

strategy&

E-Mobility Sales Review Q2 2020



Foresight to drive the industry
April 2020



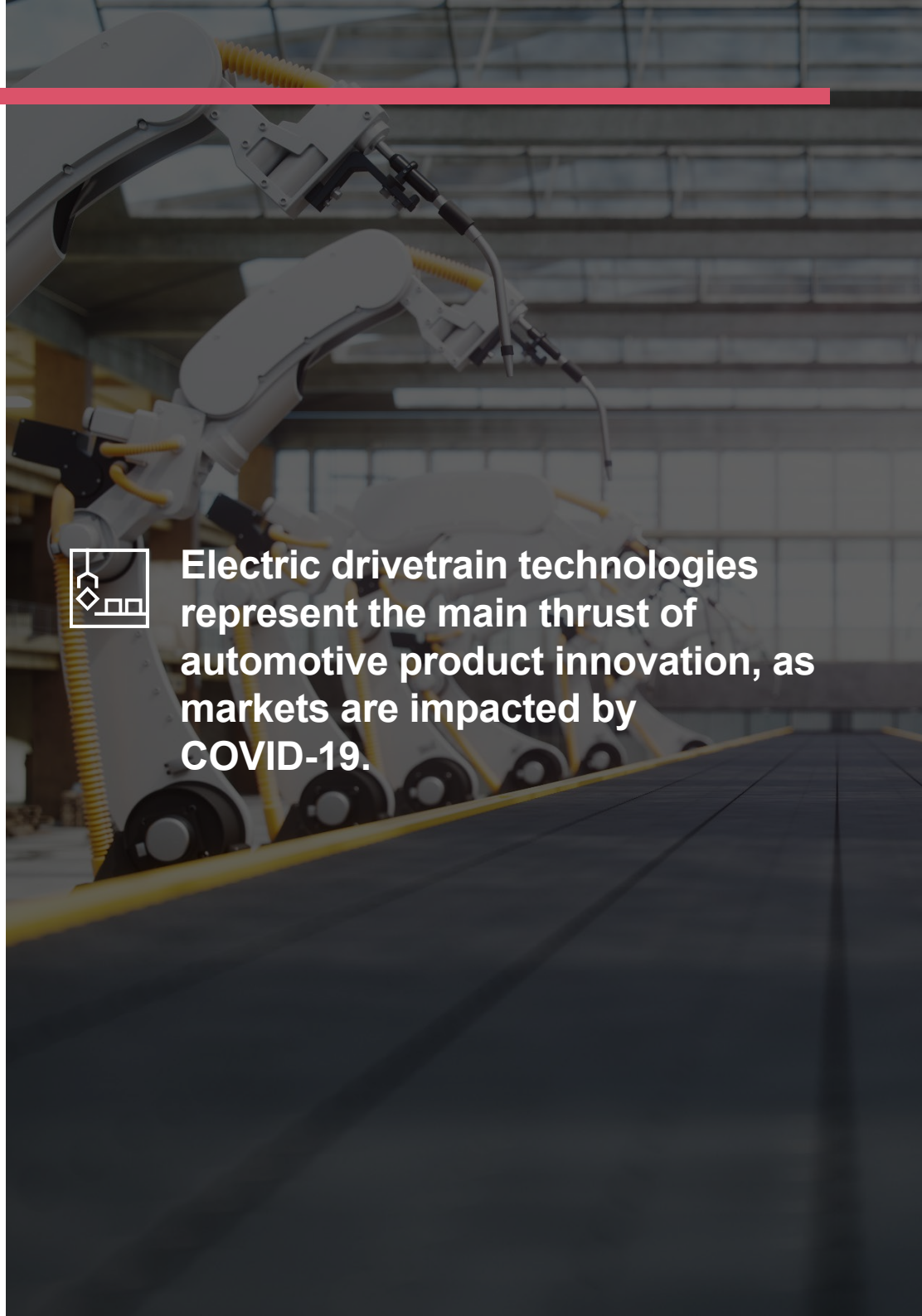


0. Executive summary and outlook

Electrification highlighted

Just as global manufacturers are starting to roll out their first generation of dedicated electric vehicle platforms and plug-in hybrid powertrains, the regions of the world have been feeling the effects of COVID-19 one after the other. After a complete shutdown in demand and production in China in February 2020, Europe followed suit in March, while North America faced a similar situation by April.

Based on full-year total market declines estimated between 10 and 40%, electrified vehicles are expected to secure growing market shares due to dedicated customer demand and an expanded product offering. Targeted subsidies and sales support have proven highly effective in overcoming buyer objections and are expected to play a major role in post-crisis recovery programs, supporting economic, regulatory and environmental targets.



Electric drivetrain technologies represent the main thrust of automotive product innovation, as markets are impacted by COVID-19.



1. Introduction

Global EV sales stalled in Q1



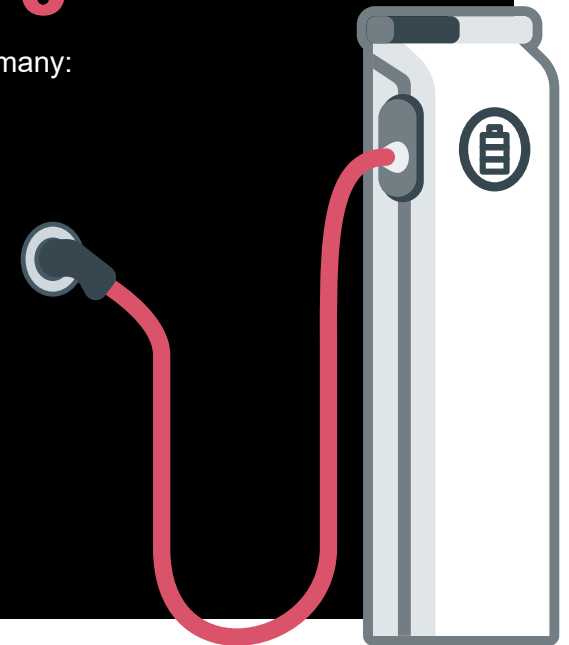
In the first quarter of 2020, sales of fully electric and electrified vehicles (xEVs) – mild, full and plug-in hybrid as well as battery electric vehicles – registered a decline of 7% in key markets compared to the first quarter of 2019.

This decrease was mainly caused by lower sales of battery electric vehicles (-23%, to 202,900 units in the EU Top 5, China and the US) compared to the first quarter of 2019. The numbers of newly registered plug-in hybrids on the other hand grew overall by 4% (102,400 units).

