in 2030 (only 56,000 units produced in 2030 according to IHS Markit**). Regulation is best focused on the solution - BEVs, and steer away from mechanisms with strong potential to be used to avoid real-world compliance, i.e. PHEVs.

[22] Regulation 2019/631 does not foresee differentiated monitoring and reporting based on category N1 classes. However, the N1 classes I - III are already defined in Regulation 715/2007 on which basis vehicles could be allocated to the Category 1 (Classes I and II) and 2 (Class III) respectively.

Currently the van regulation offers the same treatment of PHEVs (as for cars) under the WLTP tests but it is key that the new regulation does not introduce any kind of additional PHEV incentive which would have the adverse effect of driving the market towards compliance with “fake EVs” which are not charged, like we have seen for cars.

In practice, the van regulation should avoid adding an additional PHEV incentive as part of a ZEV target. Indeed, in the passenger car CO_2 regulation, the credit value of PHEV is inflated (the so-called ‘0.7 multiplier’). With regards to vans, the ZEV target should focus on incentivising ZEVs only given that LEVs (or PHEVs) are already treated very generously in their emissions test. We recommend a ZEV target and if LEVs were to be included, very important safeguards should be preserved: no multiplication factor should be added for PHEVs and the threshold for LEV should be kept at a maximum of 50 g/km. And their real-world emissions and fuel consumption must be reported using on-board fuel consumption meters, including for setting OEM-specific utility factors to be used for WLTP CO_2 value calculation.

Given the technology and cost superiority of BEVs over PHEVs, the revised van CO_2 standards should keep away from unjustified PHEV loopholes risking that they would be used for compliance purposes only by OEMs while delaying the mass adoption of zero emission vans.

5.6. Zero emission van extra-weight allowance

Because of battery weight, electrification will, at least in the early 2020s, continue to push the vehicle weight slightly upwards, further relaxing the targets. For example, in 2019 the average mass of ICEs Class II was 1491 kg, while it was 1585 kg for Class II BEVs (6% higher, which would correspond to an increased target of 1 gCO_2/km for every additional 11% BEV sales).

Zero emission vans currently do not get an extra weight allowance to take into account the impact of the additional weight from the battery pack on the maximum payload of the vehicle. Heavy-duty vehicles currently benefit from an up to 2t extra weight allowance under the Weights and Dimensions Directive [24], which is considered to be an important enabler for electrifying heavy-duty vehicles. Allowing for a similar flexibility for the heavier class III vans would provide favourable conditions for the electrification of heavier (light-duty) vans. Hence, T&E supports giving a limited **extra weight allowance of up to 300 kg for zero emission vans sold up to 2030**.

An additional weight allowance of up to 300 kg is justified by the fact that this is approximately the weight of the battery of the most sold van: the Renault e-Kangoo has a battery of 33 kWh with a total weight of 260 kg (127 Wh/kg) [25]. It is expected that the battery density will improve by at least a factor of two in the 2020s (according to Ricardo’s low battery pack density assumptions: 183 Wh/kg in 2020, 245 Wh/kg in 2025 and 318 Wh/kg [26]) which will allow for large 100 kWh batteries to be fitted with no extra weight penalty up until 2030 (100 kWh * 0.318 Wh/kg = 318 kg). This extra weight allowance should be discontinued after 2030.

It is essential that PHEVs (or low emission vehicles) do not benefit from this extra weight allowance as this would create an unjustified and harmful loophole, which would push the market towards heavy PHEV vans for compliance purposes only and thus slow down the adoption of BEV vans.

5.7. "Hot air" from WLTP-NEDC uplift

The calculations presented in Section 4.3 include a limited level of manipulation of the WLTP test from the 'hot air' created by inflating the WLTP-NEDC gap.

For cars, half of the progress in emissions reduction since 2008 is due to NEDC test optimisation. While this is separate to the issues now arising from moving from NEDC to WLTP, it highlights the background and the risks at stake with future optimisation and manipulation of the WLTP test.

Van-makers regrettably had an incentive to inflate the WLTP-NEDC gap in 2020, i.e. artificially increase WLTP test values while achieving the NEDC targets, as the difference between the two tests in 2020 is being used in the calculation of the 2021 WLTP baseline for the post-2020 targets. Plus OEMs had the possibility to double test vehicles until end 2020 (the year where the gap is monitored) under both the NEDC and WLTP. Thanks to this artificially inflated baseline, rather than seek real world emission reductions in the 2020s, OEMs would seek to reduce WLTP emissions via test manipulation, thereby ostensibly presenting high emissions reductions (in %) and thus compliance, but failing to achieve equivalent reductions on the road.

As a result, the gap between the real world and WLTP is likely to increase from 2021 onwards. The larger the gap in 2020, the more 'hot air' is created for test manipulation, with CO_2 reductions achieved on paper but not on the road. In 2020 the NEDC-WLTP uplift for vans was already much higher than for passenger cars (26% vs. 21% according to Dataforce market data), thus highlighting the particular risks of weakening for the van sector. To prevent the 2021 WLTP baseline from being unduly weakened, correction mechanisms will need to be applied.

The solution is to **measure real-world fuel efficiency using fuel consumption meters** (FCMs) and use this data to catch test manipulation and improve the enforcement of the CO_2 emission limits. With this, car and van-makers would be required to ensure that the gap between their fleet average WLTP values and fleet average real-world emissions (measured using fuel consumption meters) is constant or reduces (but cannot increase - or the remedy action is required). By doing this the WLTP real-world gap would be either constant or decrease. Such a solution will need to be provided for in the forthcoming legislative revision.

6. Annexes

6.1. Methodology for the 2020 van emissions calculation

As described in Section 1, the analysis of 2020 van emissions have been conducted based on preliminary van registration data from Dataforce. Unfortunately, the database obtained did not provide both NEDC and WLTP emission values - i.e. for each van registration only one type of emissions was available, requiring a conversion from WLTP to NEDC - making it more challenging to compare emissions with historical trends.

The conversion from WLTP to NEDC values is based on an analysis of the 2019 van models registered in the EEA database, for which more than 30% of registrations had both NEDC and WLTP emissions and gave an average 27% WLTP-NEDC gap. Therefore, for each model a specific WLTP-NEDC gap has been identified from the 2019 EEA data, and applied to the van models registered with WLTP emissions in the Dataforce database.

For statistical precautions, minor adjustments have been made for van models having less than 10% of their 2019 registrations with both NEDC and WLTP values. For these very few models (about 2% of 2019 registrations), the 2019 average gap per van maker has been used. However the difference between this method and the more simple method of applying specific gaps for all models is really low (27.2% vs 27.0% average gap). Table 4 summarizes the average WLTP-NEDC gap per van maker and Table X presents the average gap for the most sold vans in 2019.

