

**Can electric cars beat
the COVID crunch?**



Can electric cars beat the COVID crunch?

The EU electric car market and the impact of the COVID-19 crisis

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Editeur responsable: William Todts, Executive Director

Further information

Saul Lopez
Electric Mobility Manager
Transport & Environment
saul.lopez@transportenvironment.org
Mobile: +33(0)663757227

Square de Meeûs, 18 – 2nd floor | B-1050 | Brussels | Belgium www.transportenvironment.org |
@transenv | fb: Transport & Environment

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Executive Summary

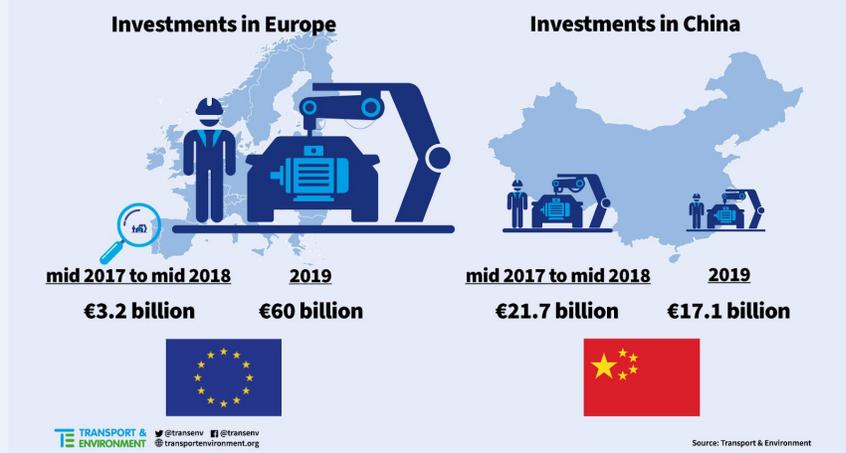
With societies months-long in confinements and factories shut, the COVID-19 pandemic has gravely impacted economies across Europe and beyond. 2020 was touted the year of the electric car in Europe and early 2020 showed record plug-in sales. But has the COVID-19 crisis killed off the electric car momentum that was finally gaining pace in response to EU emissions regulations?

The EU 2020/21 car CO₂ target of 95 gCO₂ /km was agreed more than a decade ago, and reconfirmed again in 2014. But that didn't stop EU carmakers leaving investments to comply until the last minute as they did little to prepare before 2019. Instead, as T&E calculated in 2018, they invested in China, where the aggressive electric car policy allowed the Chinese to secure seven times more investments than the EU (€21.7 billion vs €3.2 billion) over the period 2017-2018.

But with the EU 2020 regulation on emissions looming, EU carmakers eventually started investing in 2019, together with other private companies and EU Member States, to build EVs and produce batteries in Europe. T&E has analysed these investments from key OEMs and joint consortia: in 2019, **thanks to the EU car CO₂ regulations, Europe has received 19 times more investments than in 2017/2018, and 3.5 times more than China. With €60 billion invested to produce EVs in Europe, 2020 and 2021 are set to be a tipping point.**

E-mobility investments by EU carmakers and others in Europe are 3.5 times higher than in China

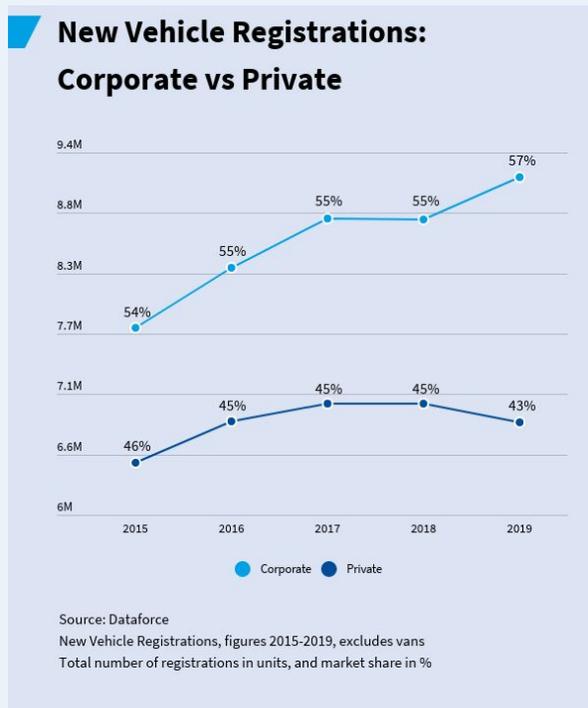
Europe is closing the investment gap with China compared to 2017/18



The investments targeted mainly 8 countries, with **Germany getting the biggest chunk, €40 billion** coming mainly from the **Volkswagen** Group, but also thanks to the investment made by **Tesla** near Berlin. Second to Germany comes the **Czech Republic: €6.6 billion** thanks to the massive investment made by the **Volkswagen** Group.

As carmakers have to meet the EU CO2 targets, the sales of electric cars are booming in Europe, rising 80% in the last quarter of 2019, and reaching a market share of 4.4% in that fourth quarter alone. While the overall automotive market fell 25.6% during the first quarter of 2020, the electric car momentum continued with record sales of electric cars. In March France reached 12% market share for EVs, four times more than the same month last year, Germany hit 9.2% and the UK 7.3%. This proves that **electric cars investments and EV production plans driven by the EU CO₂ standards were starting to pay off**.

Then came the COVID-19 crisis. It confined people at home all across Europe, disrupted supply chains, and forced temporary factory closures, impacting production and jobs. The **production of EVs in particular is likely to suffer less than that of conventional vehicles**, as most carmakers planned a ramp-up in EV production in the second half of 2020, with many new EV models starting production only after July. Now that **recovery measures** are deployed across Europe, these should ensure carmakers **prioritise EV manufacturing**, i.e. giving loan guarantees and liquidity support aiming at zero emission technologies.



Because the EU CO2 standards are sales averaged, **the number of cars sold will not impact the compliance with the car CO₂ standards**, and the declining sales volumes overall will need less EVs to achieve the targets. But who will buy electric cars after the COVID-19 crisis in a receding economy?

The **majority of new cars today (57% in 2019) are bought through the corporate channel**, i.e. by leasing companies for corporate fleets at large and small companies, or company cars. Those registrations added over 9 million vehicles in 2019, in contrast with a private sales level well below 7 million cars, a market likely to take a larger hit in the coming recession. Crucially, twice more electric cars were registered via the corporate channel than in the private segment in 2018. Since companies have a Total Cost of Ownership (TCO) focus when

buying vehicles, and most countries provide generous fiscal regimes for companies who purchase

EVs, **the main driver for EV demand in Europe during the post-COVID-19 crisis is very likely to be the corporate channel.** The emerging evidence from France confirms this - corporate sales are falling twice slower than the private ones. It is therefore important to **ensure that companies - big and small - are supported to continue to lease electric cars.**

After the health crisis the focus has to move to saving economies. Governments are already announcing large recovery programmes. This public investment should mirror our longer term climate goals and ensure green recovery. **It is of utmost importance to direct economic recovery efforts at renewable energy, zero emissions transport and related infrastructure.** Notably, the current electric car momentum should continue with the help of smart recovery measures, which would also help the car industry meet the CO₂ targets.

T&E calls on the European Commission and national governments to do the following:

- The **2020-2021 target of 95g/km should not be reopened for discussion or weakened**, as what matters is not the amount of cars sold, but their type and emissions per km.
- The European Commission should review the 2030 Car CO₂ standards as planned in June 2021, accelerating the transition to zero emission cars so that **only zero emission models are allowed to be sold across Europe from 2035 at the latest.**
- Scrappage schemes popping up across Europe to boost demand for cars and help industry recover must target zero emission vehicles and should support businesses & individuals to **exchange old cars for new zero CO₂ models or electric shared fleets.**
- Providing attractive incentives for company fleets, notably **zero rate loans to lease EVs alongside bonus malus style benefit in kind reforms and VAT deductibility**, should be continued and augmented to help struggling companies and continue the switch to the EV fleet.
- Support should also be provided to **individuals and companies to install charging infrastructure**, with focus on multi-apartment buildings, offices and commercial property.

Who killed the electric car? is a documentary that explores the roles and motives that may have pushed the carmakers, the oil and gas industry and the US federal government to kill off the electric car in the US in the 90s. *Can electric cars beat the COVID crunch?* tells how to never waste a good crisis: before COVID-19, electric car sales were booming in Europe, showing EU car CO₂ standards work. Let us not waste the opportunity to use public investments to step in to **keep shaping the future automotive industry in Europe and build a zero emissions transport system**, instead of supporting a business as usual scenario with an obsolete model with soon-to-be-stranded assets. Let us not allow coronavirus to kill the electric car.

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Abbreviations

EV	Electric Vehicle (<i>In this report, this stands for vehicles propelled by an electric motor: battery electric vehicles, fuel cell electric vehicles and plug-in hybrid electric vehicles</i>)
BEV	Battery Electric Vehicle
FCEV	Fuel Cell Electric Vehicle
ZEV	Zero-Emissions Vehicle: BEV and FCEV
PHEV	Plug-in Hybrid Electric Vehicle
ZLEV	Zero and Low Emission Vehicles (Defined in Regulation EU 2019/631 as a passenger car or a van with CO ₂ emissions between 0 and 50 g/km)
HEV	Mild and Full Hybrids
ICE	Internal Combustion Engine
SUV	Sports Utility Vehicle
LIB	Lithium-Ion Battery
GHG	GreenHouse Gas
EU	European Union (including the UK)
EU-27	EU member states (UK not included)
TCO	Total Cost of Ownership
COVID-19	Infectious respiratory disease also known as COronaVirus Disease, caused by a novel coronavirus, the SARS-CoV-2

1. Introduction

This report analyses the electric vehicle (EV) market in Europe from the perspectives of production and demand, and explores the potential consequences of the COVID-19 pandemic for the electric car market. As it was being prepared, all carmakers announced factory closures in Europe and several other facilities in the world. Since the looming recession caused by the COVID-19 health crisis is a rapidly evolving scenario, the analysis made in this report should be understood in the context and time where it has been performed, i.e. the end of the first quarter of 2020.

The report first goes through carmakers' public announcements made in 2019 to update the electric car investments in Europe, and focuses on the overall EV financing flows in the EU compared to China and the US. It compares 2018 data to the latest available figures. A direct relation between EU car CO₂ regulations and investment flows can be shown.

It then moves on to assessing the impact of these investments in the scheduled production of EVs in Europe, with a particular focus on the years 2020 and 2021. As COVID-19 clearly impacts production in the automotive industry worldwide at the end of the first quarter in 2020, this report then performs an analysis of the pandemic impact on EV production in Europe.

The European EV market analysis is then completed by an assessment of the electric car demand, both in the pre-COVID-19 and post-COVID-19 situation, by focusing on developments at the corporate vs private registrations level to attempt a forecast of EV market demand. It specifically addresses the topic of public investments aimed at EVs in a recovery stimulus scenario.

This paper does not try to predict the future, but it tries to understand possible scenarios where the European EV market can evolve in the medium-term future based on the carmakers' production plans known to date, and the COVID-19 crisis impacting demand. The purpose of this report is to show that despite the COVID-19 crisis and a potential recession, electric car momentum can continue in Europe if smart recovery measures are put in place.