The overall decline was principally caused by the locked-up Chinese market due to COVID-19, whereas European markets mostly enjoyed ongoing growth. In terms of total market shares, battery electric vehicles (BEVs) have the highest share in the European Top 5 countries at 3.7% (China: 2.3%; US: 1.3%). Europe also has the highest alternative powertrain share of 14.8% (China: 4%; US: 3.7%) which is mainly due to the growing numbers of plug-in hybrids in European markets fostered mostly by local OEMs.

266.8%

Increase in PHEV sales in Germany:
Q1 2020 vs. Q1 2019





Technology advances rapidly

Concerns about raw materials and environmental issues promote battery research

Ongoing discussions about the limited cobalt deposits worldwide and their often precarious mining have fueled the initiatives of numerous OEMs and suppliers to develop alternative battery designs. Companies such as Tesla are entering into strategic partnerships with battery manufacturers to improve the qualitative properties of lithium iron phosphate batteries as

an alternative to the common NMC chemistry. The reduced dependence on cobalt availability could provide OEMs with double-digit savings in raw material costs.

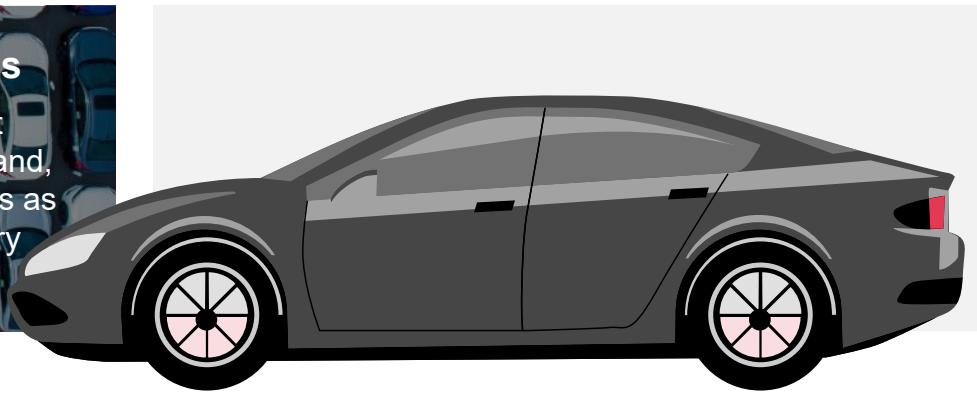
Meanwhile, European OEMs are striving to increase their own research and production capacities to reduce their dependence on Chinese battery manufacturing and to address regional needs.

While China is primarily pushing ahead with work on lithium-ion cells for small vehicles in urban areas, European OEMs must also think about other vehicle categories and routes. To reduce net lifecycle emissions, VW as well as other OEMs are intensifying their research on second-life concepts for batteries.



Emission targets will exacerbate battery shortages

As OEMs begin to leverage EVs as the primary option to meet regional emission regulations as well as global customer demand, battery supply will be under tight conditions from 2022 onwards as new e-models are launched. Capacity expansions in the battery value chain will attract significant global investment.





Latent demand unlocked

Reducing disincentives is the most effective support for electric vehicles

The share of electric vehicle sales varies greatly between European countries. While already more than 80% of newly registered vehicles in Norway are electrified, their share in the EU Top 5 markets is still just under 15%¹. An analysis² comparing different national policies to foster electric mobility concluded that reducing disincentives such as consumer barriers in affordability, convenience and availability achieved the best results, as cities like London, Oslo and Stockholm have shown. The most important factors proved to be programs to develop the local charging infrastructure, financial incentives to bridge the cost gap between e-cars and combustion-powered vehicles as well as test campaigns to create the necessary awareness for the availability of EVs and their properties.



As Norway provides a tax break of 25% on EVs, 80% of newly registered cars are electric.¹



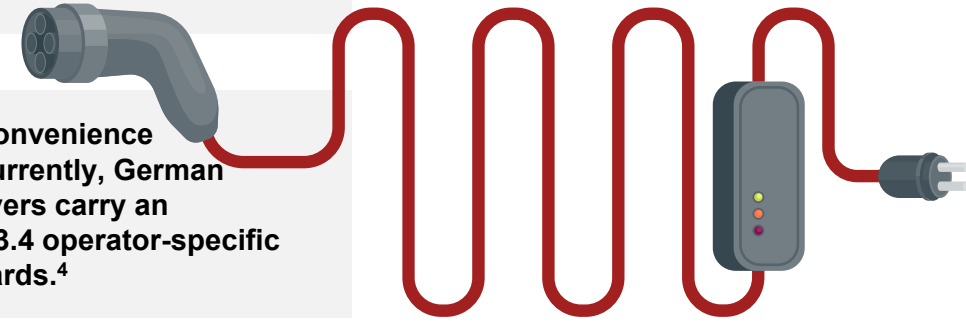
In 2030, Germany will have a shortage of between 0.6 and 1.1 million parking spaces with private charging infrastructure.³



Charging convenience problem: currently, German electric drivers carry an average of 3.4 operator-specific charging cards.⁴

Focus on domestic and workplace charging initiatives

Apart from public charging networks countries need to focus on the financial as well as regulatory support of private charging stations at home as well as at workplaces. According to research results, German buildings with one or two apartments alone have the potential for up to 12,000 charging stations.³



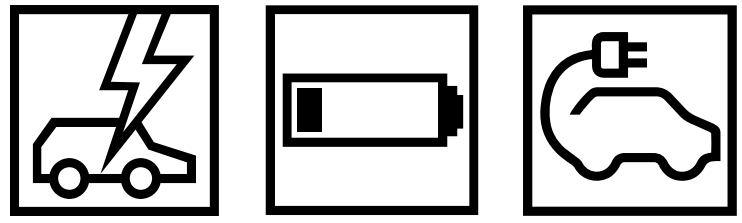
Sources:
1: PwC Autofacts (2020)
2: ICCT "Analyzing Policies to Grow the Electric Vehicle Market in European Cities" (2020)
3: dena "Privates Ladestrukturpotenzial in Deutschland" (2020)
4: New Motion "EV Driver Survey" (2020)