OEMs	2019 van registrations	2019 WLTP-NEDC gap
PSA	432,000	36%
Ford	302,000	23%
Renault	279,000	29%
Volkswagen	202,000	16%
Daimler	162,000	19%
Fiat	141,000	23%
Nissan	46,000	27%
Toyota	41,000	32%
Iveco	24,000	40%

Table 4: WLTP-NEDC gap per OEM based on 2019 EEA van registrations

Van models	OEM	2019 registrations	2019 WLTP-NEDC gap
Transit	Ford	247,000	24%
Sprinter	Daimler	88,000	22%
Kangoo	Renault	81,000	26%
Partner	PSA	76,000	35%
Master	Renault	66,000	44%
Berlingo	PSA	66,000	35%
Trafic	Renault	62,000	24%
Transporter	Volkswagen	55,000	7%
Caddy	Volkswagen	55,000	12%
Ducato	Fiat	53,000	35%
Crafter	Volkswagen	52,000	27%
Vito	Daimler	51,000	12%
Expert	PSA	51,000	33%
Boxer	PSA	47,000	52%
Ranger	Ford	42,000	18%
Doblo	Fiat	41,000	18%
Vivaro	PSA	39,000	36%
Combo	PSA	32,000	35%
Jumper	PSA	31,000	53%
Jumpy	PSA	30,000	33%

Table 5: WLTP-NEDC gap for top models based on 2019 EEA van registrations

6.2. N1 pooling list

The official 2020 van maker pools pursuant to Article 6 of Regulation (EU) 2019/631 [27] are presented in Table 6 below:

Pool name	OEMs
FCA-PSA	Alfa Romeo
	Citroën
	Peugeot
	FCA (Fiat and Chrystler)
	Opel
Ford-Volkswagen	Ford
	Volkswagen
Renault-Mitsubishi	Renault
	Mitsubishi
	Nissan
	Dacia

Table 6: 2020 N1 pooling list

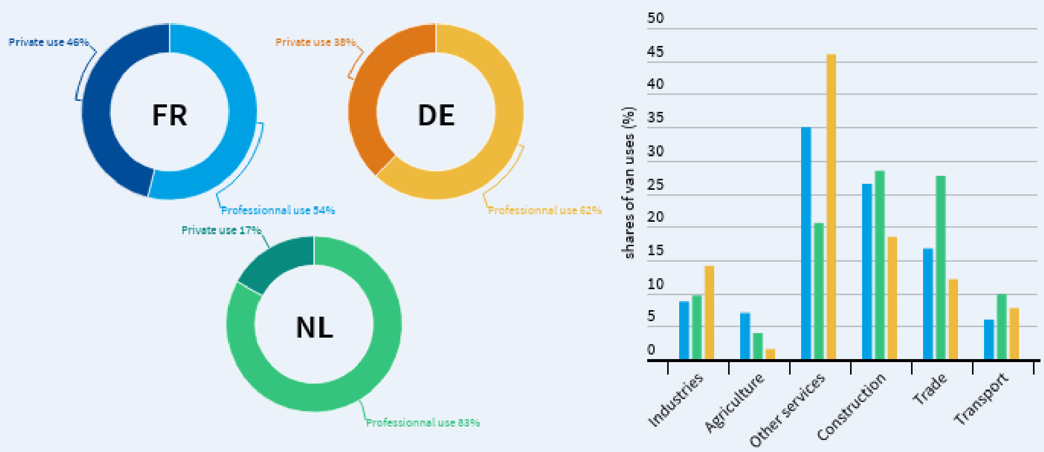
6.3. Van uses

Because they fall between cars and trucks and thus are not used just for freight or just for passengers, vans are not properly regulated. That's why, when looking at vans, one crucial aspect to keep in mind is how diverse are their uses. From deliveries to construction works or services and from SMEs to large companies, vans are today used in all economic sectors and by all kinds of companies and organisations.

Since it has not been possible to find aggregated data of van uses across the EU, some national statistics have been investigated in order to have a better understanding of how vans are used. These uses are summarized in the Infobox below.

How vans are being used?

Looking at van uses in three different countries (France, Netherlands and Germany), it can be observed that vans used for private purposes can account for a significant share of all van uses (up to 46% in France). More precisely, these uses can be done by independent workers using their van for both professional and private uses. From the economic sectors perspective, it seems that construction works, trade and diverse services make the greater share of light commercial vehicles. Purely transport-related uses, such as postal services or deliveries, seem to make less than 10% of all van uses in the three countries where data could be found. Nevertheless, this broad distribution of van uses only gives general trends as the data scope of each country could be slightly different, and some categories such as "other services" could take into account different uses.



Source: T&E analysis, data from national surveys conducted by the French Ministry of transport (2011 & 2021) and by CE Delft* (2017), and from German official vehicle registrations** (2020)

*Due to units differences between FR and NL data, NL shares per economic sector have been shifted from % of vehicle-km to % of vehicles based on average annual mileages per sector as described by CE Delft .
**German national registrations do not exactly compare to the two other countries as this shows in which economic sector vans' owners work.

Figure 27: Distribution of van uses per sector

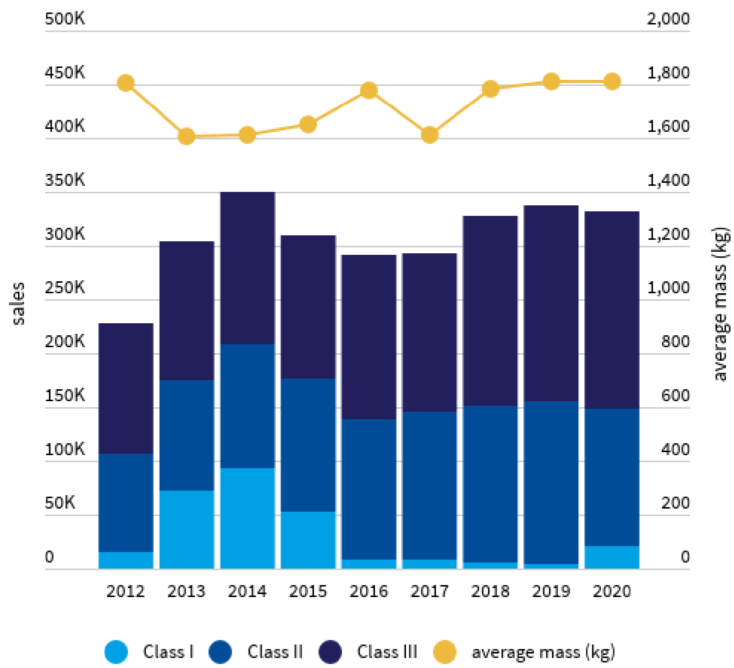
6.4. National fiches

6.4.1. France

With more than 6.2 million vehicles in its van fleet, France has by far the largest fleet in Europe (20% of the EU27+UK fleet). Vans accounted for 20% of France's road transport emissions (vs 13% on average in the EU) with 25.1 $MtCO_2$ emitted in 2019. These vehicles represented the second largest emissions increase in road transport after 2-wheelers with a 30% CO_2 increase between 1990 and 2019.

While van sales increased by 48% between 2012 and 2019, sales only slightly decreased (-1%) between 2019 and 2020 following the COVID-19 crisis compared to the average trend in Europe (-15% van sales between 2019 and 2020, see Section 1).

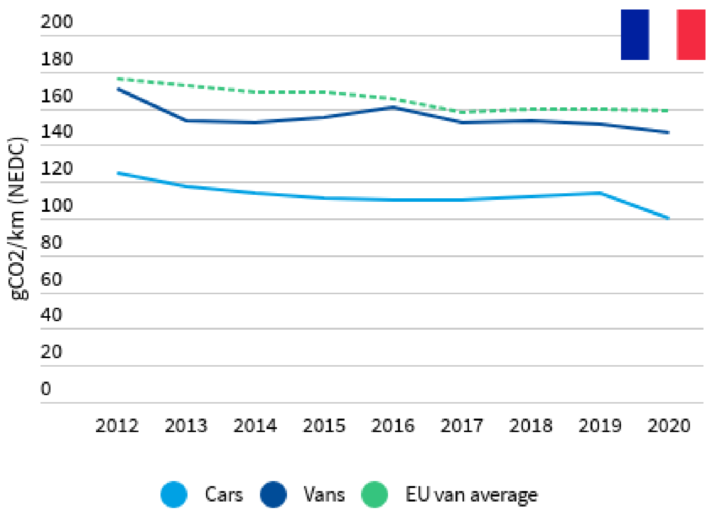
French vans appear to be lighter than the EU average, with only 55% of its sales being Class III in 2020 (compared to 69% in the EU), translating in 1,810 kg average weight compared to 1,886 kg for all countries. But Class III vans are growing, noting they only represented 42% of sales in 2015, meaning an increase of weight of 10% between 2015 and 2020 (Figure 28).