2. Carmakers substantially increased investments in Europe in the wake of EU CO₂ regulations

2.1 Profiteering from SUVs until 2019 (and beyond?)

The target of 95 gCO₂/km for 2020/21 was agreed more than a decade ago, and reconfirmed in 2014 with a revision of the rules that introduced a phase-in of the target over 2 years, with 95% of the cars having to meet the standard in 2020, and all cars in 2021. The regulation contains numerous flexibilities that are intended to maintain fair competition between carmakers, and allow different compliance approaches such as selling small and lower CO₂ conventional models, or traditional hybrids like the **Toyota** Prius, or plug-in cars capable of driving in zero emissions mode. These flexibilities lead to different compliance strategies that enable carmakers options to combine sales of various types of vehicles, together with all-electric cars, to reach the emissions target.

But even if carmakers knew the target since 2009 and had an extra confirmation since 2014, they did little to prepare in the years prior to the 95g standard entering force. Instead, investments into electric technologies were flowing mainly to China until at least 2018¹, based on carmakers' own announcements. This was driven by China's aggressive electric vehicle policy, as it required every carmaker to produce a minimum share of EVs. China secured seven times more investments than the EU over the period 2017-2018 thanks to this EV policy.

Meanwhile, in Europe the market share of SUVs rocketed up to over a third of new car sales, reaching 38% in 2019², adding bigger and heavier cars to the fleet and driving CO₂ emissions up. Carmakers have been taking advantage of the profitable SUV market until the very last minute before the CO₂ regulations kicked in, and by doing so they allowed GHG emissions from cars to rise continuously since 2016, reaching 120.4 gCO₂/km in 2018³, well above the target that was set more than a decade

¹ T&E, Transport & Environment (2018). EU playing catch-up: China leading the race for electric car investments. Retrieved from

https://www.transportenvironment.org/sites/te/files/EV%20investments%20paper%20FINAL_210618.pdf

² JATO Dynamics (2019). Press Release. CO₂ emissions rise to highest average since 2014, as the shift to diesel from gasoline continues. Retrieved from

<https://www.jato.com/wp-content/uploads/2019/03/CO2-Europe-2018-Release-Final.pdf>

³ European Environment Agency (2019). Average CO₂ emissions from new cars and new vans increased in 2018. Retrieved from <https://www.eea.europa.eu/highlights/average-co2-emissions-from-new>

ago. The latest available data⁴ is even worse, as it indicates that 2019 also saw a rise in emissions, to the tune of 121.8 gCO₂/km.

But as the CO₂ target (together with potential fines and reputational damage) was looming, things changed drastically. Towards the end of 2018 substantial investments by carmakers started flowing into Europe to build the necessary manufacturing facilities, from battery production to vehicle assembly plants.

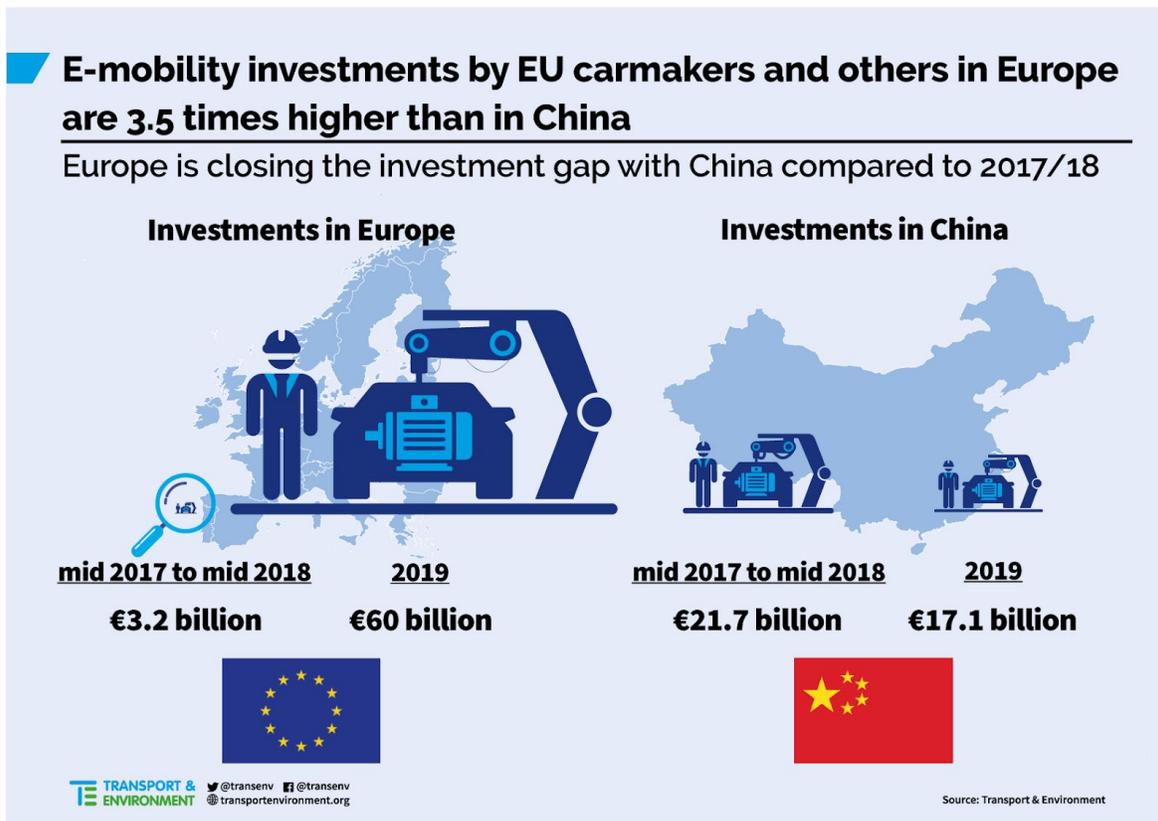


Figure 1: EU investments in e-mobility are 3.5 times higher than China

⁴ JATO Dynamics (2020). Press Release. New car CO₂ emissions hit the highest average in Europe since 2014. Retrieved from <https://www.jato.com/wp-content/uploads/2020/03/CO2-Europe-2019-Release-Final.pdf>

2.2. Europe finally gets electric car investments, up to €60 billion in total

In a report⁵ from June 2018, T&E analysed carmakers' public announcements into electric vehicle manufacturing over a period of 12 months prior to publication. The investment figures showed that China had secured EUR 21.7 billion of investments to produce electric vehicles, while the EU had only secured EUR 3.2 billion, seven times less.

This report has now performed a similar analysis to update investment figures through desk research, tracking carmakers' announcements over a period of 12 months, from January to December 2019, and has completed the analysis with additional EV related investments (i.e. battery manufacturing). All sourced details from company official announcements and surrounding news articles are provided in the annex at the end of this report.

A massive change in investments trend has been found: carmakers alone have invested up to EUR 47.7 billion to produce EVs in Europe, and that also triggered additional investments into European battery manufacturing, to the tune of EUR 12.2 billion. Electric car investments, including EV production and battery manufacturing, hence total EUR 60 billion, 19 times more than the investments found in our previous report.

China's share of investments, in turn, dropped considerably among European carmakers, with a total of EUR 17 billion. The investments in the USA by European carmakers were even lower: EUR 7.8 billion in 2019.

⁵ Transport & Environment (2018). EU playing catch-up: China leading the race for electric car investments. Retrieved from https://www.transportenvironment.org/sites/te/files/EV%20investments%20paper%20FINAL_210618.pdf

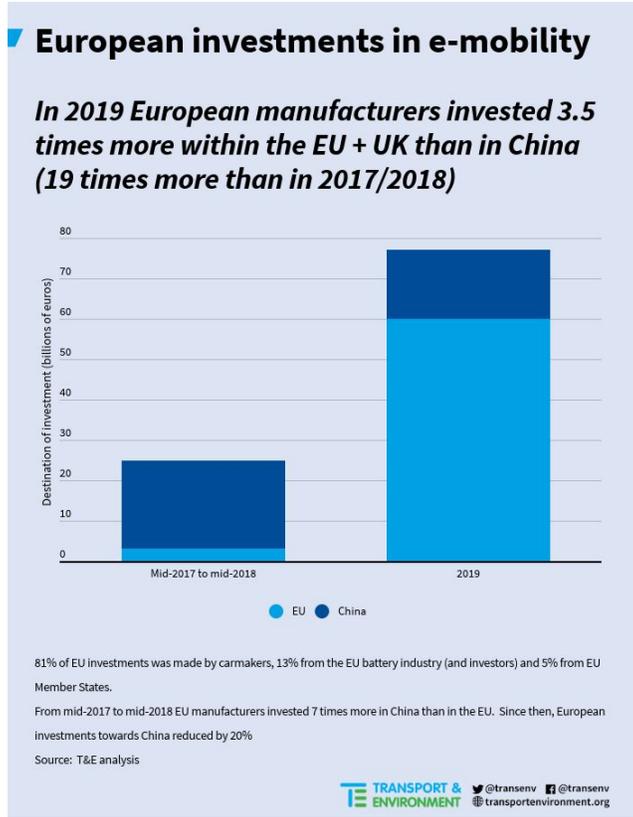


Figure 2: EU investments in e-mobility, 2019

In Europe, the investment champion in 2019 is the **Volkswagen Group** (which includes twelve brands from seven European countries, out of which eight are passenger car brands: **Volkswagen, Audi, Škoda, Seat**, and luxury brands such as **Porsche, Bentley, Lamborghini** and **Bugatti**), with a plan that includes EUR 60 billion in electric mobility, digitalization and electrification for the years 2020-2024, leading to the production of up to 75 all-electric models by 2029. **Volkswagen** scheduled those electric vehicles to be made in Germany in the group plants in Zwickau, Emden, Hannover, Zuffenhausen and Dresden, and also outside Germany in the plants the group has in Mlada Boleslav (Czech Republic), in Chattanooga (USA), and in Foshan and Anting (China). The Volkswagen Group has not disclosed the investment split per factory or per region, so this report assumes that the investment is evenly distributed between locations, thus bringing EUR 40 billion investment to Europe, and EUR 20 billion going to USA and China.

The FCA Group is also investing heavily in Europe, with **Fiat** dedicating over EUR 1.7 billion to factories in Italy for the production of plug-in hybrids and EVs such as the all-electric Panda (based on the Centoventi concept), and the electric version of the Fiat 500. **Jaguar Land Rover** invests substantially in the UK, with EUR 1.2 billion for electrified car production in the Castle Bromwich plant which includes the next generation all-electric Jaguar XJ.

Other carmakers also made electric car investments in Europe. The **BMW Group** (which includes not only **BMW** cars, but also **Mini** and **Rolls-Royce**) is investing EUR 400 million in its Dingolfing plant in Germany to produce the iNext, **Opel** invested EUR 250 million in the Spanish plant of Figueruelas for the production of a new platform designed for electric powertrains, and **Group PSA** invested EUR 82 million in France to create a joint venture with Punch Powertrain to produce electrified dual clutch transmission systems to be used in electric vehicles. **Hyundai and Kia** poured EUR 80 million in Rimac, the electric performance cars manufacturer from Croatia, for a technical partnership to collaborate on two high-performance electric vehicles by 2020, and **Ford** invested EUR 42 million in Spain for the production of PHEV models and batteries.