3. E-mobility sales data

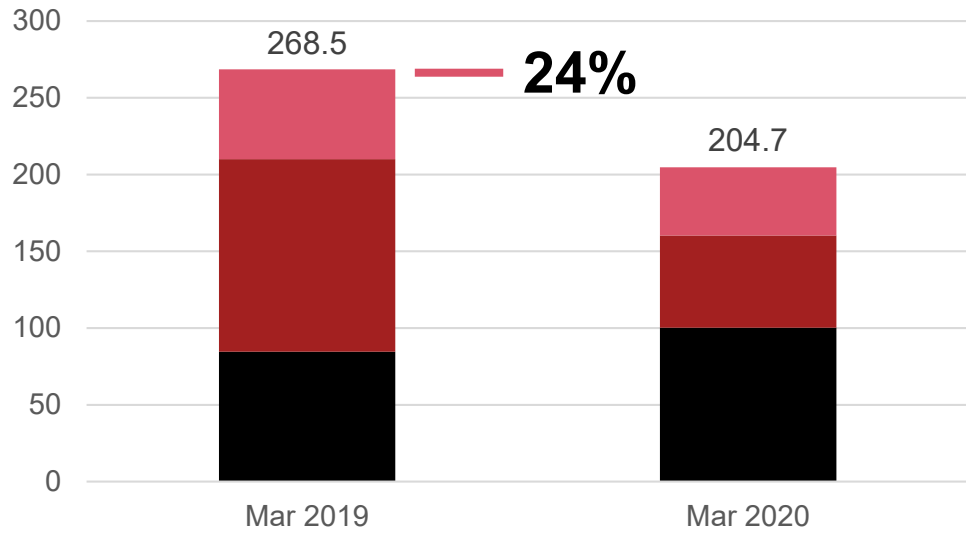
China impacts global sales

Key Markets

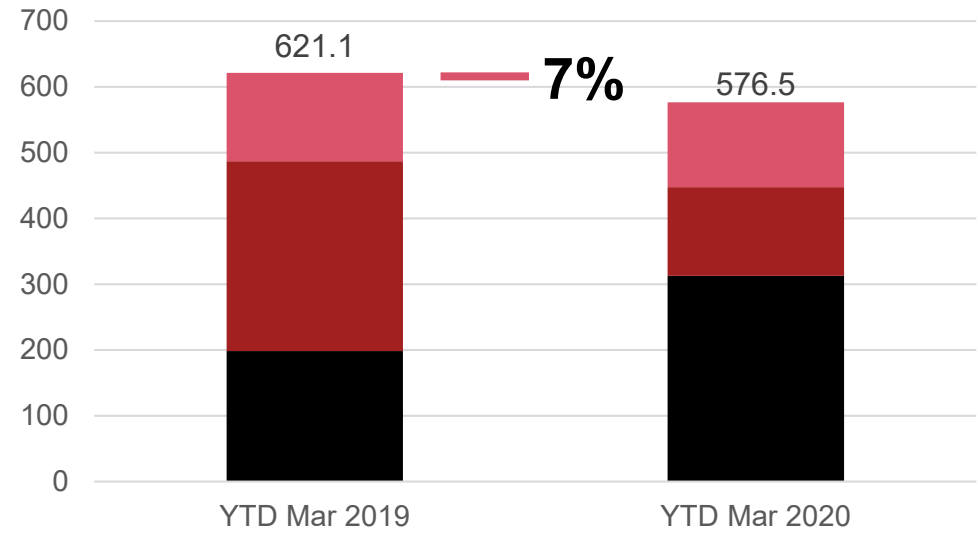


Electric Vehicles (EVs*)

Mar' 19 vs. Mar' 20 (in '000 units)



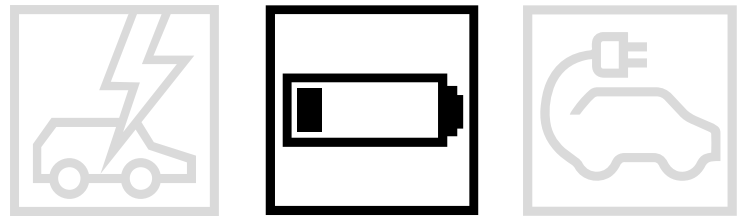
YTD Mar' 19 vs. YTD Mar' 20 (in '000 units)





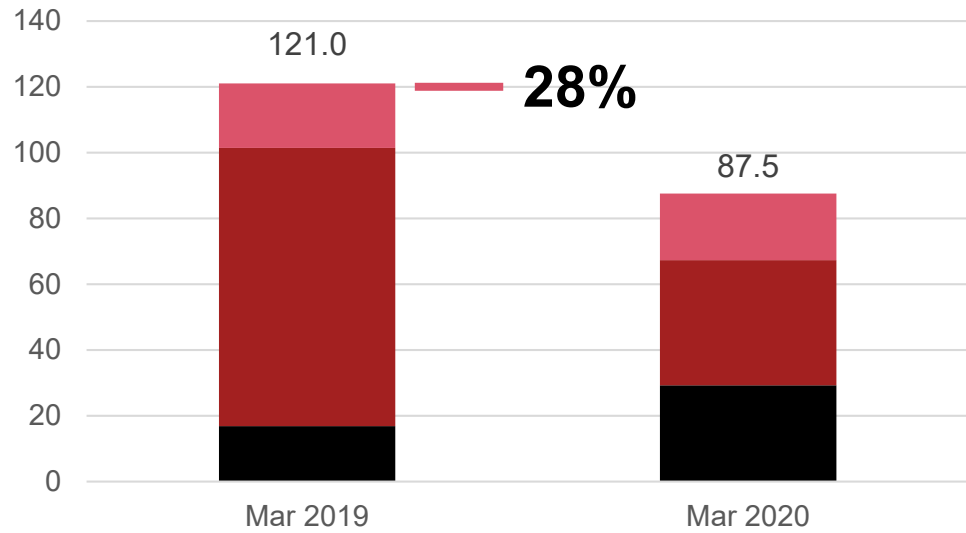
BEVs lose steam as China stalls

Key Markets

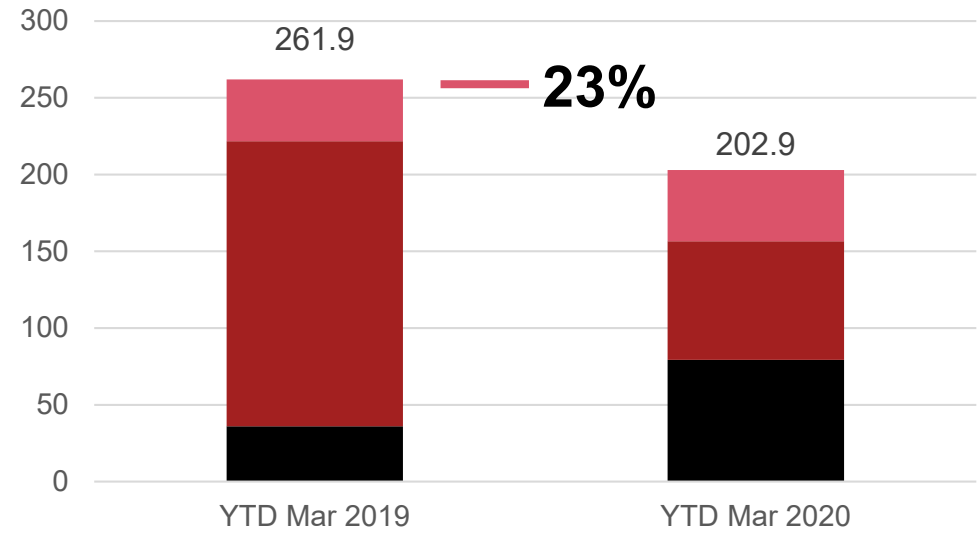


Battery Electric Vehicles

Mar' 19 vs. Mar' 20 (in '000 units)