Source: T&E analysis, 2012-2019 data from the EEA monitoring of CO2 emissions from vans, 2020 preliminary data from Dataforce.

Figure 28: Van sales evolution in France

Looking at emissions, vans sold in France were 8% less emitting than the average for the EU and UK. As shown in Figure 29, with 146.7 gCO_2/km (NEDC) according to 2020 preliminary data, emissions from new vans sold in France decreased by 3% between 2019 and 2020 (compared to -0.3% EU wide), making France one of the best performing countries, while they decreased by 12% for cars over the same period.

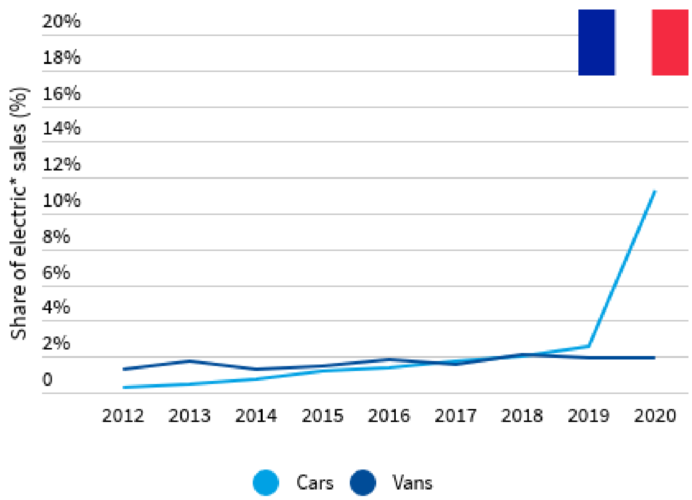


Source: T&E analysis, 2012-2019 data from the EEA monitoring of emissions from cars and vans, 2020 preliminary data from Dataforce

Figure 29: Emissions of new vans sold in France

On the van maker side, Renault and PSA made 35% and 33% of van sales respectively, followed, with a significant gap, by Ford (7.4%) and Daimler (6.5%). The two French van makers have quite low average emissions (135 gCO_2/km and 145 gCO_2/km for PSA and Renault respectively, see Section 1.3), and this explains why the average emissions in France are so low compared to other EU countries.

Even though battery electric vans sold in France represented more than 20% of all EU e-vans, they only made up 1.9% of van sales in France, just below the EU average of 2%. However, compared to e-cars, for which new sales soared from 2.6% in 2019 to 11.3% in 2020, sales of new e-vans stagnated between 2019 and 2020 in France, staying under 2% (Figure 30).

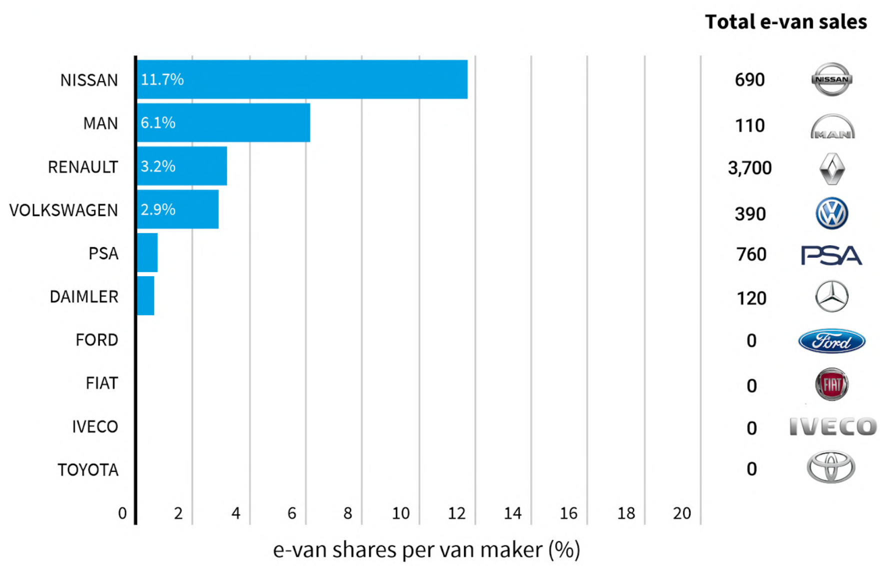


Source: T&E analysis, 2012-2019 data from the EEA monitoring of emissions from cars and vans, 2020 preliminary data from Dataforce

*electric sales include both battery electric and plug-in hybrid sales

Figure 30: E-vans vs e-cars in France

Looking at van makers, Renault led by far with 60% of the overall French e-van sales (of which more than 99% were e-Kangoos). On the other hand, the other main French van maker, PSA, sold more than 110,000 vans but only 760 e-vans, as seen in Figure 31 below.



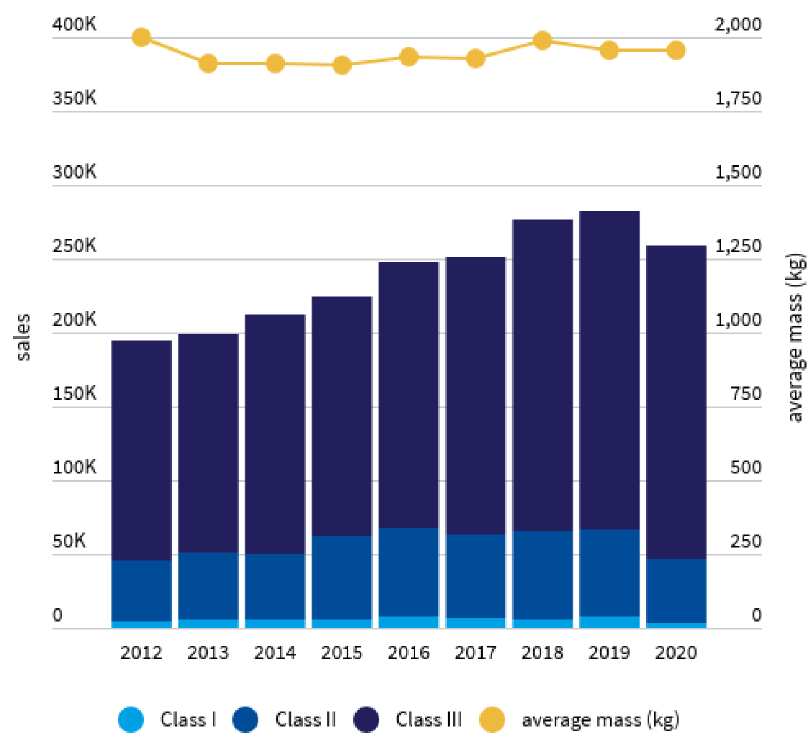
Source: T&E analysis, data from Dataforce

Figure 31: 2020 battery electric van sales in France

6.4.2. Germany

With 2.7 million vehicles in its van fleet, Germany has the 5th largest van fleet in Europe, emitting 7% of its road transport emissions in 2019 (11.4 $MtCO_2$). German vans had the fastest growing emissions compared to other road vehicles, with a 110% emissions increase between 1990 and 2019 (vs -15% for cars).

As shown in Figure 32, van sales increased steadily over the past decade (+45% between 2012 and 2019) but slightly decreased by 5% between 2019 and 2020 following the COVID-19 crisis. Looking at the class distribution, Class III vans represented 80% of van sales in 2020 (slightly higher than in 2012 when Class III vans made 77% of sales), which explains why vans sold in Germany were on average 1,953 kg in 2020 (4% above the EU average).