And last but not least, the e-mobility transition brings a crucial industrial opportunity for Europe to produce the batteries that will power the vehicles. The **Volkswagen Group** invested EUR 1 billion in battery cell activities: EUR 900 million in the **Northvolt** factory in Salzgitter, and EUR 100 million in the **Volkswagen** development center and pilot line. **CATL** announced an investment of EUR 1.8 billion in Germany to build its first battery production facility outside China, and **Tesla** is also currently starting construction work to build a factory near Berlin that will include all-electric car assembly lines and potentially also cell manufacturing, with an investment of EUR 4 billion.

This report acknowledges that there were additional investments in 2019, especially in charging infrastructure (like the **Ionity** project). But the plethora of investors, the diverse source of funds (equity financing, grants, loans, etc.) and the lack of details disclosed by stakeholders does not allow to compile them all in this report.

2.3. Carmakers are not the only ones investing in e-mobility in Europe

Investments are not exclusive to carmakers, as the powertrains of the electric cars need a key component: the battery. Currently global production of battery cells and packs mostly comes from Asia, but many projects have seen fit to build battery production capacity in Europe. Therefore, huge investments have been made.

Northvolt is one of the biggest projects, with a battery manufacturing facility in Sweden and EUR 1 billion raised in equity capital, where **Volkswagen** and **BMW** are amongst the biggest investors.

Saft also invested EUR 200 million within the European Battery Alliance initiative: **Saft** formed an alliance with European partners Siemens, Solvay and Manz to research, develop and build a new generation solid-state battery to compete with Asian and U.S. manufacturers.

Investments in battery manufacturing capacity did not come exclusively from the private sector, as **Germany** pledged EUR 1.25 billion and **France** announced that EUR 960 million would be invested in the production of battery cells for electric cars over the next five years.

The scope of this report is to count investments committed until the end of 2019, tracking announcements from January to December. But there have been more investments made beyond that period. In early 2020 several additional investment announcements were made, notably the **Automotive Cell Company**, a joint venture by **Total** and **PSA**, with the support of French, German, and EU authorities. This project has already received EUR 1.3 billion investments and is expected to receive up to EUR 5 billion in total by 2030⁶. The project will develop two EV battery manufacturing facilities, one in France in the Hauts-de-France region, and one in Germany (led by **Opel**, **PSA** and **Saft**) in Kaiserslautern, with a total capacity of 48 GWh, which represents up to one million batteries produced per year. However, projects like this fall outside the scope of this report, as they were announced in 2020.

⁶ Saft TOTAL (2020). Press Release. Retrieved from <https://www.saftbatteries.com/press-releases/launch-pilot-plant-manufacture-european-batteries-electric-vehicles>

To sum up, since the briefing⁷ T&E published in June 2018, electric car investments have soared by almost 20 times, from EUR 3.2 billion to EUR 60 billion. The impact of EU car CO₂ regulations cannot be overlooked as it explains the massive shift of investments from China to Europe in the last year and a half.

In that same briefing, T&E underlined that Europe was running the risk that by 2030 a quarter of the jobs in automotive manufacturing could be lost if electric vehicles were imported rather than manufactured in the EU, and reminded that more ambitious CO₂ limits and ZEV targets for cars and vans would bring more jobs to Europe, as several national and pan-European studies had shown. The effect of EU CO₂ standards on industry and jobs is finally coming to light, with Europeans catching up with global champions such as China. Crucially, investments today dictate where future jobs will be, so vehicle standards are a centerpiece of EU industrial policy.

2.4. Recap of investments in Europe, by country

The electric car investments done in 2019 did not spread evenly across the EU since the EUR 60 billion total investments went to mainly eight countries. **Germany** got the biggest chunk of investments with close to EUR 40 billion, thanks to the huge investments scheduled by **Volkswagen** in the Group plants in Zwickau, Emden, Hannover, Zuffenhausen and Dresden, but also thanks to the battery production investments made by **Tesla** near Berlin and those pledged by the German government within the European Battery Alliance initiative.

Second to Germany comes the **Czech Republic** with EUR 6.6 billion, again thanks to the massive investment the **Volkswagen Group** made in electric mobility, digitalization and hybridization for the years 2020-2024, and which is thought to be spread evenly across the group's nine plants, including the Czech factory in Mlada Boleslav. **Italy** secured EUR 1.75 billion in investments from **FCA**, while **France**, **Sweden** and the **UK** each got around EUR 1 billion. **Spain** received close to EUR 300 million from **Opel**, and **Croatia** got EUR 80 million from **Hyundai** and **Kia**.

⁷ Transport & Environment (2018). EU playing catch-up: China leading the race for electric car investments. Retrieved from https://www.transportenvironment.org/sites/te/files/EV%20investments%20paper%20FINAL_210618.pdf

E-mobility in Europe*: who invests where?

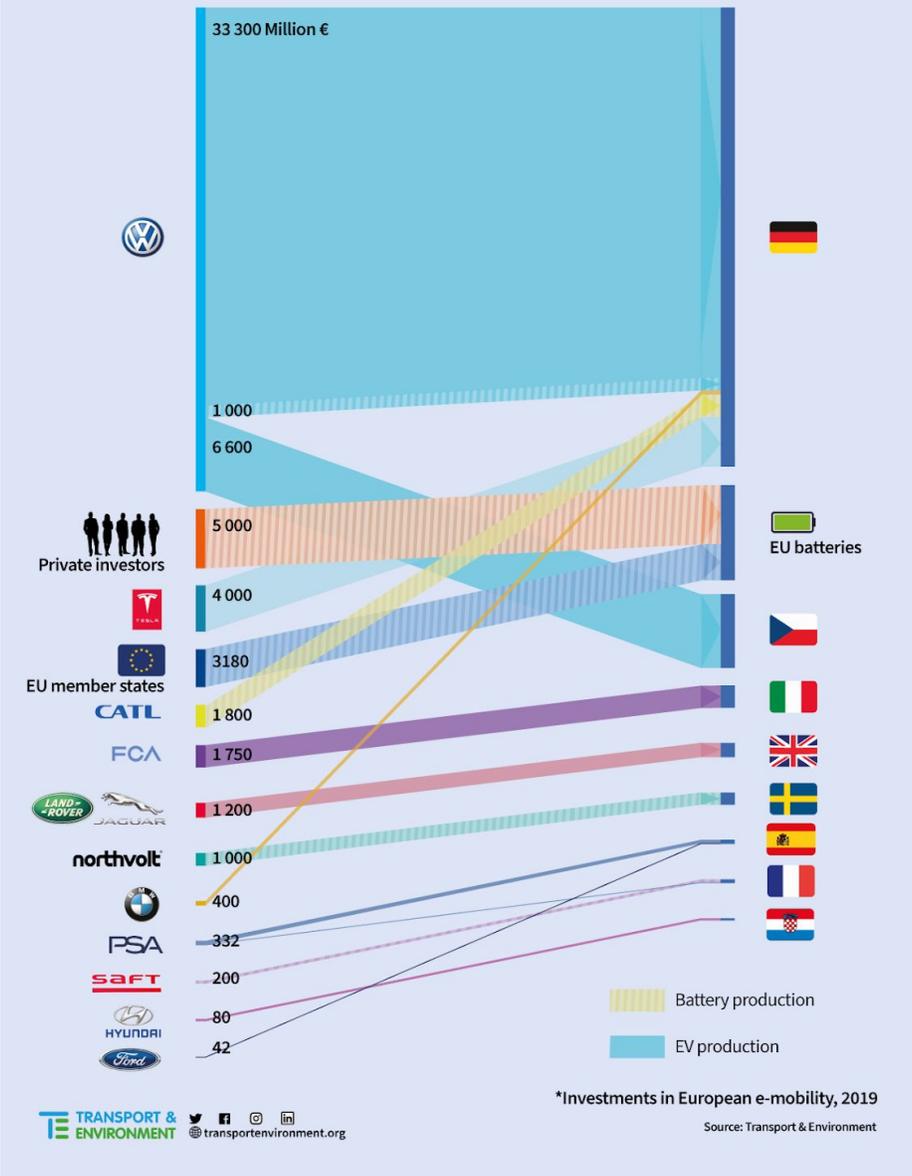


Figure 3: E-mobility in Europe: who invests where

Another example of investments involving multiple countries across Europe is the **European Battery Alliance**: the project is led by France, Germany, Belgium, Finland, Poland, Sweden and Italy. Government grants come to EUR 3.2 billion, and a further EUR 5 billion of private investment is expected⁸.

3. The impact of COVID-19 on European EV production

3.1. European EV production before COVID-19

With EUR 60 billion invested to produce electric vehicles in Europe, 2020 and 2021 were set to be a tipping point, as EV models were about to enter a new phase where they approached mass market levels.

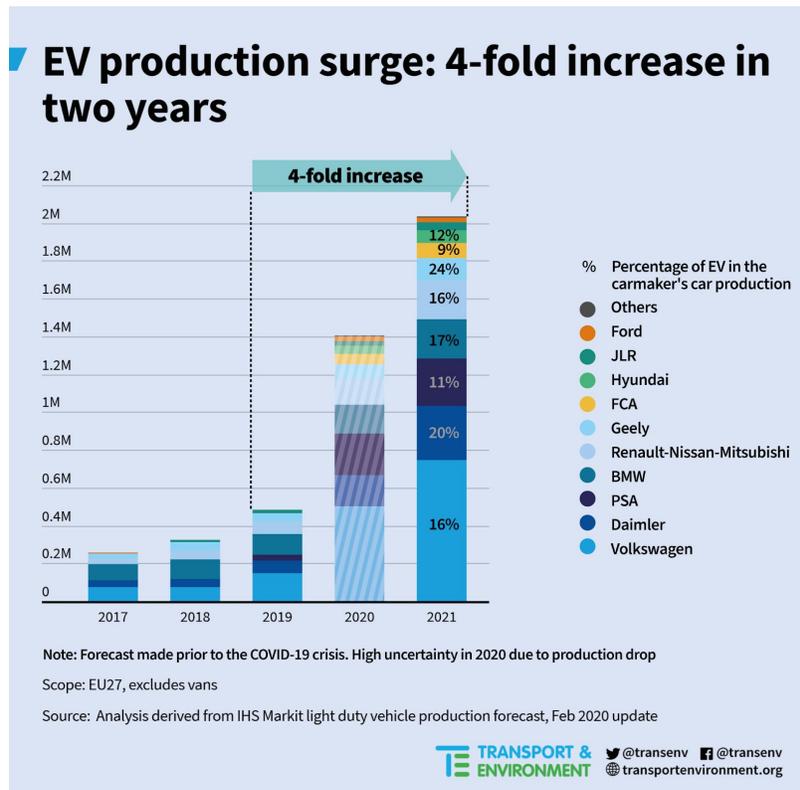


Figure 4: EV production in Europe, 2017-2021

⁸ European Commission (2019), Press Release. Retrieved from https://ec.europa.eu/commission/presscorner/detail/en/ip_19_6705

Thanks to massive investments, EV production in Europe is expected to experience more than a 4-fold increase in just two years (between 2019 and 2021), as figure 4 shows. According to IHS Markit data⁹ for EU27, the EU automotive industry has produced 485,000 electric cars in 2019, and a production of 1.4 million EVs was scheduled for 2020 (forecast made in February 2020, before COVID-19 forced plants to close in Europe), while 2021 will see the amount of EVs produced climb to about 2 million units, unless the COVID-19 crisis forces carmakers to downgrade their production plans. That is an **increase in EV output of 319% in just two years.**

Volkswagen is the EU carmaker that was producing most EVs in 2019 already, with about 150,000 units, and should be the leader in EV production also in 2021, with an output of 745,000 units. **Daimler** comes second in 2021 with about 285,000 EVs produced, and **PSA** third with 250,000 electric cars.