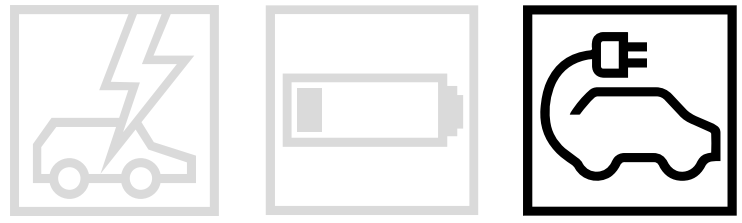
YTD Mar' 19 vs. YTD Mar' 20 (in '000 units)





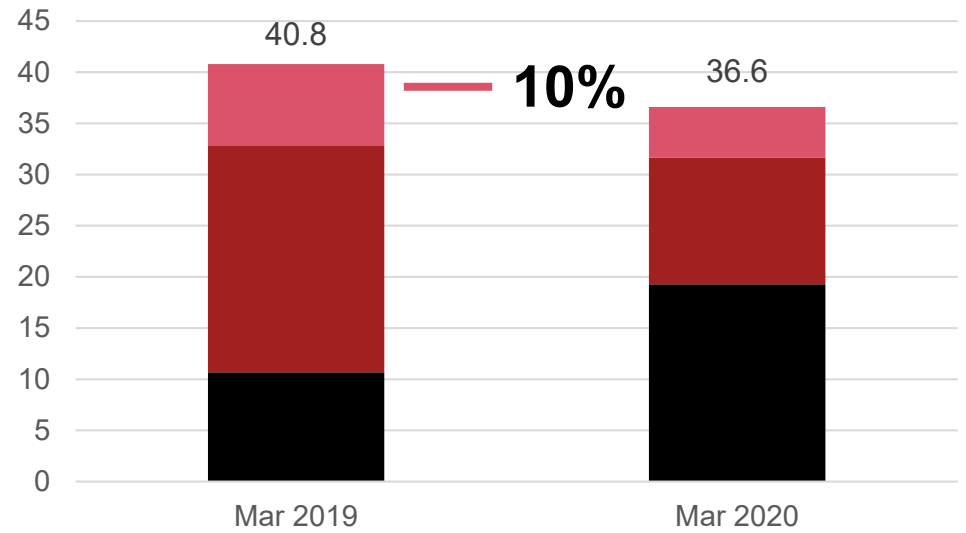
Plug-ins start their catch-up

Key Markets

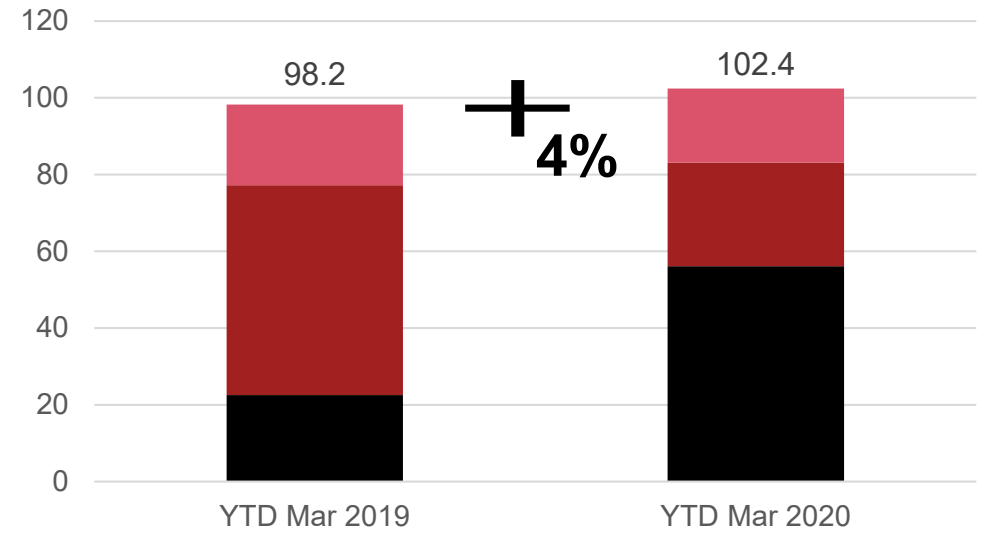


Plug-in Hybrids

Mar' 19 vs. Mar' 20 (in '000 units)



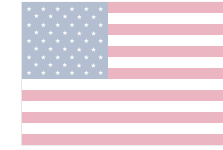
YTD Mar' 19 vs. YTD Mar' 20 (in '000 units)





4. EU Top 5

EU Top 5



France, Germany, Italy, Spain, and the UK

Although the European automotive industry was hit by the effects of COVID-19 from mid-March, registrations of electrified cars continued to grow strongly in the first quarter of 2020 compared to the equivalent quarter of last year. Within the first three months of this year, 313,000 new electrified vehicles were registered in the EU Top 5 markets, marking a total increase of 58%. The reason for this growth is to be found in both a pull factor of customers who are interested in e-mobility and a push factor of OEMs seeking to place electric vehicles in the market in order to meet CO2 fleet emission targets.

Taking a closer look at the growth rates, the figures show that this boom was mainly driven by PHEVs as the strongest-growing segment (+149%) due to increasing product availability followed by BEVs with a growth rate of 120%. Registrations of hybrid cars continued to climb with a rise of 27% compared to the first quarter of 2019.

These developments were fostered by stand-out markets like Germany where overall registrations went up by 81.3% with a remarkable boom in PHEVs (+266.8%; 26,407 units). European EV leaders such as the Netherlands show exponential growth rates (+40.7% regarding EV registrations), while Norway reached a market share of 80.2%.