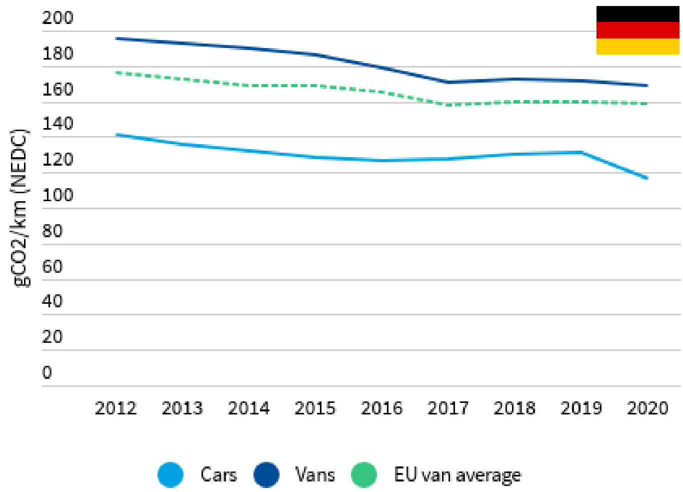


Source: T&E analysis, 2012-2019 data from the EEA monitoring of CO2 emissions from vans, 2020 preliminary data from Dataforce.

Figure 32: Van sales evolution in Germany

Looking at emissions, this high average mass explains why emissions from new vans are so high: 168.9 gCO_2/km (NEDC) in 2020, or 6% above the EU average or 15% above the official 2020 EU target of 147

gCO_2/km. Nevertheless, new vans in Germany were slightly less emitting with a 2% reduction between 2019 and 2020 (Figure 33), while car emissions decreased by 12% over the same period.

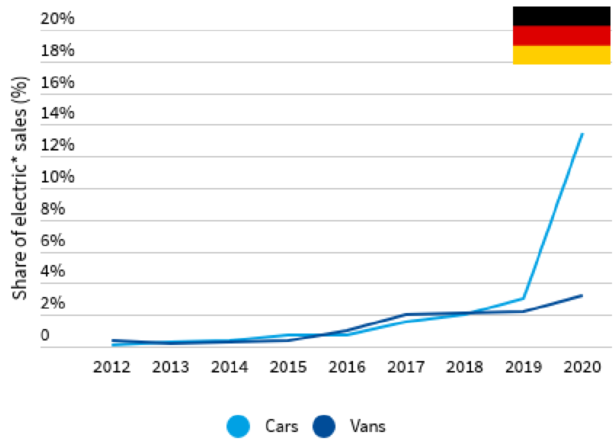


Source: T&E analysis, 2012-2019 data from the EEA monitoring of emissions from cars and vans, 2020 preliminary data from Dataforce

Figure 33: Emissions of new vans sold in Germany

In 2020, Daimler, Volkswagen and Ford were leading the van market with 25%, 18% and 17% sales shares respectively. These van makers sell mainly heavy vans and with the Ford-Volkswagen pool not being compliant according to 2020 preliminary data (see Section 1.3), this explains why new vans sold in Germany are high emitting (see Section 1.2) and lagging behind best performing countries.

Battery electric van sales represented 3.1% of all van sales in 2020, making Germany the 3rd e-van market in terms of percentage sales, after Norway (9%) and Sweden (6%). Taking the 8,000 e-vans sold in 2020, 4,500 have been sold by traditional van makers and 3,500 sold by StreetScooter, a firm owned by DHL to compensate for the lack of e-van supply from other main manufacturers (see Infobox in Section 2.2). However, while e-cars jumped from 3% to 13.5% between 2019 and 2020, e-vans only increased from 2.2% to 3.2% over the same period in Germany (Figure 34).

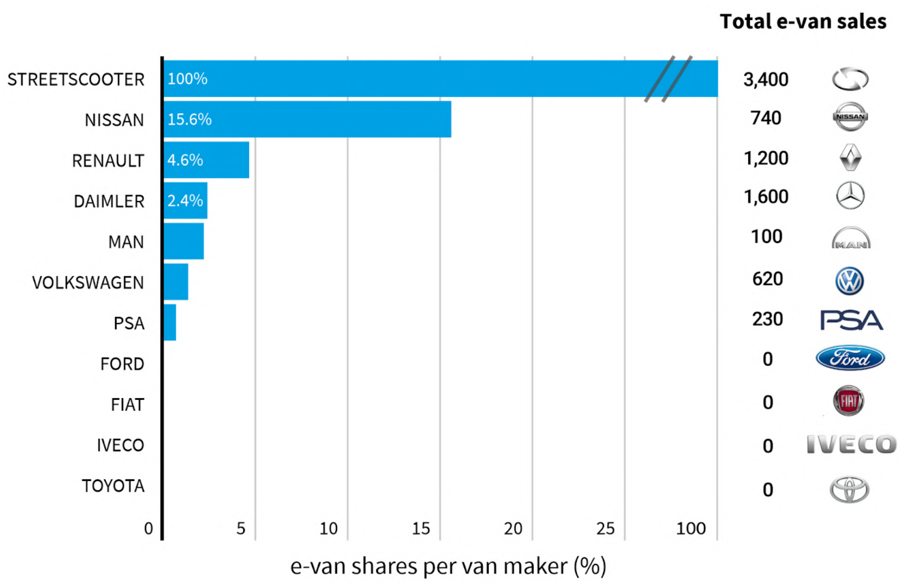


Source: T&E analysis, 2012-2019 data from the EEA monitoring of emissions from cars and vans, 2020 preliminary data from Dataforce

*electric sales include both battery electric and plug-in hybrid sales

Figure 34: E-vans vs e-cars in Germany

As shown in Figure 35, among the main OEMs, Daimler led with about 1,600 e-vans sold, followed by Renault with 1,200 vehicles sold. While the two main German van makers, Daimler and Volkswagen, sold 69,000 and 49,000 vans in 2020 respectively, their e-van sales only reached 1,600 and 620 vehicles.



Source: T&E analysis, data from Dataforce

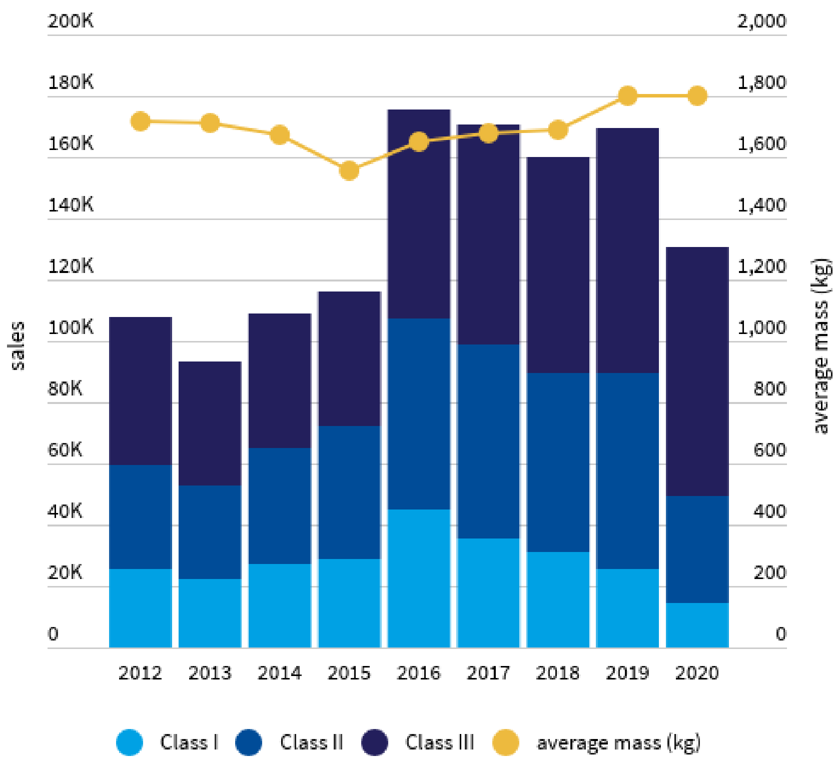
Figure 35: 2020 battery electric van sales in Germany

6.4.3. Italy

With 4.1 million vehicles in its van fleet, Italy has the 4th largest fleet in Europe. Vans accounted for 11% of Italy's road transport emissions with 10.5 $MtCO_2$ emitted in 2019, making vans the second largest emissions increase in road transport with +10% CO_2 emitted between 1990 and 2019 (after cars which emissions increased by 19% over the same period).