⁹ IHS Markit, Light-vehicle production forecast, updated in February 2020

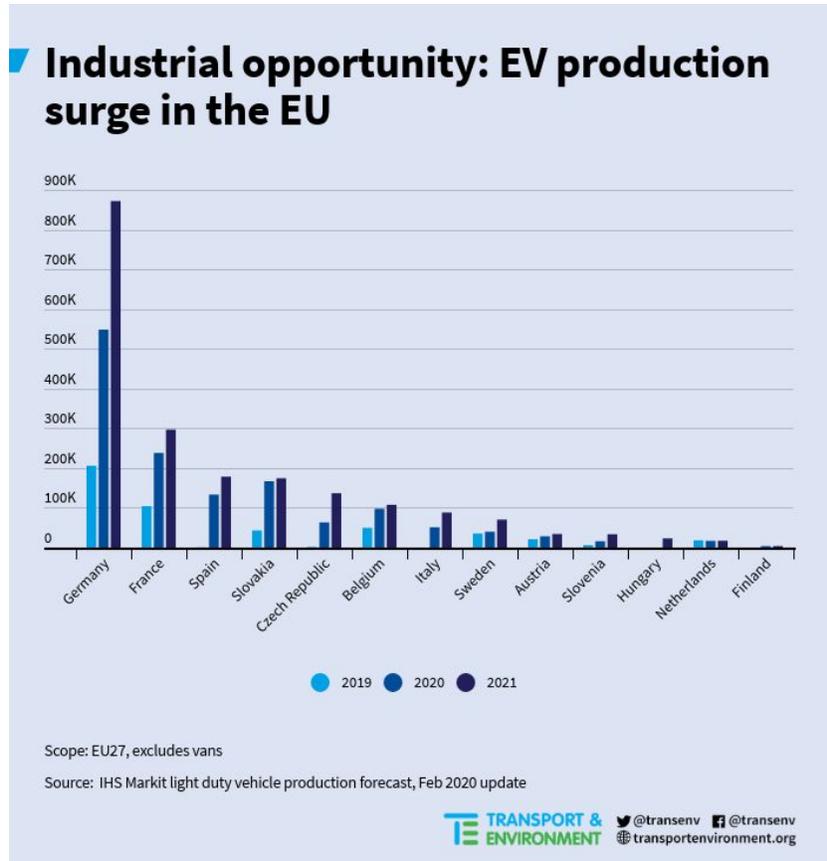


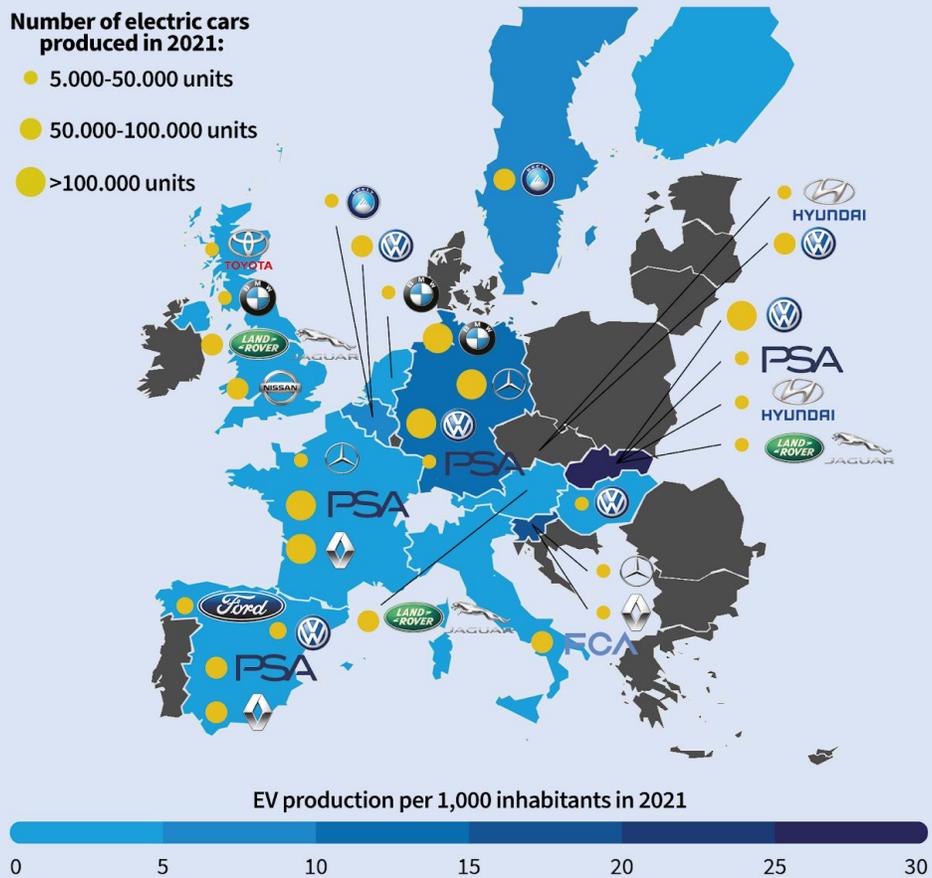
Figure 5: EV production in the EU, by country

If we sum all-electric vehicles (BEV + PHEV) and analyse production per country in 2021, as shown on Figure 5 above, we see that **Germany** remains the EV production leader with 870,000 units, while **France** secures the second position with 295,000 EVs. **Spain** is third in terms of EV output, with 180,000 units yearly. As seen on figure 5, several other EU countries produce electric vehicles, but most do so below 100,000 yearly units: Italy, Sweden, Austria, Slovenia, Hungary, the Netherlands and Finland.

E-mobility in Europe*: who invests where?

Number of electric cars produced in 2021:

- 5.000-50.000 units
- 50.000-100.000 units
- >100.000 units



*Investments in European e-mobility, 2019

Source: T&E analysis of IHS Markit light duty vehicle production forecast (02/2020)

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[transportenvironment.org](https://www.transportenvironment.org)

Figure 6: Who produces EVs in Europe?

3.2. Factory closures

As this report is being written, the new coronavirus causing COVID-19 that emerged in China towards the end of 2019 has spread to nearly every country in the world. It has taken hold in Europe and most countries have imposed societal lockdowns to combat the spread of the potentially deadly virus. With people confined to their homes and supply chains disrupted, carmakers announced temporary closures of factories in Europe.

All manufacturers started announcing plant shutdowns from March 16th, either to protect workers and comply with lockdown measures, or because of supply chain reliability issues and market conditions, as production volumes are adjusted by carmakers to market demand. The impact on the automotive industry in Europe is hence massive, with an overall volume impact in production estimated by IHS Markit¹⁰ at over 2.6M units as of May 5th, or about 13% of the total car production previously planned for 2020. These factory shutdowns affect mostly ICE vehicle production since they currently represent the vast majority of car manufacturing in Europe, but also impact the production of EVs, affecting models like the **Opel** Corsa-e, the **Peugeot** e-208, the **Renault** Zoe, the **Nissan** Leaf, and the **Volkswagen** e-Golf, to name but a few.

The latest information available at the time of writing points at a halt in production of around two months, well into May 2020. And as vehicle manufacturing halts, what will be the consequences for electric vehicles? Is the electric surge¹¹ under threat?

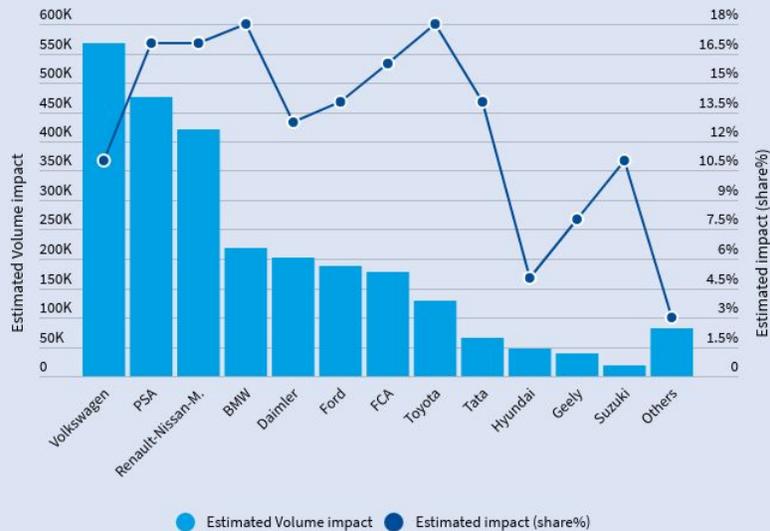
¹⁰ IHS Markit, COVID-19 EMEA Production daily tracker (paid subscription, consulted on May 5th 2020)

¹¹ Transport & Environment (2019). Electric Surge: Carmakers' electric car plans across Europe 2019-2025.

Retrieved from

https://www.transportenvironment.org/sites/te/files/publications/2019_07_TE_electric_cars_report_final.pdf

Estimated impact of Covid-19 on car production in Europe



On average 13% of the light duty vehicle production previously planned for 2020 have been impacted by factory closures as a consequence of the covid-19 crisis.

Scope: EMEA countries which includes EU countries and small volumes in Russia, Turkey, Uzbekistan, Kazakhstan, Serbia, Belarus and Ukraine. Includes both cars and vans

Source: IHS Markit light-vehicle production forecast, Feb 2020 update and IHS Markit EMEA light-vehicle and production downtime trackers, consulted on the 5th of May.

Figure 7: Impact of COVID-19 on EU car production

3.3. How will the current factory closures affect the European EV production?

Europe has been afflicted by a crisis with unknown duration, as car market conditions worsen and demand plummets, while car dealerships had to close for weeks and production was halted. According to IHS Markit data¹², when taking the above-mentioned conditions into account, Europe's

¹² IHS Markit, Automotive Webinar: COVID 19 Update 5 on April 16th 2020

light-vehicle demand in 2020 is forecast at 13.6 million units, down by 25% over 2019. This represents a downgrade of 4 million vehicles versus the pre-COVID-19 prediction.

However, all is not lost for electric vehicles, as carmakers had been planning EV production over the year 2020 with lower volumes in the first two quarters of the year and a significant ramp-up in EV models produced over the second half of 2020. For 2021, plans should still bring up to 214 electric models. Investments were made to produce EVs, and even though demand is likely to be lower as a consequence of the COVID-19 crisis, smart government incentives to reignite demand across the economy post-crisis can help ensure these vehicles continue to be bought. If the factory closures are indeed relatively short, as has been planned by carmakers, most of the electric models scheduled for production in 2020 would only see a limited impact. This is because manufacturing was planned to start in the second half of the year for many of them, and those already in production in the first half were scheduled to ramp-up significantly in the third and fourth quarter. Crucially, it depends on what carmakers decide to reopen and ramp up first - for example **Volkswagen**'s decision to restart the Zwickau plant (where the all-electric ID.3 is a key production model) first is a promising sign¹³.