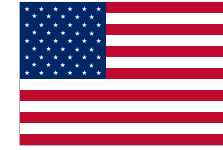


	2020 Q1	Comparison to 2019 Q1
BEV	79,000	+120%
PHEV	56,000	+149%
Hybrid	177,000	+27%
Total	313,000	+58%



4. United States

United States



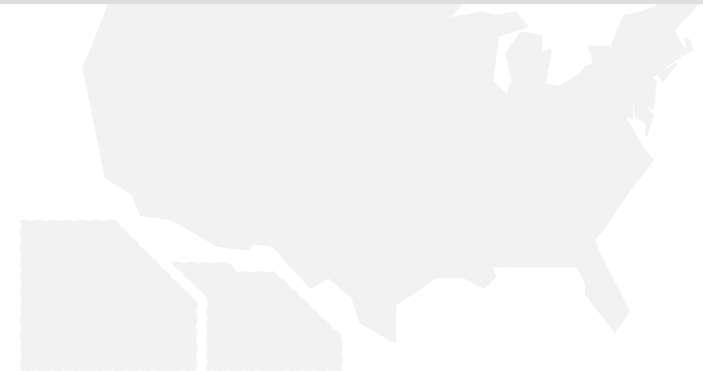
USA

Registrations of PHEVs and hybrids declined by 8% and 13% respectively. However, BEV sales increased by 15% to 46,000 units compared to the first quarter of last year. This was again mainly due to best-selling vehicles like the Tesla Model 3.

The impact of COVID-19 measures on sales is expected to be severe in April 2020, as well as in the months ahead. Due to the further relaxation of federal fuel efficiency standards, automakers offer EV products for strategic and product-feature reasons rather than compliance. Given the participation of established brands as well as well-funded startups, the segment holds out the promise of intriguing new entries and significant growth prospects.



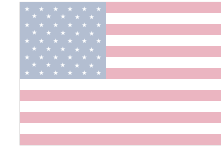
	2020 Q1	Comparison to 2019 Q1
BEV	46,000	+15%
PHEV	19,000	-8%
Hybrid	63,000	-13%
Total	129,000	-4%





4. China and Rest of Asia

China and Rest of Asia



China

The Chinese market for electric vehicles continues to shrink due to subsidy cuts as well as the effects of COVID-19 in the first quarter of 2020. Total EV registration numbers plummeted by 53%, with comparable declines across all categories. BEV registrations declined by 58%, PHEVs by 51% and hybrids by 37%, resulting in 135,000 new units within Q1. This massive drop is also the main reason for the shrinking global market growth of EVs.

In order to support the post-crisis market recovery, China has decided to extend sales subsidies for NEV (BEV and PHEV) and tax breaks for two years. These measures are forecast to reinstate China as the largest EV sales market within the year 2020 and further extend its total market share.

Rest of Asia

Electric vehicles sales data for South Korea confirm the region's downward trend in the first quarter, although it is less pronounced than in China. South Korea's overall EV registrations went down by 14.2% compared with the average for last year.