While van sales increased by 58% between 2012 and 2019, sales decreased by 21% between 2019 and 2020 following the COVID-19 crisis (compared to the 15% observed on average across the EU and UK).

In Italy, heavy Class III vans represented 60% of all van sales in 2020, compared to 36% in 2015 and 47% in 2019. As shown in Figure 36, this explains the significant weight increase from 1,554 kg in 2015 to 1,801 kg in 2020 (+16%).

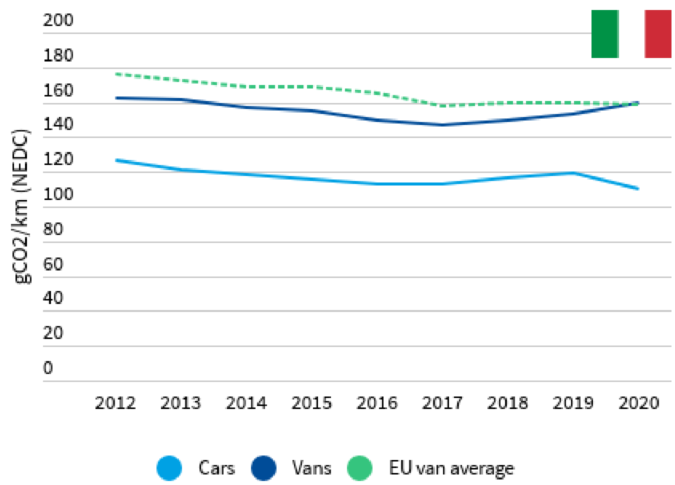


Source: T&E analysis, data from the EEA monitoring of CO2 emissions from vans

Figure 36: Van sales evolution in Italy

Looking at emissions, this significant mass increase over the past few years resulted in more emissions from new vans sold in Italy. From 147 gCO_2/km (NEDC) in 2017, emissions increased to 152.3 gCO_2/km

in 2019 and even 160 gCO_2/km in 2020 as preliminary data suggest (Figure 37), while car emissions decreased by 8%. This is 1% above the EU average or 9% above the official 2020 EU target of 147 gCO_2/km.

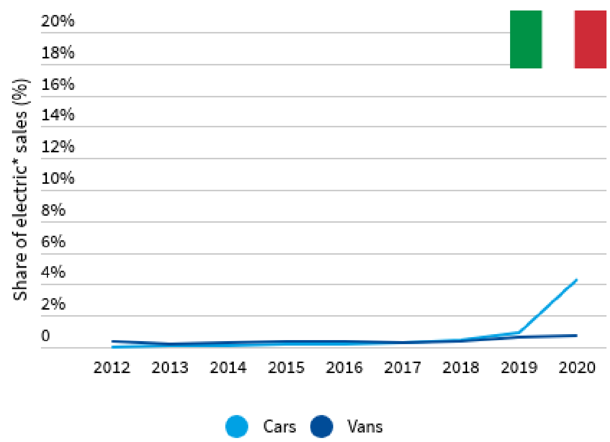


Source: T&E analysis, 2012-2019 data from the EEA monitoring of emissions from cars and vans, 2020 preliminary data from Dataforce

Figure 37: Emissions of new vans sold in Italy

On the van maker side, Fiat led the market in 2020 with about 29% of all van sales, followed by PSA (19%) and Ford (15%). The Italian van maker has seen its emissions increasing in 2020 compared to 2019 (from 157 gCO_2/km in 2019 to 162 gCO_2/km, see Section 1.3), this explains why van emissions kept increasing overall in Italy.

Battery electric vans only reached 0.7% of all van sales, far below the EU average of 2%. While e-car sales rose from 0.9% to 4.3% between 2019 and 2020, e-van sales increased from 0.4% to 0.6% over the same period.

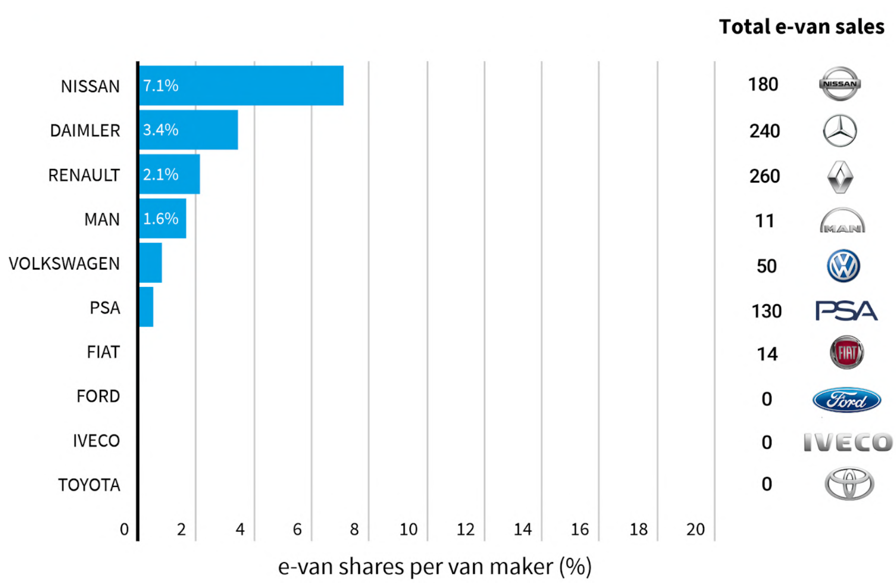


Source: T&E analysis, 2012-2019 data from the EEA monitoring of emissions from cars and vans, 2020 preliminary data from Dataforce

*electric sales include both battery electric and plug-in hybrid sales

Figure 38: E-vans vs e-cars in Italy

Over the 980 e-van sales, Renault and Daimler led with only 260 and 240 vehicles sold respectively. On the other hand, the Italian van maker, Fiat, sold almost 40,000 vans but only 14 e-vans, as seen in Figure 39 below.



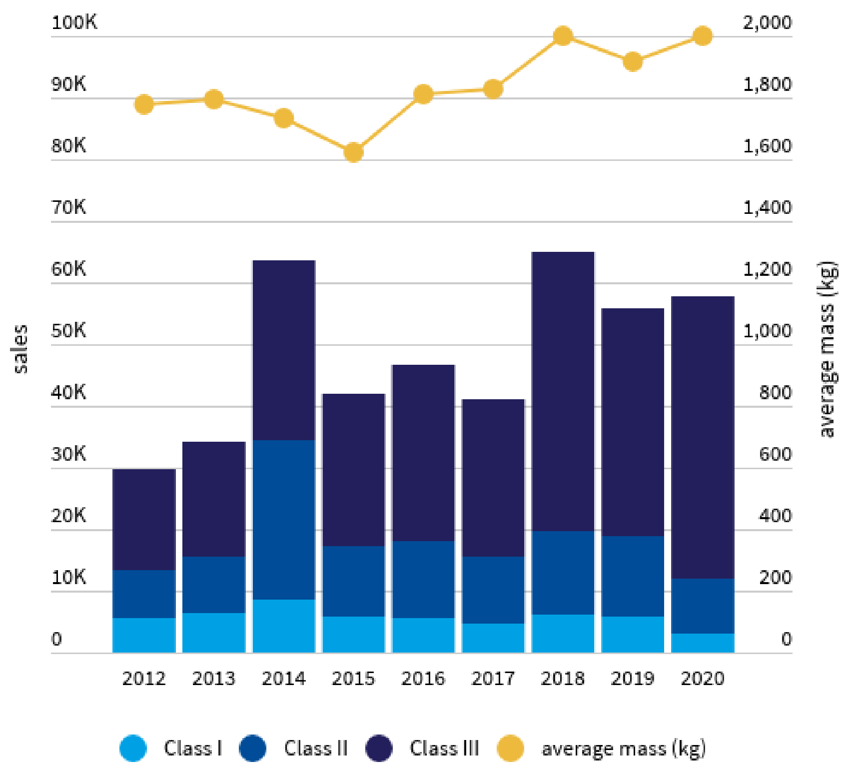
Source: T&E analysis, data from Dataforce

Figure 39: 2020 battery electric van sales in Italy

6.4.4. Poland

With 2.6 million vehicles in its van fleet, Poland emitted 8.5 MtC_2 in 2019, 13% of its road transport emissions. Polish van emissions almost doubled between 1990 and 2019 with a 95% increase.