On average in the EU27, according to the IHS Markit forecast from February 2020, the production of electric cars would have increased by 26% in the second half of 2020. The carmakers that have the most significant increase in EV production between the first and the second half of the year are those who are likely to be less affected by the COVID-19 factory closures, as can be seen below in Figure 8.

That is the case of **FCA**, who had planned to increase production of electric cars in the third and fourth quarters by 139%, of **Daimler** with a 77% increase, and the **Volkswagen** Group, with a 40% increase. However, the COVID-19 impact on EV production hits the carmakers that were already producing high volumes of electric cars, as **BMW** and **PSA** both had roughly split their EV production evenly in 2020, and entails a more severe impact on manufacturers that had already ramped-up their EV production in the first half of 2020.

A few examples of EVs not yet in production and hence not likely to be affected by temporary factory closures are the **Fiat** 500e, the PHEV versions of the **Renault** Captur and Megane, and the **Seat** Leon PHEV. There are also EV models currently in production but that had a significant ramp-up scheduled

¹³ Staff and wire reports (2020, April 15). VW focuses production restart on key electric model. Automotive News Europe. Retrieved from <https://europe.autonews.com/automakers/vw-focuses-production-restart-key-electric-model>

in the second half of 2020, who will see a limited impact: the **Hyundai** Kona EV, or the **Mercedes** EQC, to name but a few.

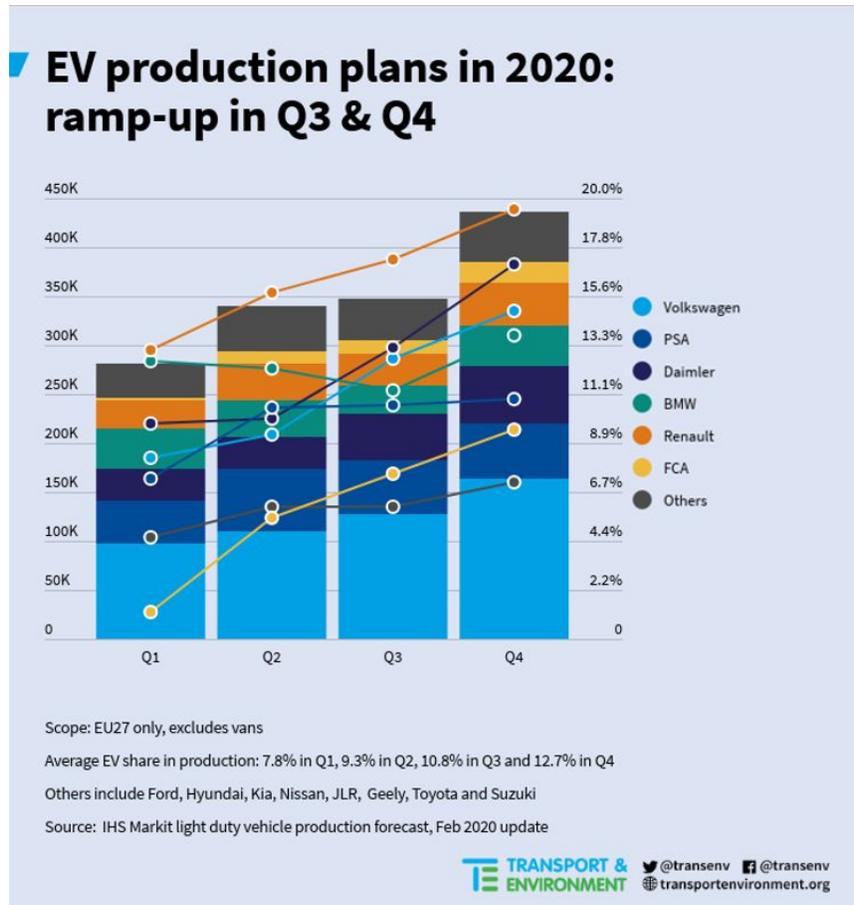


Figure 8: 2020 EV production plans (pre-COVID-19), Q3 & Q4 ramp-up

If carmakers resume production in Europe after only some weeks of factory closures the impact on the scheduled EV production should be limited. The situation in China leads to thinking the production will resume shortly, as Reuters reported¹⁴ on March 13th that 95% of large firms in China had resumed

¹⁴ Cheng, L., Zhang, L. and Young Lee, S. Editing by Navaratnam, S. (2020, March 13). Over 95% of larger Chinese firms outside Hubei resume work: official. Reuters. Retrieved from

work in the Hubei province, the epicenter of the COVID-19 outbreak, a month and a half after the lockdown was put in place at the end of January. Furthermore, **Volkswagen** states that they expect sales in China to pick up quickly and quadruple in March¹⁵ with sales of up to 1 million in March, from 250,000 in February. If a similar recovery happens in Europe, the impact on EV production should indeed be limited.

But if the situation worsens and the automotive industry sees factories in Europe closed for a longer period of time, there could be a risk of losing momentum to China as their output has resumed and most car factories have opened. Should that happen, the EU would have to reflect quickly on how to use public spending to stimulate continuous investments into EV and battery production in Europe and make sure it does not lose the lead to China again.

There is also another consequence to the factory closures, one that has far reaching impacts on the economy: the jobs loss. Studies show that the employment impact of COVID-19 in the automotive industry across the EU27 + UK is critical, with over 1.1 million jobs affected¹⁶. This is the figure of direct jobs, but the numbers are bigger if indirect jobs from the automotive supply chain are also taken into account. **Germany** is, by far, the country where more jobs are affected (over 500,000), followed by **France** with 90,000 jobs, and **Italy, Sweden** and **Spain**, each with levels around 60,000 jobs affected, following closely. It is therefore crucial to ensure that the first goal of any public support given to the car industry is to prioritise job security and ensure workers are not laid off.

This report has so far analysed the direct consequences of factory closures on EV production volumes that were scheduled by carmakers in a pre-COVID-19 scenario. But the potential slump in demand stemming from a recession should also be taken into consideration, as adjustments to EV production in a post-COVID-19 scenario could be made by carmakers to meet market demand.

<https://www.reuters.com/article/us-health-coronavirus-china-work/over-95-of-larger-chinese-firms-outside-hubei-resume-work-official-idUSKBN2100DH>

¹⁵ Steitz, C. (2019, March 31). VW sees China sales picking up after coronavirus blow. Automotive News Europe. Retrieved from

<https://europe.autonews.com/automakers/vw-sees-china-sales-picking-after-coronavirus-blow>

¹⁶ European Automobile Manufacturers Association (ACEA), 2020. Employment impact of COVID-19 on the European auto industry. Retrieved from

<https://www.acea.be/news/article/interactive-map-employment-impact-of-covid-19-on-the-european-auto-industry>

4. The impact of COVID-19 on European electric car sales

With the economic hardship looming in Europe as a consequence of the COVID-19 crisis and its impact on the ability of people and businesses to purchase new cars, it is fundamental to attempt to analyse the market demand for electric cars. Both production and sales have come to a full stop towards the end of the first quarter of 2020, but at the time this report is being written, production is restarting progressively and looks like returning to normal by the end of May. While production capacity does not seem to be under threat beyond the short-term, unless there are further waves of COVID-19 contagion that trigger population lockdown measures, the EV market demand from a longer term view, under economic recession conditions, seems to be the key to maintain the momentum for EVs in Europe. This report will hence now analyse the electric car market in Europe and the potential EV market drivers for demand in a receding economy.

4.1. An impressive start in the first quarter of 2020

Before the COVID-19 crisis, sales of electric cars were booming in Europe, reaching 3% market share for the full year, but rising 80% in the last quarter of 2019¹⁷ and reaching a market share of 4.4% in that fourth quarter alone. The first months of 2020, just as the EU CO₂ targets kicked in, also showed a record in demand and an EV market share of 6.4% was reached in January at EU level, followed by a 6.3% share in February, and 10% in March¹⁸. The first quarter of 2020 as a whole saw EVs in Europe reach a market share of 6.8%¹⁹, a level never seen before, hence proving that electric cars investments and EV production plans driven by the EU CO₂ standards were starting to pay off.

¹⁷ European Automobile Manufacturers Association (ACEA), 2020. Press Release. New Passenger Car Registrations by Fuel Type in the EU. Quarter 4 2019. Retrieved from https://www.acea.be/uploads/press_releases_files/20200206_PRPC_fuel_Q4_2019_FINAL.pdf

¹⁸ The International Council on Clean Transportation (ICCT), 2020. European Passenger Car Registrations. January-March 2020. Retrieved from <https://theicct.org/sites/default/files/publications/MarketMonitor-EU-Fact%20Sheet-20200428.pdf>

¹⁹ European Automobile Manufacturers Association (ACEA), 2020. Press Release. New Passenger Car Registrations by Fuel Type in the EU. Quarter 1 2020. Retrieved from https://www.acea.be/uploads/press_releases_files/20200512_PRPC_fuel_Q1_2020_FINAL.pdf

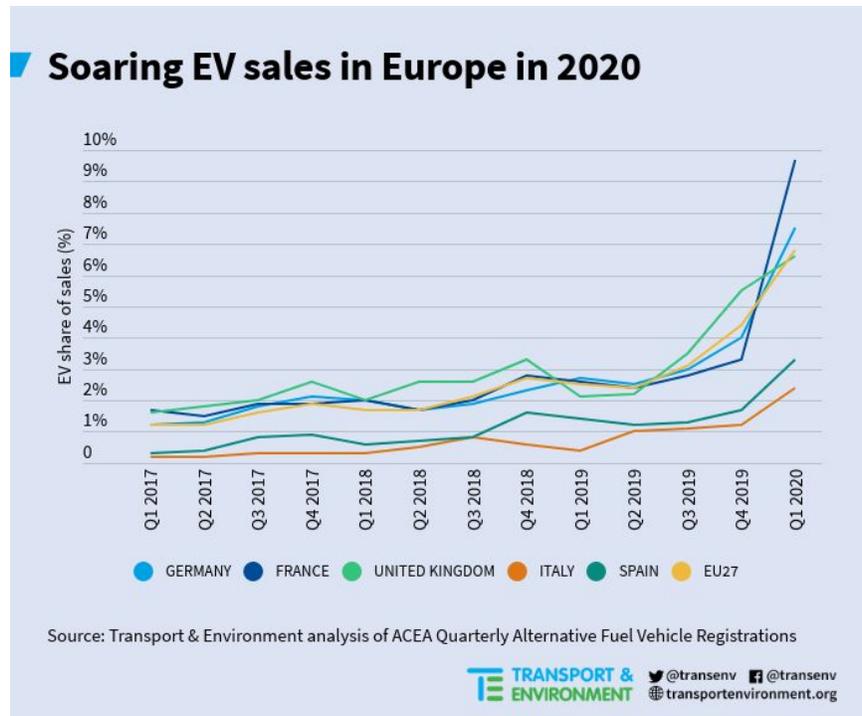


Figure 9: sales of electric vehicles in Europe, Q1 2020

If we focus on key automotive markets in Europe, March 2020 in **Germany** brought a massive increase in EV registrations: 9,426 plug-in hybrids (representing an increase of 207.9% vs March 2019) and 10,329 all-electric cars (56.1% more than March 2019)²⁰. In **France**, the data from March 2020 shows a market share of 9.7% for EVs, with all-electric cars leading the way at 25,914 units registered, while PHEVs hit 9,423 units (2.6% market share)²¹. And the **UK** brought EVs to a market share of 7.3% in March 2020, with BEV registrations adding 11,694 units (+197.4% vs March 2019) and PHEVs adding 6,818 units (+38% vs March 2019)²².