	2020 Q1	Comparison to 2019 Q1
BEV	77,000	-58%
PHEV	27,000	-51%
Hybrid	31,000	-37%
Total	135,000	-53%

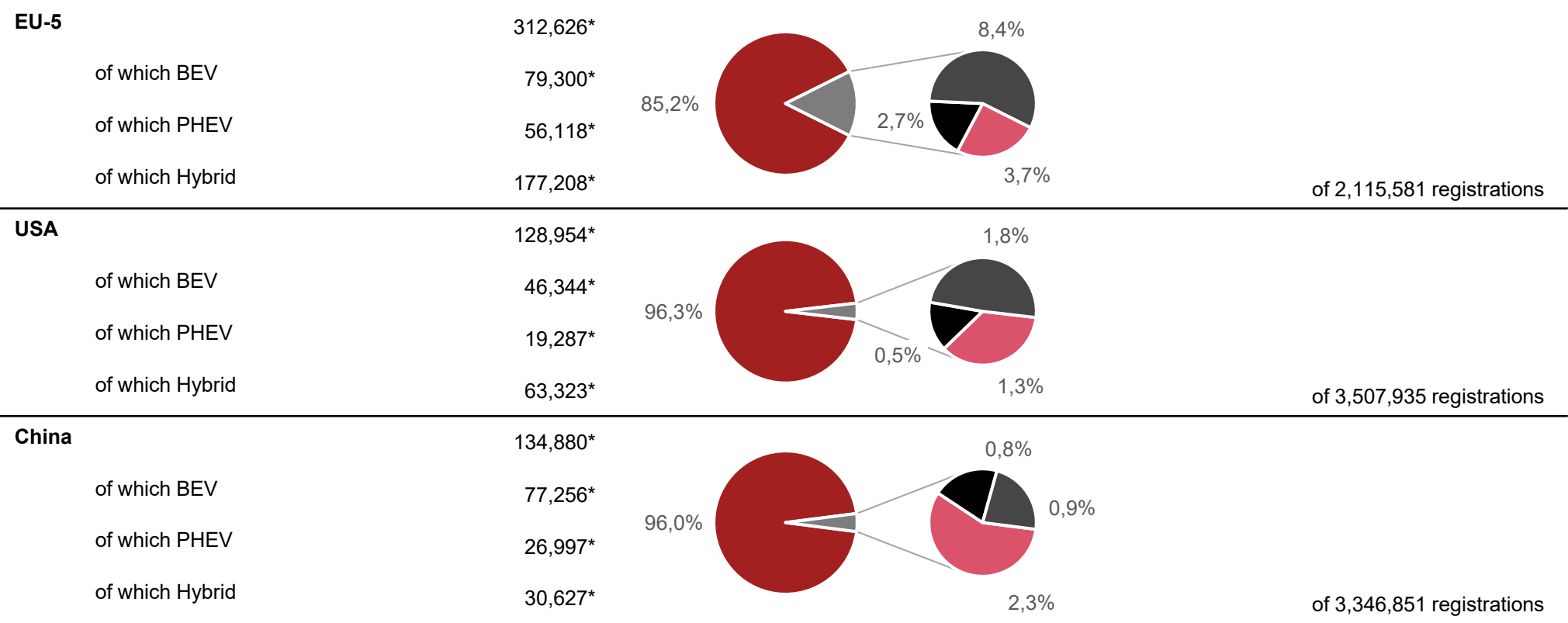




5. Rankings

Rankings for EV registrations

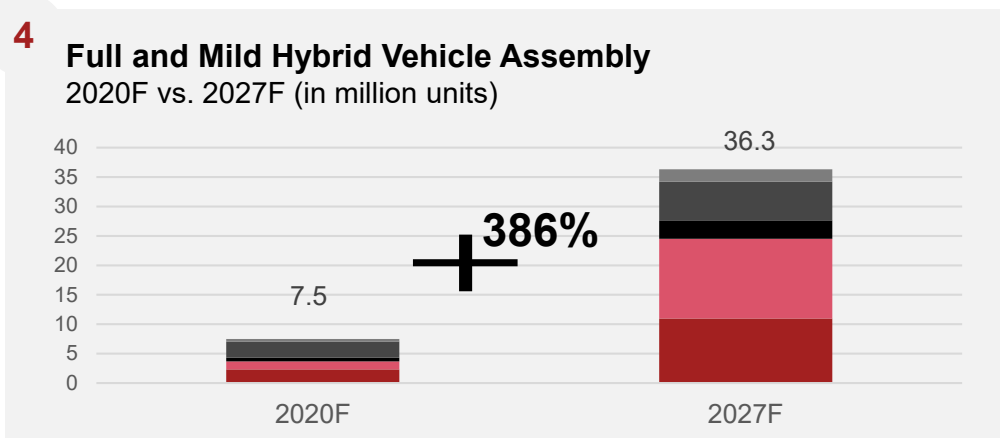
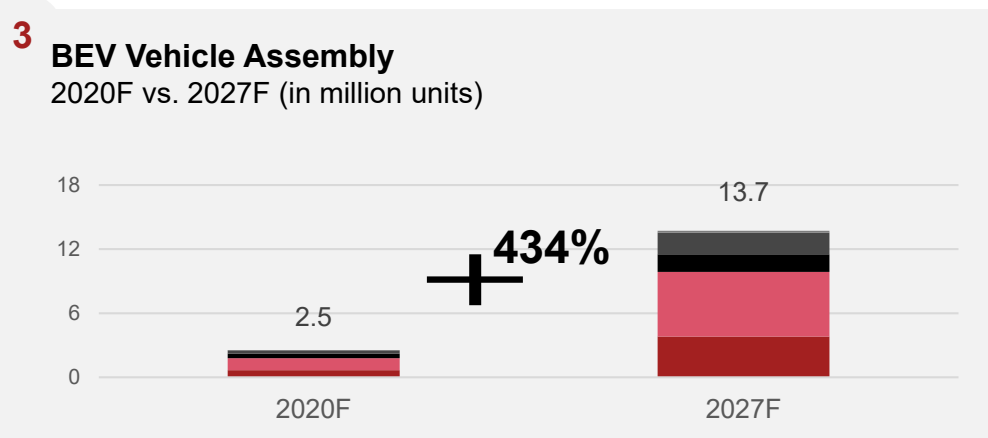
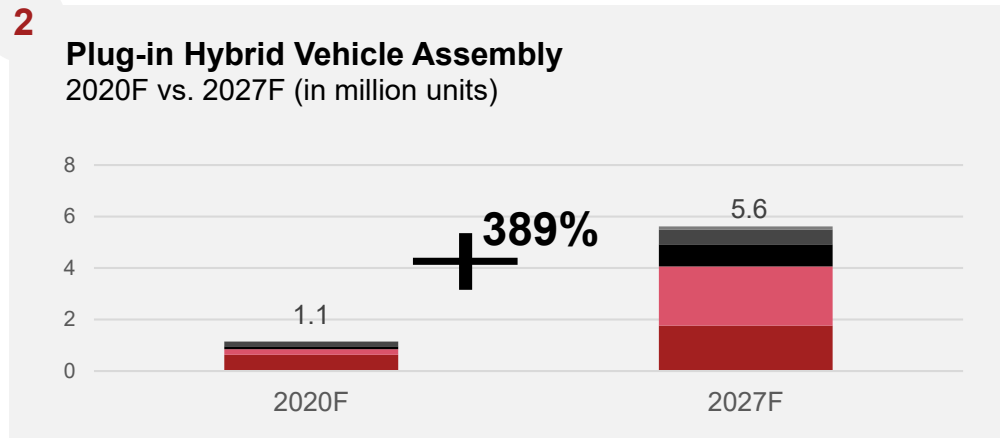
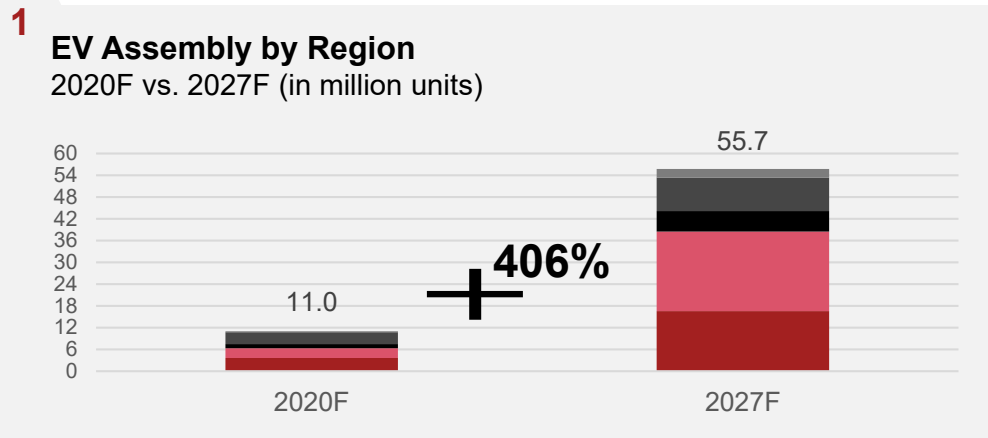
EV registrations YTD 'Mar 2020