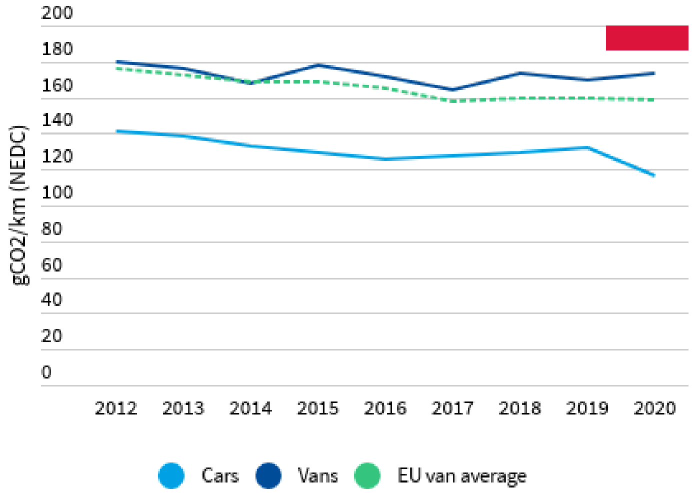
As shown in Figure 40, van sales increased by 88% over the past decade (between 2012 and 2019) and even kept increasing during the COVID-19 pandemic with 4% more sales between 2020 and 2019. Looking at the class distribution, Class III vans represented 80% of van sales in 2020, higher than in 2019 (66% of all sales), and than in 2012 (55% of all sales), which explains why vans sold in Poland have been increasing by 8% between 2012 and 2019 (from 1,778 kg to 1,918 kg) and even by 4% between 2019 and 2020 (from 1,918 kg to 1,997 kg).



Source: T&E analysis, data from the EEA monitoring of CO2 emissions from vans

Figure 40: Van sales evolution in Poland

Emissions from new vans sold in Poland have only been decreasing by 10 gCO_2/km (NEDC) between 2012 and 2019 (vs -17 gCO_2/km in Europe in average). After having reached 164 gCO_2/km in 2017, emissions increased again, following the mass increase trend, and reached 169.8 gCO_2/km in 2019 and even 173.6 gCO_2/km in 2020 according to preliminary data (+2% between 2019 and 2020). As shown in Figure 41, this is 9% above the current EU average and 18% above the official EU target of 147 gCO_2/km (NEDC) in 2020.

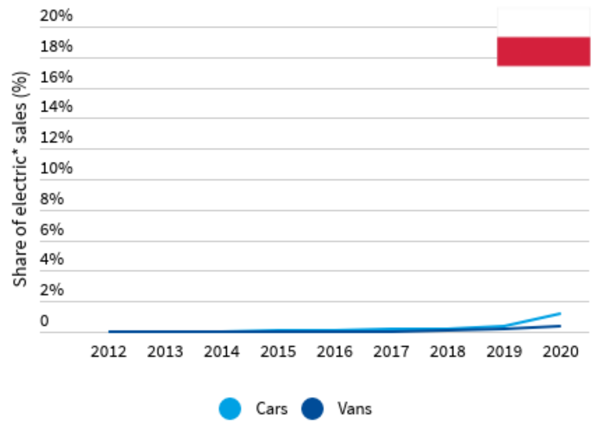


Source: T&E analysis, 2012-2019 data from the EEA monitoring of emissions from cars and vans, 2020 preliminary data from Dataforce

Figure 41: Emissions of new vans sold in Poland

In 2020, Renault and PSA led the van market with 18% and 17% of sales respectively, followed by Fiat and Ford with 13.8% and 13.6% sales.

Battery electric van sales represented 0.4% of all van sales in 2020, far below the European average of 2%. Comparing vans and cars, e-cars stepped up from 0.4% in 2019 to 1.2% in 2020, while e-vans only increased from 0.2% to 0.4% (Figure 42).

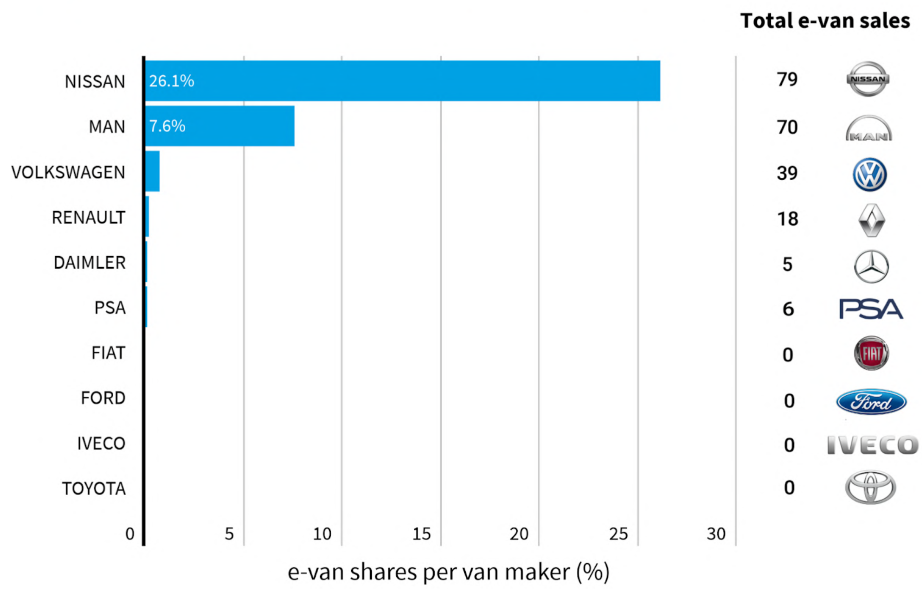


Source: T&E analysis, 2012-2019 data from the EEA monitoring of emissions from cars and vans, 2020 preliminary data from Dataforce

*electric sales include both battery electric and plug-in hybrid sales

Figure 42: E-vans vs e-cars in Poland

For the 200 e-vans sold in 2020 in Poland, Nissan and MAN led with about 79 and 70 e-vans sold. While Renault and PSA sold more than 10,000 vans each in 2020, they only sold 18 and 5 e-vans respectively (Figure 43).