²⁰ KBA (April 2020). Press Release: Pressemitteilung Nr. 09/2020 - Fahrzeugzulassungen im März 2020 Retrieved from https://www.kba.de/DE/Presse/Pressemitteilungen/2020/Fahrzeugzulassungen/pm09_2020_n_03_20_pm_komplett.html

²¹ CCFA (April 2020). Press release: Marché français (VP) par type d'énergie Janvier à mars 2020. Retrieved from <https://ccfa.fr/wp-content/uploads/2020/04/dp-04-2020-1.pdf>

²² SMMT (April 2020). Press release: UK new car registrations fall -44.4% in March as coronavirus crisis hits market. Retrieved from

However, these high shares mask the falling automotive sales volumes overall, with the slump starting already before the COVID-19 pandemic, in the beginning of 2020. For example, the February EV figures were registered in a falling overall vehicle market with -7% year over year. And March 2020 showed the full impact of the COVID-19 crisis forcing production halts and dealership closures: the overall automotive market was down 72% in **France**, 38% in **Germany**, and 44% in the **UK**, with the full first quarter of 2020 down 25.6%²³.

The last quarter of 2019 and the first quarter of 2020 look like a confirmation that the tipping point for EVs had been reached, thanks to EU car CO₂ regulations and massive investments, but the COVID-19 crisis has put a halt to the sales of vehicles in Europe in March and the question now is: how long will the automotive industry take to recover from the sales slump? What is clear is that the number of cars sold will not impact the compliance with the car CO₂ standards, as they are a fleet average target, and the declining volumes overall will necessitate fewer lower-CO₂ models (e.g. small cars) and EVs to achieve the targets.

4.2. Overview of available EV models in Europe

According to EV database²⁴ there are currently 39 different all-electric models from all carmakers available for sale in Europe. This includes 62 variants of those models, and they are present in all market segments with all body types available. Also, it is worth noting that the prices start from below 20,000€ including local incentives, as is the case of the **Seat** Mii, the **Renault** Twingo ZE, and the **Škoda** CITIGOe IV. If we also add the available plug-in hybrid electric vehicles, such as the **BMW** 330e, the **Volvo** CX40, and the **Opel** Grandland X, the total number of EVs currently available increases to 70 models with over 100 variants in all segments.

<https://www.smmmt.co.uk/2020/04/uk-new-car-registrations-fall-44-4-in-march-as-coronavirus-crisis-hits-market/>

²³European Automobile Manufacturers Association (ACEA), 2020. Press Release. Passenger car registrations: -25.6% first quarter of 2020; -55.1% in March. Retrieved from <https://www.acea.be/press-releases/article/passenger-car-registrations-25.6-first-quarter-of-2020-55.1-in-march>

²⁴ EV database, <https://ev-database.org/>

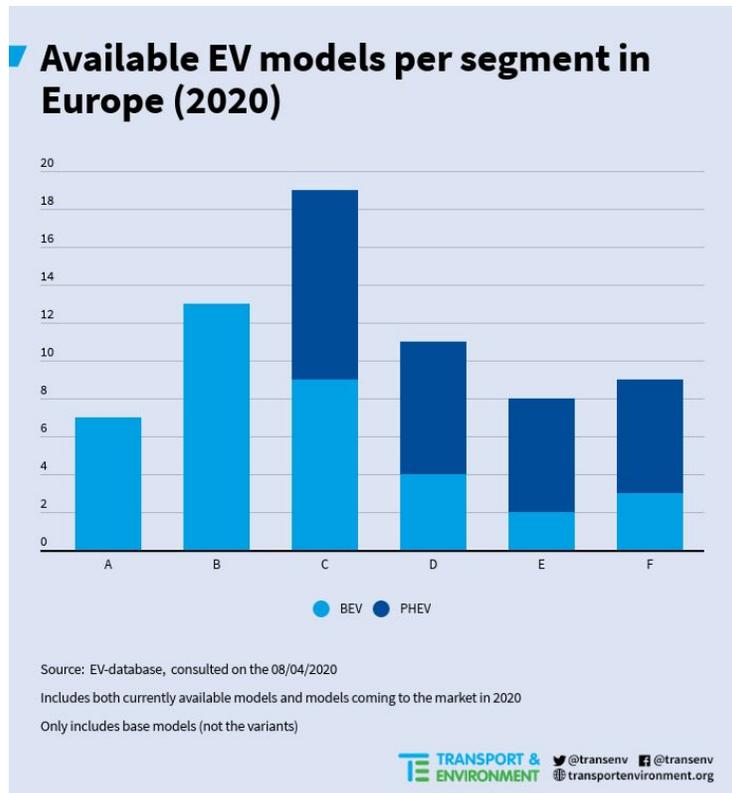


Figure 10: EV models per segment, EU 2020

This report will now analyse EV average prices by car market segments (A to F). The price figures given here below include all available versions of each model, not only the base (and cheaper) version.

The analysis of price and range per segment within the all-electric cars shows there is a direct correlation between those factors, as smaller models from the A segment (such as the **Volkswagen** e-Up) are cheaper - average price is €22,461 - and provide less range - 139 km on average - while bigger models from segment F (like the **Porsche** Taycan), with an average price well over €100,000 have the highest average range: 439 km.

BEV Models from the segment B, like the **Opel** Corsa-e, have an average price of €35,763 and a range of 275 km. In segment C we can find models like the **Volvo** XC 40 and the **Volkswagen** ID.3 with an average price of €38,559 and a range of 301 km. Segment D brings bigger cars, like the **Mercedes** EQC or the **Tesla** Model 3, a segment that also brings higher average prices - €57,186 - and higher range:

385 km. The E segment contains models like the **Jaguar** I-Pace and the **Audi** e-tron, with average prices of €81,636 and a range of 346 km, while the full luxury segment F has an average price of €117,837 and a range of 439 km with models like the **Porsche** Taycan and the **Tesla** Model S. It is also worth mentioning that **the average range of BEVs across all segments is 310 km today**, with the smaller models (segments A-B-C) having a lower range than the average, and the bigger models (segments D-E-F) having more range.

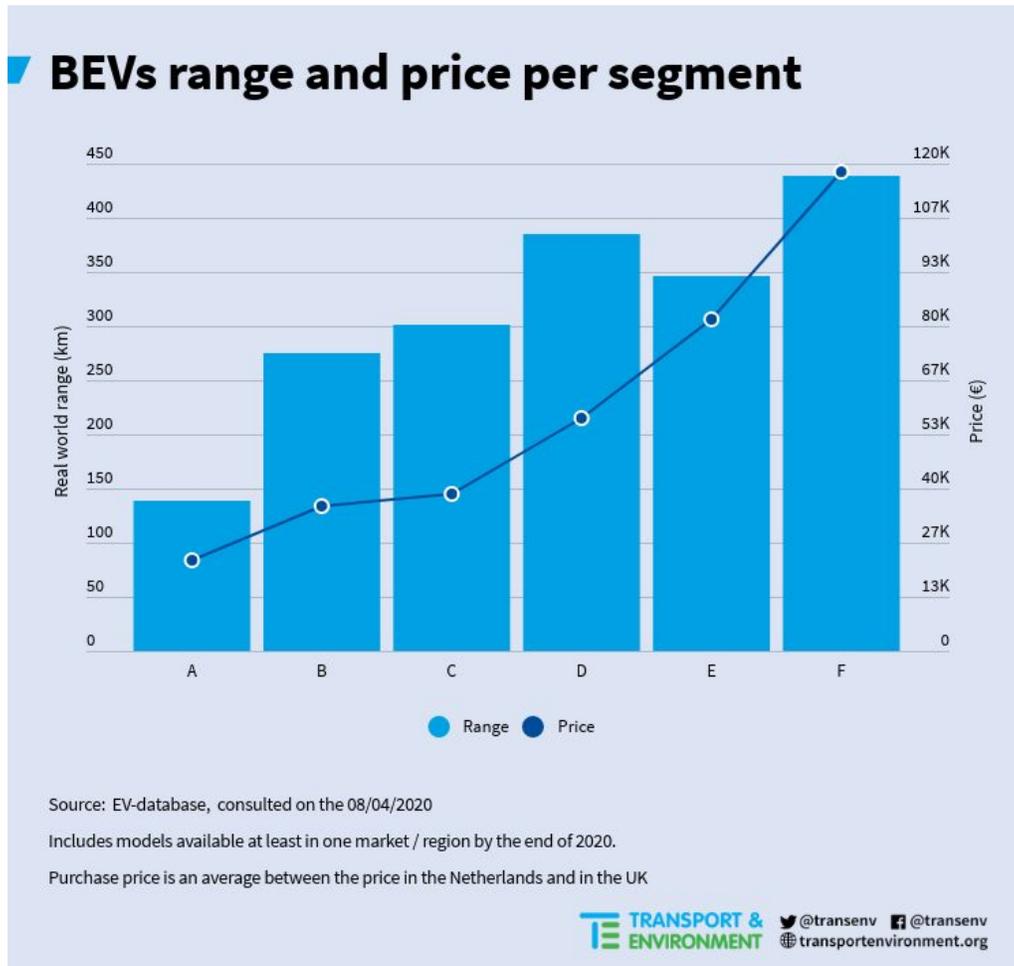


Figure 11: EV models sorted by market segment and range. Includes variants of each model

The EV market is made up of all-electric cars (BEV) like the models analysed above, but also of **plug-in hybrid vehicles (PHEV)** which **have much lower electric range: 34 km on average** across all segments, against 310 km for BEVs.

When looking at average prices and comparing PHEVs vs BEVs, it turns out plug-in hybrids have higher prices than all-electric cars in all segments except one: segment E. In this segment, which includes large cars like the **Volvo** S90, a PHEV costs €62,170 vs €81,636 for a BEV, so 24% less for a plug-in hybrid than for an all-electric car. All other segments where PHEVs are available show lower average prices for all-electric cars. This is what can be found in segment D, with cars like the **BMW** 330e, where a PHEV costs €58,091 vs €57,186 for a BEV (a PHEV is about 2% more expensive). The same happens in segment C with cars like the **Hyundai** Ioniq, where a plug-in hybrid costs on average about €3,000 more than a fully electric car, and in segment F with cars like the **Porsche** Panamera, where the average cost of a PHEV is €124,582 and the BEV average is €117,837, about 6% more. There are no PHEVs available in segments A or B.