6. Electrified vehicle assembly forecast

Electrified vehicle assembly forecast by region

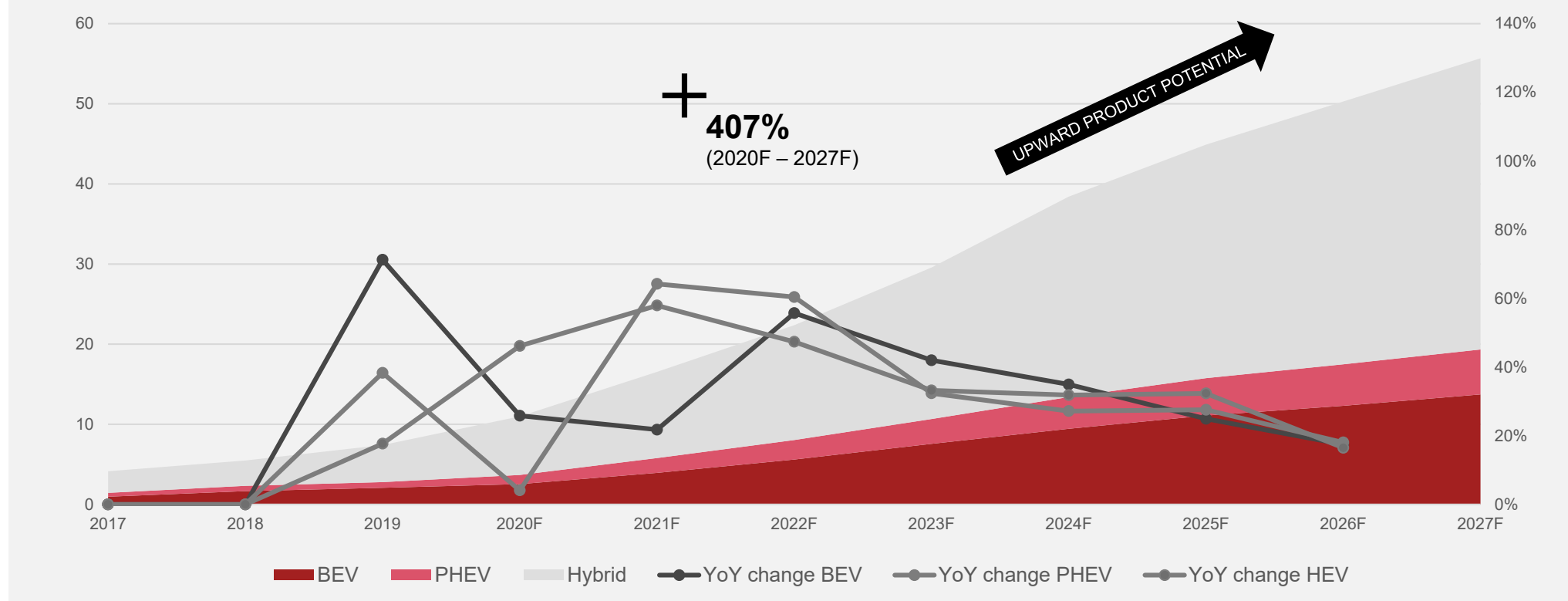




6. Electrified vehicle assembly forecast

Electrified vehicle assembly forecast

5 EV assembly by powertrain type
2020F vs. 2027F (in million units, percent)





Authors and press contact



Felix Kuhnert
Partner, Global Automotive
Leader, PwC Germany
Phone: +49 711 25034-3309
felix.kuhnert@pwc.com



Christoph Stürmer
Global Lead Analyst PwC
Autofacts®, PwC Germany
Phone: +49 69 9585-6269
christoph.stuermer@pwc.com



Joern Neuhausen
Director,
Strategy& Germany
Phone: +49 211 3890-345
joern.neuhausen
@strategyand.de.pwc.com



Annabelle Kliesing
Senior PR Lead,
Strategy& Germany
Phone: +49 89 54525-613
annabelle.kliesing
@strategyand.de.pwc.com

strategy&

Part of the PwC network

Thank you

strategyand.pwc.com

© 2020 PwC. All rights reserved.

PwC refers to the PwC network and/or one or more of its member firms, each of which is a separate legal entity. Please see pwc.com/structure for further details.

Disclaimer: This content is general information purposes only, and should not be used as a substitute for consultation with professional advisors.

E-Mobility sales data

France, Germany, Italy, Spain, UK

Legend

MOY = Month-on-Year

QOY = Quarter-on-Year

YOY = Year-on-Year

YTD = Year-to-Date

Source: Autofacts Analysis, Autoactu, ANFAC, ANFIA, BOVAG, Fourin, KBA, SMMT, Marklines

France	YTD 2020	Market Share	YTD 2019	YOY YTD 20-19	20 Q1	QOY 20 Q1	Mar 20	MOY Mar 20	Feb 20	MOY Feb 20	Jan 20	MOY Jan 20
BEV	25,885	7.1%	10,552	145.3%	25,885	145.3%	5,491	19.0%	9,443	228.0%	10,951	258.0%
PHEV	9,607	2.6%	3,934	144.2%	9,607	144.2%	1,797	19.0%	3,933	208.0%	3,877	238.0%
Hybrid	15,790	4.3%	22,982	-31.3%	15,790	-31.3%	2,253	-72.6%	6,863	-2.7%	6,674	-13.4%
Total	51,282	14.1%	37,468	36.9%	51,282	36.9%	9,540	-33.5%	20,239	80.6%	21,502	80.5%
Germany												
BEV	25,354	3.6%	15,460	64.0%	25,354	64.0%	10,329	61.5%	7,876	74.2%	7,149	57.3%
PHEV	26,407	3.8%	7,200	266.8%	26,407	266.8%	9,462	217.3%	8,291	296.7%	8,654	306.7%
Hybrid	62,863	9.0%	40,576	54.9%	62,863	54.9%	19,273	31.6%	21,577	65.5%	22,013	70.7%
Total	114,624	16.3%	63,236	81.3%	114,624	81.3%	39,064	62.6%	37,744	92.1%	37,816	93.3%
Italy												
BEV	5,399	1.6%	1,185	355.6%	5,399	355.6%	927	47.8%	2,525	882.5%	1,947	546.8%
PHEV	2,951	0.8%	1,083	172.5%	2,951	172.5%	388	-15.1%	1,223	356.3%	1,340	274.3%
Hybrid	34,717	10.0%	27,285	27.2%	34,717	27.2%	3,533	-64.3%	16,827	83.3%	14,357	74.7%
Total	43,067	12.4%	29,553	45.7%	43,067	45.7%	4,848	-55.8%	20,575	112.0%	17,644	98.8%
Spain												
BEV	4,406	2.0%	2,866	53.7%	4,406	53.7%	825	-37.9%	1,759	98.8%	1,822	179.4%
PHEV	3,489	1.6%	1,727	102.0%	3,489	102.0%	812	3.0%	1,210	182.7%	1,467	187.1%
Hybrid	35,478	16.2%	22,628	56.8%	35,478	56.8%	11,360	43.4%	12,225	74.0%	11,893	54.9%
Total	43,373	19.8%	27,221	59.3%	43,373	59.3%	12,997	29.4%	15,194	82.2%	15,182	71.7%
UK												
BEV	18,256	3.8%	5,982	205.2%	18,256	205.2%	11,694	198.5%	2,508	243.1%	4,054	203.9%
PHEV	13,664	2.8%	8,582	59.2%	13,664	59.2%	6,818	38.0%	2,058	49.9%	4,788	111.1%
Hybrid	28,360	5.9%	26,258	8.0%	28,360	8.0%	15,265	-7.1%	4,154	71.9%	8,941	20.6%
Total	60,280	12.5%	40,822	47.7%	60,280	47.7%	33,777	33.6%	8,720	92.9%	17,783	61.5%