Source: T&E analysis, data from Dataforce

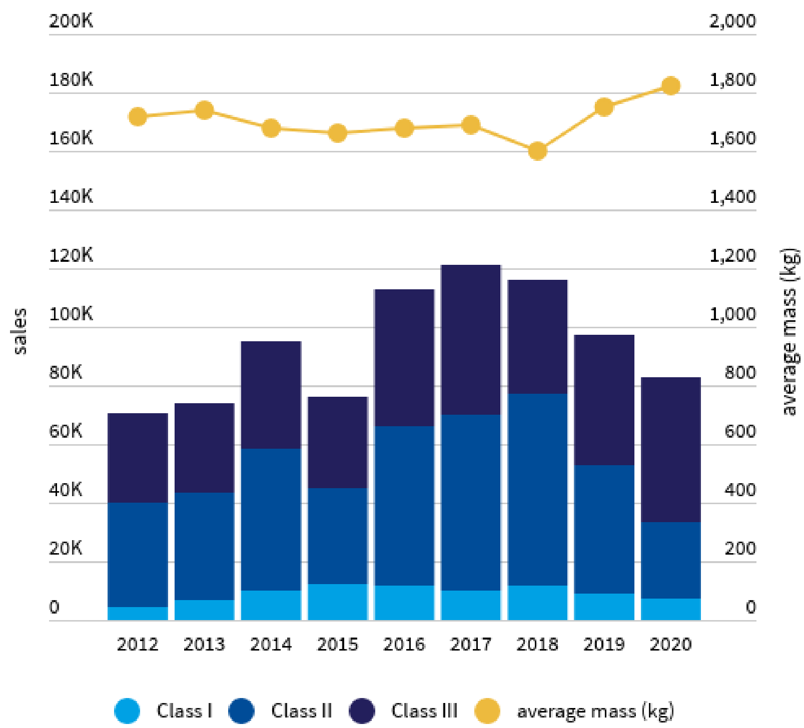
Figure 43: 2020 battery electric van sales in Poland

6.4.5. Spain

With more than 4.6 million vehicles in its van fleet, Spain has the second largest fleet in Europe. Vans accounted for 6% of Spain's road transport emissions (vs 13% in average in the EU) with 5.2 $MtCO_2$ emitted in 2019. These vehicles saw their emissions increase by 46% emitted between 1990 and 2019 (compared to a 73% increase in cars emissions over the same period).

While van sales increased by 36% between 2012 and 2019, sales decreased by 14% between 2019 and 2020 following the COVID-19 crisis, quite close to the average trend in Europe (-15% van sales between 2019 and 2020, see Section 1).

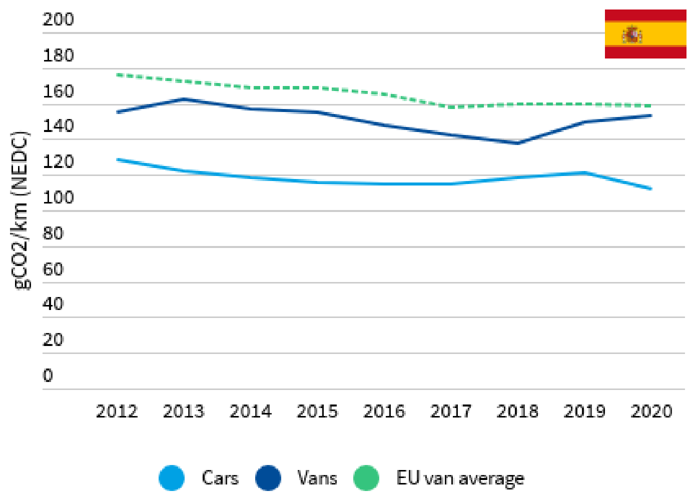
From 2012 to 2019, Spanish vans appeared to be lighter than the EU average, with only 46% of its sales being Class III in 2019 (compared to 69% in the EU). However, between 2019 and 2020, Class III sales increased by 10%, reaching 59% of all van sales. Therefore, the average mass increased from 1,660 kg in 2015 to 1,748 kg in 2019 and 1,823 kg in 2020 (Figure 44).



Source: T&E analysis, data from the EEA monitoring of CO2 emissions from vans

Figure 44: Van sales evolution in Spain

Looking at emissions, this significant mass increase over the past few years resulted in more emissions from new vans sold in Spain. From 138 gCO_2/km (NEDC) in 2018, emissions increased to 149 gCO_2/km in 2019 and even 153 gCO_2/km in 2020 as preliminary data suggest (Figure 45), while new car emissions decreased by 8%. This is 3% below the EU average but 4% above the official 2020 EU target of 147 gCO_2/km.

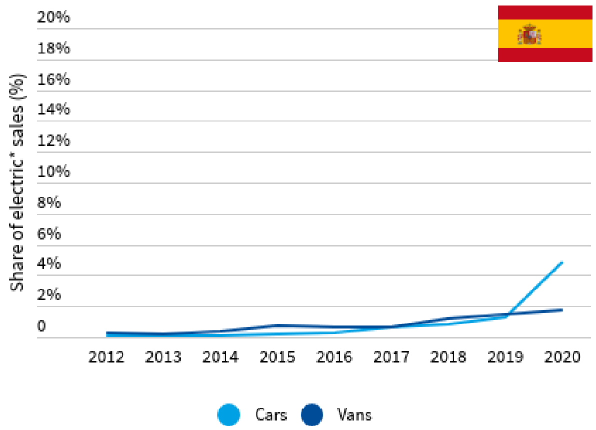


Source: T&E analysis, 2012-2019 data from the EEA monitoring of emissions from cars and vans, 2020 preliminary data from Dataforce

Figure 45: Emissions of new vans sold in Spain

In 2020, PSA, Renault and Ford led the van market with 27%, 19% and 16% of sales shares respectively. From 38% and 35% sales shares respectively in 2019, Renault and PSA lost van shares to van makers such as Ford, Daimler or Volkswagen selling heavier and more emitting vans, which explains why emissions from new vans increased significantly over the past few years in Spain.

Battery electric van sales represented 1.7% of all van sales in 2020, just below the European average of 2%. While e-cars jumped from 1.3% to 4.9% between 2019 and 2020, e-vans only increased from 1.5% to 1.7% over the same period (Figure 36).

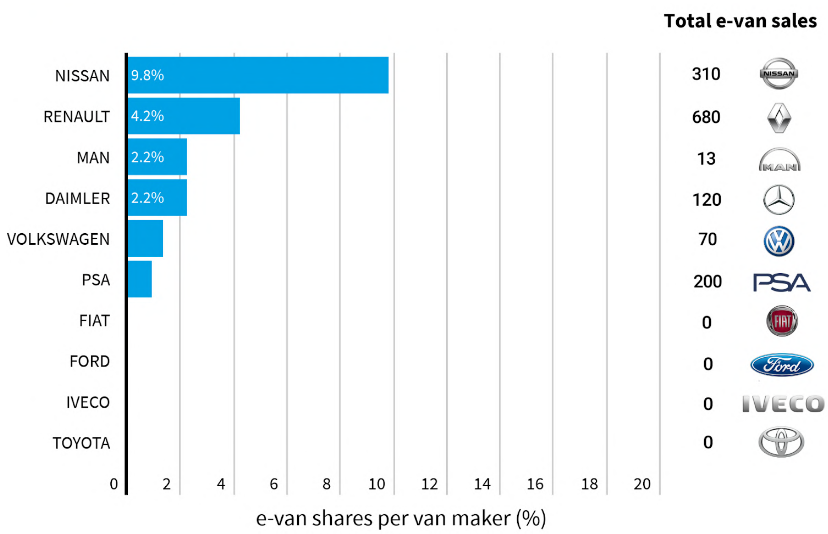


Source: T&E analysis, 2012-2019 data from the EEA monitoring of emissions from cars and vans, 2020 preliminary data from Dataforce

*electric sales include both battery electric and plug-in hybrid sales

Figure 46: E-vans vs e-cars in Spain

As shown in Figure 47, among the main OEMs, Renault led with about 700 e-vans sold, followed by Nissan and PSA. While Volkswagen only sold a few e-vans in 2020 in Spain, Ford, Iveco, Fiat and Toyota did not sell any e-vans at all the same year.