The limited electric range of PHEV models (only 34 km on average) is a considerable disadvantage, while their lower price only exists in some segments: D and E - which are bigger cars, and in particular SUVs. But in smaller and medium segments (A, B, and C), PHEVs are either nowhere to be found, or more expensive than all-electric cars. Taking into consideration the fact that in the medium term BEVs will be cheaper, with the falling battery production costs, it is very likely that soon an all-electric car will be cheaper than a plug-in, in every possible market segment.

A look at the market segments for EVs in Europe shows that the majority of models of BEVs are concentrated in the mini, small and compact segments (A, B and C), while PHEVs are found mostly in medium, big and luxury segments (D, E and F), as seen in figure 10. It is worth noting that the PHEV sales take place in particular with SUV and Crossover body types.

In terms of models available for sale per market segment the split is very similar: 70% of EVs currently in the market or soon to be released are concentrated in the lower segments, i.e. small and compact size vehicles like the **Volkswagen** ID.3, the **Peugeot** e-208, the **Opel** Corsa-e, and the **Seat** Mii, to name only a few. This is likely to make BEVs affordable faster in the medium term, while a more premium-dominated PHEV segment will likely remain expensive for years to come.

4.3. Who will buy electric cars after COVID-19?

Electric cars are cheap to own but currently costly to buy, which is one of the main barriers to EV adoption. The purchasing costs of EVs are still higher than those of cars with internal combustion engine powertrains, but the most recent data²⁵ suggests that falling battery pack prices will take some electric cars to price parity starting from 2022.

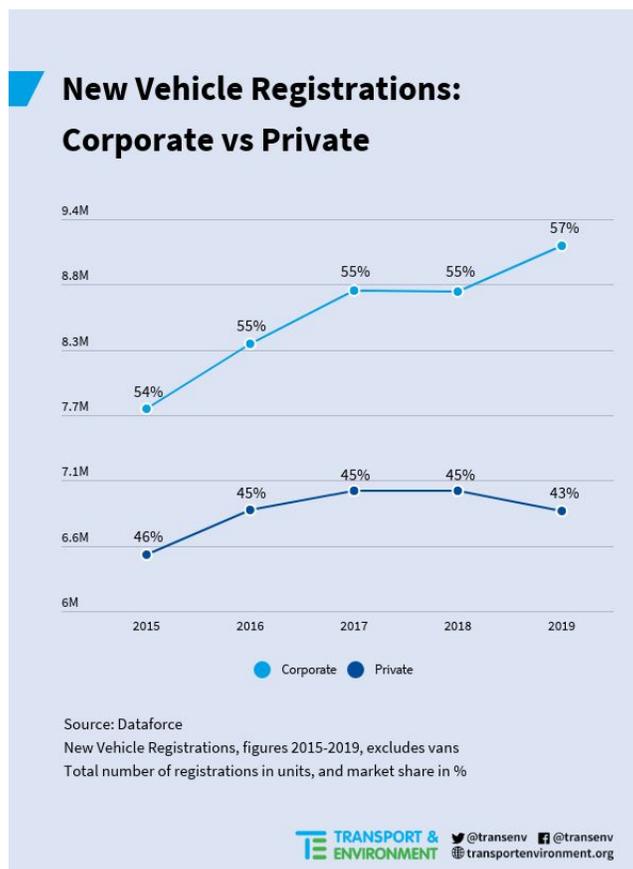


Figure 12: corporate VS private registrations, EU 2015-2019

²⁵ Bullard, N. (2019, April 12). Electric Car Price Tag Shrinks Along With Battery Cost. Bloomberg. Retrieved from <https://www.bloomberg.com/opinion/articles/2019-04-12/electric-vehicle-battery-shrinks-and-so-does-the-total-cost>

The majority of new cars today - 57% in 2019 - are bought through the corporate channel²⁶, mainly by (1) leasing companies for corporate fleets such as company cars, or on PCP (Personal Contract Purchase) finance deals done by companies, (2) car rental companies, and (3) carmakers self-registrations (to be used as company cars by employees, mainly). Those registrations added over 9 million vehicles in 2019, as shown in figure 12, while private registrations recorded well below 7 million cars. So 43% is bought by private owners, a private market likely to take a larger hit in the coming recession.

The situation with the corporate market, however, is quite different, and it is likely to drop less drastically. The emerging evidence²⁷ we have from France confirms that the corporate sales were falling in March 2020 at half the rate of private sales. This trend was however not applicable in April as businesses were closed, including car dealerships and factories, and there were no sales of vehicles. But the economic crisis is likely to impact corporate car sales less - at least for bigger companies - than for the average private driver. Companies are TCO (Total Cost of Ownership) oriented, and before making any investments the fleet managers analyse the total cost of ownership: running costs, repairs, taxes, maintenance, depreciation and resale values. When that TCO analysis is made, electric cars are very likely to become the most optimal investment²⁸. Combining the TCO focus of companies with the fact that most countries provide generous fiscal regimes for companies who purchase EVs, the main driver for EV demand in Europe during the post-COVID-19 crisis is very likely to be the corporate/leasing channel. It is therefore important to ensure that companies - big and small - are supported to continue to lease electric cars post COVID19 crisis.

The five biggest car markets in Europe already reached impressive levels of corporate registrations in 2019²⁹: **Germany** with 65.5%, **UK** with 56%, **Spain** with 53%, **France** with 54%, and **Italy** with 40%. The corporate registrations are especially important for premium brands like **Volvo**, **BMW**, **Audi** and **Mercedes**.

²⁶ Data supplied by Dataforce GmbH - extracted from the IRIS® information system

²⁷ Beziat, E. (2020, April 8). Les flottes d'entreprise pourront-elles sauver le secteur de l'automobile ? Le Monde. Retrieved from https://www.lemonde.fr/economie/article/2020/04/08/les-flottes-d-entreprise-pourront-elles-sauver-le-secteur-de-l-automobile_6035918_3234.html

²⁸ Van der Goot, M. (2019, Oct 1). The Total Cost of Ownership of EVs vs Traditional Vehicles. Retrieved from <https://www.leaseplan.com/en-ix/global-fleet-insights/tco-ev/>

²⁹ Data supplied by Dataforce GmbH - extracted from the IRIS® information system

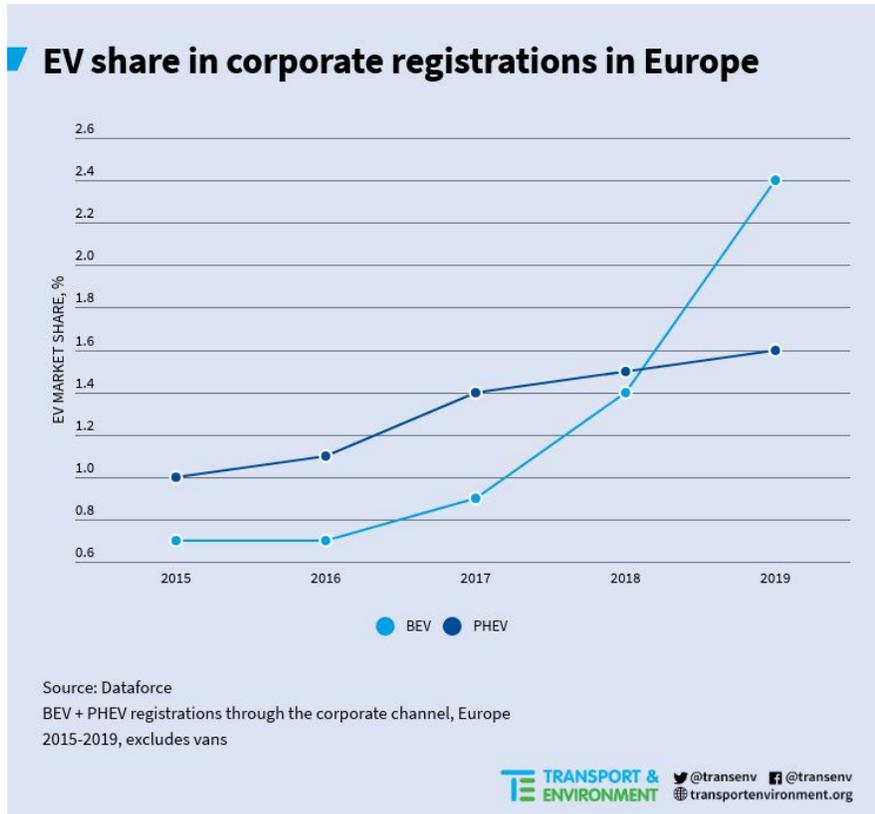


Figure 13: EV share progress amongst corporate registrations in Europe

As seen in figure 13, the EV market share of passenger cars registered through the corporate channel experienced clear gains in Europe over the last few years, especially all-electric cars (BEVs) which climbed from 1.4% in 2018 to 2.4% in 2019, with 218,184 new registrations. The first two months of 2020 increased the share of BEVs even further, to almost 3.7%.

This shows that the corporate registration levels in Europe for all-electric cars are higher than private registration levels, since section 4.1 of this report underlined that in February 2020 the overall EV market share reached 6.3% at EU level. If we look at EVs in total (including both BEV and PHEV) the market share achieved in 2019 for corporate registrations increases to 4% with 369,278 new registrations.

In contrast, the EV private registrations in 2019 added 188,564 units, almost half the number of registrations made through the corporate channel. This underlines the importance of company cars, fleets and leasing contracts as a driver for EV demand in a post-COVID-19 scenario where private registrations are likely to slump.

The number 1 brand in 2019 for plug-in hybrid sales through the corporate channel in Europe is **BMW**, while **Mitsubishi** is the brand who secures the top spot within private registrations. The most sold PHEV model in Europe, in both corporate and private channels, is the **Mitsubishi** Outlander PHEV. This does not mean, however, that plug-in electric vehicles are dominant within company registrations, as the PHEV market share within corporate registrations is 1.7%, while BEVs make up 2.4% of the corporate market. The absolute BEV leader in 2019 both in corporate and private registrations is **Tesla**, who also has the most sold BEV model in both channels: the Model 3, with 95,247 vehicles sold³⁰.

The main takeaways from the evolution of corporate registrations in Europe is that (1) the market share of new registrations through companies keeps rising and is today the biggest demand driver for carmakers, and (2) the growth of electric powertrains, in particular all-electric vehicles (BEV) and to a lesser extent, plug-in hybrids (PHEV) shows clear gains, even amid an overall declining market.

With private EV demand likely to drop substantially over the next few months after the COVID-19 crisis, it would be reasonable to think that only cheaper cars will achieve decent sales levels, as happened during the 2008 recession. But the corporate channel driven by TCO and fiscal considerations is likely to continue the trend of soaring EV sales, especially if the post-crisis recovery schemes smartly focus on this particular market. Demand for EVs in Europe in a post-COVID-19 recession scenario is thus very likely to come mainly from the leased cars market.

³⁰ Pontes, J. (2020, January 27). Tesla Model 3 Shatters Records in Hot European Market - EV Sales Report. Cleantechnica. Retrieved from <https://cleantechnica.com/2020/01/27/tesla-model-3-shatters-records-in-hot-european-market-ev-sales-report/>

5. Conclusions & policy recommendations

5.1. COVID-19 consequences: the need for an EU Green Recovery Plan

The consequences of the global pandemic caused by COVID-19 are devastating in terms of human costs, from the deaths of friends and family, to the physical effects of infection and mental health problems caused by confinement, fear and trauma. While health measures must be the top priority for Governments, it is now clear that the economic consequences of this crisis will be similarly devastating.