E-Mobility sales data

EU-5, Netherlands, Norway, EU-5+2

Legend

MOY = Month-on-Year
 QOY = Quarter-on-Year
 YOY = Year-on-Year
 YTD = Year-to-Date

Source: Autofacts Analysis, Autoactu, ANFAC, ANFIA, BOVAG, Fourin, KBA, SMMT, Marklines

EU-5	YTD 2020	Market Share	YTD 2019	YOY YTD 20-19	20 Q1	QOY 20 Q1	Mar 20	MOY Mar 20	Feb 20	MOY Feb 20	Jan 20	MOY Jan 20
BEV	79,300	3.7%	36,045	120.0%	79,300	120.0%	29,266	73.4%	24,111	160.0%	25,923	162.1%
PHEV	56,118	2.7%	22,526	149.1%	56,118	149.1%	19,277	80.5%	16,715	207.5%	20,126	213.9%
Hybrid	177,208	8.4%	139,729	26.8%	177,208	26.8%	51,684	-9.5%	61,646	59.2%	63,878	45.5%
Total	312,626	14.8%	198,300	57.7%	312,626	57.7%	100,226	18.4%	102,472	91.8%	109,927	82.6%
Netherlands												
BEV	8,676	8.4%	8,626	0.6%	8,676	0.6%	3,938	-2.4%	2,835	35.5%	1,903	-23.8%
PHEV	3,271	3.2%	1,718	90.4%	3,271	90.4%	1,096	79.4%	844	139.1%	1,331	76.5%
Hybrid	11,560	11.2%	6,360	81.8%	11,560	81.8%	3,689	36.8%	3,338	116.1%	4,533	113.9%
Total	23,507	22.7%	16,704	40.7%	23,507	40.7%	8,723	18.8%	7,017	75.8%	7,767	44.6%
Norway												
BEV	16,347	50.5%	18,637	-12.3%	16,347	-12.3%	6,966	-35.1%	5,145	14.1%	4,236	24.6%
PHEV	6,221	19.2%	4,750	31.0%	6,221	31.0%	2,392	17.5%	1,910	34.9%	1,919	47.8%
Hybrid	3,372	10.4%	3,661	-7.9%	3,372	-7.9%	884	-38.3%	1,137	-6.3%	1,351	33.1%
Total	25,940	80.2%	27,048	-4.1%	25,940	-4.1%	10,242	-27.9%	8,192	14.8%	7,506	31.4%
EU-5+2												
BEV	104,323	4.6%	63,308	64.8%	104,323	64.8%	40,170	26.9%	32,091	102.2%	32,062	103.1%
PHEV	65,610	2.9%	28,994	126.3%	65,610	126.3%	22,765	70.8%	19,469	170.2%	23,376	176.2%
Hybrid	192,140	8.5%	149,750	28.3%	192,140	28.3%	56,257	-8.1%	66,121	59.4%	69,762	48.3%
Total	362,073	16.1%	242,052	49.6%	362,073	49.6%	119,191	12.2%	117,681	82.3%	125,200	75.6%

E-Mobility sales data

China, USA, South Korea, Total (Analyzed Markets)

Legend

MOY = Month-on-Year

QOY = Quarter-on-Year

YOY = Year-on-Year

YTD = Year-to-Date

Source: Autofacts Analysis, Autoactu, ANFAC, ANFIA, BOVAG, Fourin, KBA, SMMT, Marklines

China	YTD 2020	Market Share	YTD 2019	YOY YTD 20-19	20 Q1	QOY 20 Q1	Mar 20	MOY Mar 20	Feb 20	MOY Feb 20	Jan 20	MOY Jan 20
BEV	77,256	2.3%	185,635	-58.4%	77,256	-58.4%	38,042	-55.0%	9,946	-72.6%	29,269	-54.8%
PHEV	26,997	0.8%	54,706	-50.7%	26,997	-50.7%	12,355	-44.1%	2,155	-82.9%	12,487	-37.6%
Hybrid	30,627	0.9%	48,341	-36.6%	30,627	-36.6%	9,719	-48.0%	1,953	-81.7%	18,954	-0.1%
Total	134,880	4.0%	288,682	-53.3%	134,880	-53.3%	60,116	-52.0%	14,054	-76.4%	60,710	-41.5%
USA												
BEV	46,344	1.3%	40,240	15.2%	46,344	15.2%	20,237	3.1%	13,376	32.8%	12,731	20.8%
PHEV	19,287	0.5%	21,005	-8.2%	19,287	-8.2%	4,966	-38.0%	7,712	13.1%	6,608	7.0%
Hybrid	63,323	1.8%	72,900	-13.1%	63,323	-13.1%	19,141	-38.0%	24,788	8.6%	19,394	1.0%
Total	128,954	3.7%	134,145	-3.9%	128,954	-3.9%	44,345	-24.2%	45,876	15.5%	38,733	7.8%
South Korea												
BEV	5,086	1.3%	6,321	-19.5%	5,086	-19.5%	3,172	-36.4%	1,652	86.7%	262	-41.4%
PHEV	916	0.2%	174	426.1%	916	426.1%	398	239.7%	235	2511.1%	283	489.6%
Hybrid	19,534	5.1%	23,251	-16.0%	19,534	-16.0%	8,132	-5.5%	4,454	-33.3%	6,948	-12.8%
Total	25,536	6.6%	29,746	-14.2%	25,536	-14.2%	11,702	-14.7%	6,341	-16.2%	7,493	-11.5%
Total (Analyzed Markets)												
BEV	233,009	2.5%	295,504	-21.1%	233,009	-21.1%	101,621	-27.8%	57,064	-9.6%	74,324	-18.8%
PHEV	112,809	1.2%	104,879	7.6%	112,809	7.6%	40,484	-7.0%	29,571	11.0%	42,754	23.2%
Hybrid	305,624	3.2%	294,242	3.9%	305,624	3.9%	93,250	-21.9%	97,316	19.2%	115,058	23.5%
Total	651,442	6.9%	694,625	-6.2%	651,442	-6.2%	235,354	-22.5%	183,951	7.3%	232,137	5.8%