Source: T&E analysis, data from Dataforce

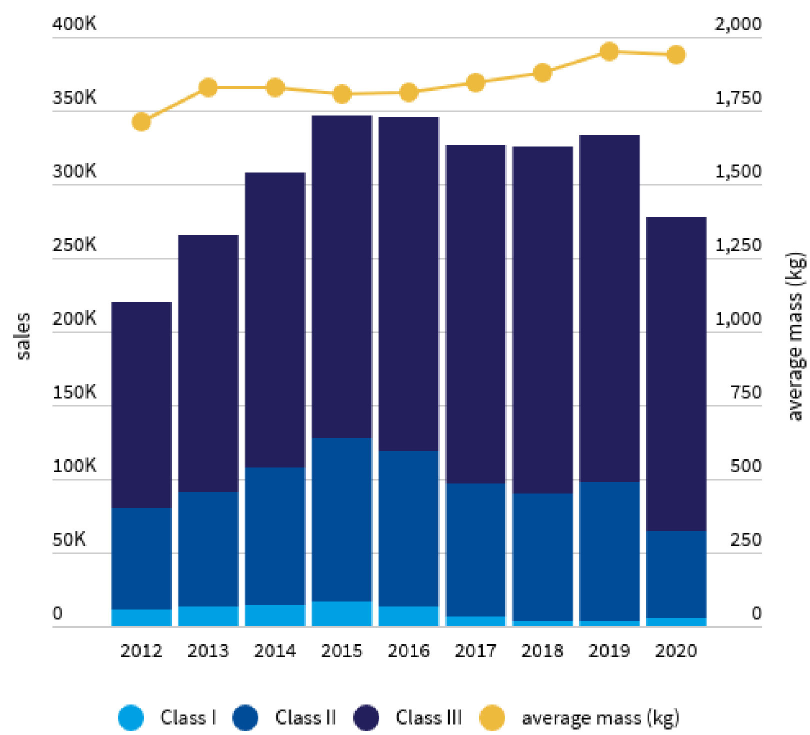
Figure 47: 2020 battery electric van sales in Spain

6.4.6. United Kingdom

With 4.4 million vehicles in its van fleet, the United Kingdom has the 3rd largest fleet in Europe. Vans accounted for 17% of the UK's road transport emissions with 25.1 MtCO_2 emitted in 2019, making vans the largest emissions increase in road transports with +61% CO_2 emitted between 1990 and 2019.

While van sales increased by 43% between 2012 and 2019, sales decreased by 16% between 2019 and 2020 following the COVID-19 crisis.

In the UK, heavy Class III vans represented 77% of all van sales in 2020, compared to 60% in 2012. As shown in Figure 48, this explains the significant weight increase from 1,714 kg in 2012 to 1,938 kg in 2020 (+13%), 3% above the EU average.

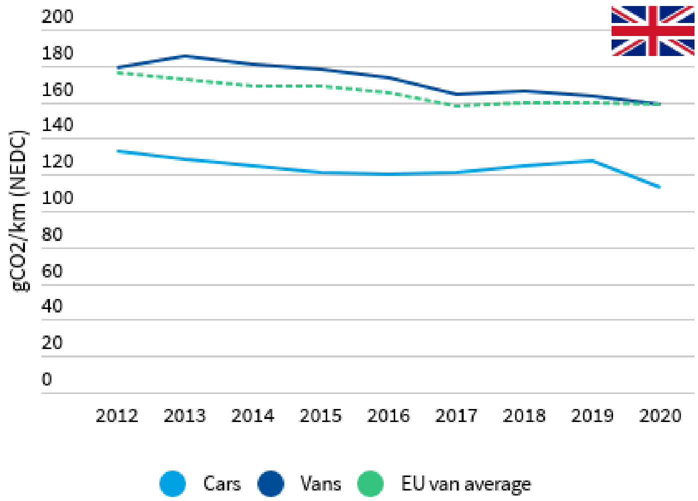


Source: T&E analysis, 2012-2019 data from the EEA monitoring of CO2 emissions from vans, 2020 preliminary data from Dataforce.

Figure 48: Van sales evolution in the United Kingdom

Looking at emissions, with 158.4 gCO_2/km (NEDC) vans sold in the United Kingdom were for the first time below the Europe average in 2020 (0.3% below). As shown in Figure 49, according to 2020 preliminary data, emissions from new vans sold in the United Kingdom decreased by 3% between

2019 and 2020 (compared to -0.3% EU wide), while new car emissions decreased by 12%. Nevertheless, vans were still 8% above the official EU target of 147 gCO_2/km (NEDC) in 2020.

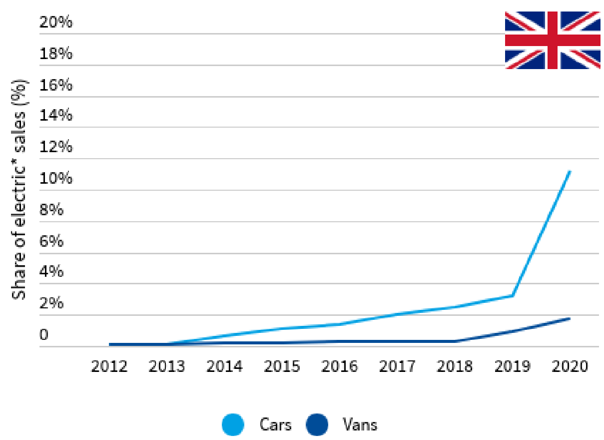


Source: T&E analysis, 2012-2019 data from the EEA monitoring of emissions from cars and vans, 2020 preliminary data from Dataforce

Figure 49: Emissions of new vans sold in the United Kingdom

On the van maker side, Ford led the market with 34% of van sales in 2020, followed by PSA with 28% and to a smaller extent Daimler with 11%.

In total, e-vans reached 1.7% of vans sold in the UK, below the 2% EU average. While electric car sales soared from 3.2% to 11.2% between 2019 and 2020, e-van sales only increased from 0.9% to 1.7% over the same period (Figure 50).

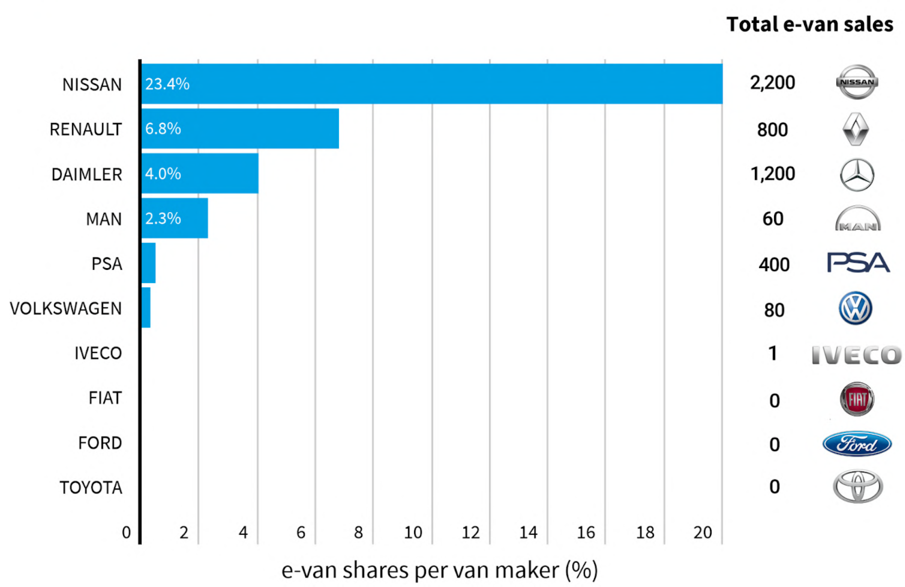


Source: T&E analysis, 2012-2019 data from the EEA monitoring of emissions from cars and vans, 2020 preliminary data from Dataforce

*electric sales include both battery electric and plug-in hybrid sales

Figure 50: E-vans vs e-cars in the United Kingdom

Finally, Nissan and Daimler were the only van makers selling more than 1,000 battery electric vans, with 2,200 and 1,200 e-van sales respectively in 2020. While Ford and PSA sold 95,000 and 78,000 vans in 2020 respectively, Ford did not sell any e-vans at all and PSA only sold about 400 electric vehicles, as shown in Figure 51.



Source: T&E analysis, data from Dataforce

Figure 51: 2020 battery electric van sales in the United Kingdom

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