The clamor for green recovery plans has already started, and rightly so. As soon as the health crisis passes, the focus has to move to saving economies, and it is of utmost importance to direct economic recovery efforts towards clean energy, zero emissions transport and related infrastructure. At their meeting in mid-April, the EU heads of state and government agreed to launch the EU Recovery Fund - this should have a strong sustainability component. What this means for electric cars is that the needed short term stimulus measures directed at shoring up demand must aim at zero and low emission vehicles and their required charging infrastructure. And the long term measures must be designed in order to shape the market and steer the auto industry into the direction of future-proof technologies, always with zero emission vehicles as a priority.

The European Public Health Alliance recently warned that those living in polluted cities are more at risk from COVID-19³¹, since air pollution can cause respiratory diseases. This corroborates a study³² from 2003 on victims from the coronavirus SARS that found that patients in regions with moderate air pollution levels were 84% more likely to die than those in regions with low air pollution.

Therefore, the shift to electric vehicles, including all-electric urban delivery vehicles, zero emissions public transport systems with electric buses, taxis, car sharing and ride hailing services that use fully electric vehicles, must be a priority. Investments in EV charging infrastructure should be used to boost demand and economic recovery, tax reforms for businesses should be implemented to accelerate the shift to zero emissions fleets, and any funds for the automotive sector must come with strings attached: they must contribute to the EU's 2050 climate neutrality goal. Public money should not only be used as a short term relief but as a tool to shape the transport system of the future to come out stronger and greener from the looming recession.

³¹ EPHA, <https://epha.org/coronavirus-threat-greater-for-polluted-cities/>

³² Environmental Health, <https://ehjournal.biomedcentral.com/track/pdf/10.1186/1476-069X-2-15>

The fact that electric car investments have increased by a factor of almost 20 compared with the situation from 2018 allows the EU to close the gap with China and reduces the risk of missing out on the 21st century green industrial and economic opportunity. But the EU needs to strengthen and robustly enforce CO₂ standards for cars and vans to ensure market uptake and EV manufacturing in Europe.

It is worth noting that it is not only western Europe that benefits from investments: second to Germany as a country destination of EV investments comes the **Czech Republic** with EUR 6.6 billion, thanks to the massive investment the **Volkswagen Group** made in electric mobility.

With a recession of unknown proportions settling in despite the fact that the car production halt has been temporary, public investments need to step in to stimulate investments, production and demand, particularly supporting EV registrations through the corporate channel as it is key for zero emissions vehicles growth and needs continued support. This is governments' chance to shape the future automotive industry in Europe and propel the EU into a zero emission transport system where zero emissions vehicles are the only output.

5.2. Policy Recommendations

The current crisis and the unprecedented public money injection for the European car industry must be used to stimulate EV demand and manufacturing of zero emissions vehicles in the short term, and to shape the future EU car industry in the long term, so the automotive sector comes out of the recession with a product portfolio fit for the 21st century and in line with the EU's 2050 net zero emissions goals.

T&E calls on the European Commission and EU governments to do the following:

EU Car CO₂ standards:

- What matters for EU vehicle standards is not the amount of cars sold, but their type and emissions per km. With EV sales at record levels in early 2020 and many carmakers already compliant in those months, there is no reason to delay or weaken the current CO₂ rules. The **2020-2021 target of 95g/km should therefore not be reopened or weakened.**

- The European Commission should review the 2030 Car CO₂ standards in June 2021 as proposed in the EU Green Deal strategy, and increase the longer term ambition post-2025 to be on the trajectory to zero emissions mobility in the next decade. The review should set a **clear trajectory for the industry and accelerate the transition to zero emission cars so that only zero emission models are allowed to be sold across Europe from 2035 at the latest**. It should be accompanied by an EU plan for jobs to prepare the workforce.
- The current design of the car regulation whereby targets kick-in in five year intervals (with no emission reductions required in between) has caused much delays in investments into clean technology. This leads to a situation where carmakers are way off target, as was the case in 2018-2019 across Europe. The per km emissions even increased in the years preceding the entry into force of the regulation, as carmakers prioritised selling polluting but profit-making (SUV) models. The 2021 review should **improve the design by moving to annual CO₂ targets** (with banking and borrowing for flexibility) as is the case in the United States or China. T&E's back of the envelope calculation shows that even **setting an intermediate target between 2025 and 2030 would result in a cumulative CO₂ saving from new car sales of 5-8% by 2030**; an important contribution to raising the EU's overall 2030 ambition. Similarly, given the uptake of electrification technology such as plug-in hybrids, the outdated design flaw that allows heavy vehicles to emit more CO₂ should be amended. Given the technological improvement, **a maximum CO₂/km limit per car should be considered**, as the highest emitters are often premium models that can electrify and absorb the cost.

Demand for electric cars post-COVID-19:

- Scrappage schemes and purchase incentives will undoubtedly be introduced across Europe to boost demand for cars quickly and help industry recover. These must target the market for zero emission vehicles and supporting infrastructure. It would be ill-sighted of governments to spend any public money on conventional cars and SUVs that are above 95gCO₂/km as this would jeopardise the ability of the car industry to achieve the EU emission targets, resulting in hefty penalties. Instead, scrappage schemes should support companies and individuals to **exchange old cars** (Euro 4 petrol and Euro 5 diesel) **for new zero CO₂ models and shared electric fleets (eg taxis)**, or for **relatively new 2-4 years old second hand cars** on which the first lease has come to an end. Supporting the purchase of cars entering the second hand market for the first time is important to help leasing companies - main purchasers of new EVs - to renew their stock and continue increasing their EV offer.

- Companies, big and small, are an important demand driver for electric cars registered into their fleets or as company cars. Providing attractive incentives, notably **zero rate loans to lease EVs alongside bonus-malus type benefit in kind schemes and VAT deductibility**, should be continued and augmented to help struggling companies and continue growth in the EV market.
- Support should also be provided to **individuals and companies to install charging infrastructure**, with focus on multi-apartment buildings, offices and commercial property (including parking spots renovation). This should include both financial support and administrative support by speeding up permitting procedures and cutting red tape.

Green Recovery Plan:

- The EU Recovery Fund and national long term economic stimuli should target **sustainable projects in line with the European Green Deal strategy**. This includes cabling buildings and launching large charging infrastructure projects (often labour intensive), upgrading grids for increased electrification, supporting lithium-ion battery manufacturing and reskilling the workforce towards the professions of the future, notably electronics, software and chemistry.
- With recovery measures being deployed across Europe, national governments should ensure carmakers prioritise EV manufacturing. For example, state intervention should introduce ‘green’ conditionality clauses so that **any state-backed fund or subsidy comes under the condition that the funds are used for investments in zero emission vehicles and related technology**, notably batteries.

*Who killed the electric car?*³³ is a documentary that explores the roles and motives that may have pushed the carmakers, the oil and gas industry and the US federal government to kill off the electric car in the US, through the story of an EV: the General Motors EV1 from the mid-1990s. *Can electric cars beat the COVID crunch?* is a report by T&E that shows how to never waste a good crisis: before COVID-19, electric car sales were booming in Europe, showing that EU car CO₂ standards were starting to pay off and EVs were set to reach mass market levels, allowing the EU to jump on the bandwagon of the 21st century green industrial and economic opportunity. Let us not waste the opportunity to use public investments to step in to keep shaping the future automotive industry in Europe and build a zero emission transport system, instead of supporting a business as usual scenario with an obsolete model with soon-to-be-stranded assets. Let us not allow Coronavirus to kill the electric car.

³³ Sony Pictures Classics, <https://www.sonyclassics.com/whokilledtheelectriccar/presskit.pdf>

Annex I: EV investments made since June 2018

EV investments: Investments and long term pledges made since June 2018				
Company / Organization	Type of investment	Source	Investment	Region
European Commission	European Battery Alliance	European Commission, Dec 2019	€8 billion +	EU
BMW Group	BMW iNEXT production	BMW press, Dec 2019	€400 M	EU
FCA	FIAT 500e production	FCA press, Jul 2019	€700 M	EU
FCA	Battery assembly complex	FCA press, Oct 2019	€50 M	EU
FCA	Alfa Romeo Tonale production Fiat Panda hybrid production	Reuters, Sep 2019	€1 billion	EU
Volkswagen	Investment Plan 68: electric mobility, hybridization and digitalization	Volkswagen press, Nov 2019	€60 billion*	EU
Volkswagen	Battery cell production and testing	Volkswagen press, Sep 2019	€1 billion +	EU
Tesla	Tesla Model Y production	Deutsche Welle, Nov 2019	€4 billion	EU
Hyundai	Technical partnership to produce a performance EV	Rimac press, May 2019	€64 M	EU

Kia	Technical partnership to produce a performance EV	Rimac press, May 2019	€16 M	EU
Jaguar	Electrified cars production	Financial Times, Jul 2019	€ 1.2 billion	EU
Ford	Battery assembly plant and electric models production	Las Provincias, Jan 2020	€42 M	EU
Opel	Production of new vehicle platform	El Pais, Oct 2019	€250 M	EU
PSA	Production of electrified dual-clutch transmissions	PSA press, Sep 2018	€82 M	EU
Northvolt	Lithium-ion battery plant	Reuters, Jun 2019	€1 billion	EU
Saft (Total)	Research, develop and build new generation solid-state battery	Reuters, May 2018	€200 M	EU
CATL	Battery production factory	CATL press, Jun 2019	€1.8 billion	EU
Daimler	Battery technology investment	Financial Times, Apr 2019	€90 M	US
Ford	Investment in platform from electric pickup startup Rivian	Ford press, Apr 2019	€453 M	US
Ford	Production of new electrified variants of the F-150 truck	Ford press, Dec 2019	€635 M	US
BMW	Electric vehicles production	VOA News, Oct 2018	€3.6 billion	CN
Renault	Electric vehicle joint venture with Jiangling Motors	Financial Times, Jul 2019	€128 M	CN

Nissan	Production system geared toward electric vehicles	Business Insider, Nov 2019	€275 M	JP
Renault-Nissan-Mitsubishi	Alliance Ventures fund targeting technology and business model innovation in New Mobility, Autonomous Driving, Connected Services, EVs	Alliance Ventures press, 2018	€910 M	WORLD

* Volkswagen Group disclosed only a few details, stating that planned investments and development costs for future areas such as hybridisation, electric mobility and digitalisation “will total roughly EUR 60 billion between 2020 and 2024”, also adding that the Group “intends to invest around EUR 33 billion of that figure in electric mobility alone”. Since hybridisation and digitalisation overlap with electric mobility, this report hence assumes that the total EUR 60 billion investment is evenly distributed between the 9 locations where Volkswagen scheduled those electric vehicles to be made: in Germany in the group plants in Zwickau, Emden, Hannover, Zuffenhausen and Dresden, and also outside Germany in the plants the group has in Mlada Boleslav (Czech Republic), in Chattanooga (USA), and in Foshan and Anting (China). The estimated total amount of investments going to the EU is hence EUR 40 billion.