

Electric vehicles market monitor for light-duty vehicles: China, Europe, United States, and India, 2020 and 2021

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This is ICCT's first Major Markets Electric Vehicle Monitor. It builds upon another ICCT publication that focuses solely on Europe, and the Major Markets series will analyze the electric vehicle (EV) market development and fleet carbon dioxide (CO₂) emissions trends of manufacturers of light-duty vehicles (LDVs) in China, Europe, the United States, and India.¹ In 2021, these four markets made up approximately 73% of global LDV sales.

This briefing covers 2020 and 2021 and we expect that each future edition will cover an additional 6 months of market activity. Relevant definitions and details about the data sources, methodology, and assumptions that underlie the analysis are in the appendices.

THE GLOBAL MARKET

Sales of EVs globally more than doubled from 3.2 million in 2020 to 6.7 million in 2021 and EVs were 8.5% of the approximately 76 million new LDVs sold worldwide in 2021. Continued policy support for EVs and growing market interest in electrification spurred this sales growth despite the ongoing global economic disruption due to COVID-19 and supply chain problems.

In **Europe**, EVs were 17% of all new LDVs sold in 2021. This was the highest EV market share in the world and a 70% increase from Europe's EV share in 2020. **China** followed with a 13.5% EV market share in 2021. EV market shares in the **United States** and

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¹ The latest in our Europe-focused series is Peter Mock et al., "Market Monitor – European Passenger Car and Light Commercial Vehicle Registrations: January–September 2022," (ICCT: Berlin, Germany, 2022), <https://theicct.org/publication/market-monitor-eu-jan-to-sep-nov22/>.

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India increased slightly in 2021, to 4.8% and 0.4%, respectively, but both countries significantly lagged China and Europe in terms of both absolute number of EVs sold and EV market share.

In **Figure 1**, the EV market share of the four regions is on the y-axis, model availability is on the x-axis, and the size of the circles represents the number of EVs sold. As the figure also shows, in 2021, battery electric vehicles (BEVs) dominated EV sales in all markets except for Europe, where almost half of EVs were plug-in hybrids (PHEVs).² The share of BEVs remained constant in China and India in both 2020 and 2021, at 82% and 100%, respectively, and the United States saw an increase in the share of PHEVs from 23% in 2020 to 27% in 2021. Limited model availability could be a barrier to EV uptake. Although all four major markets saw an increase in EV model availability in 2021, the United States and India continued to lag China and Europe.

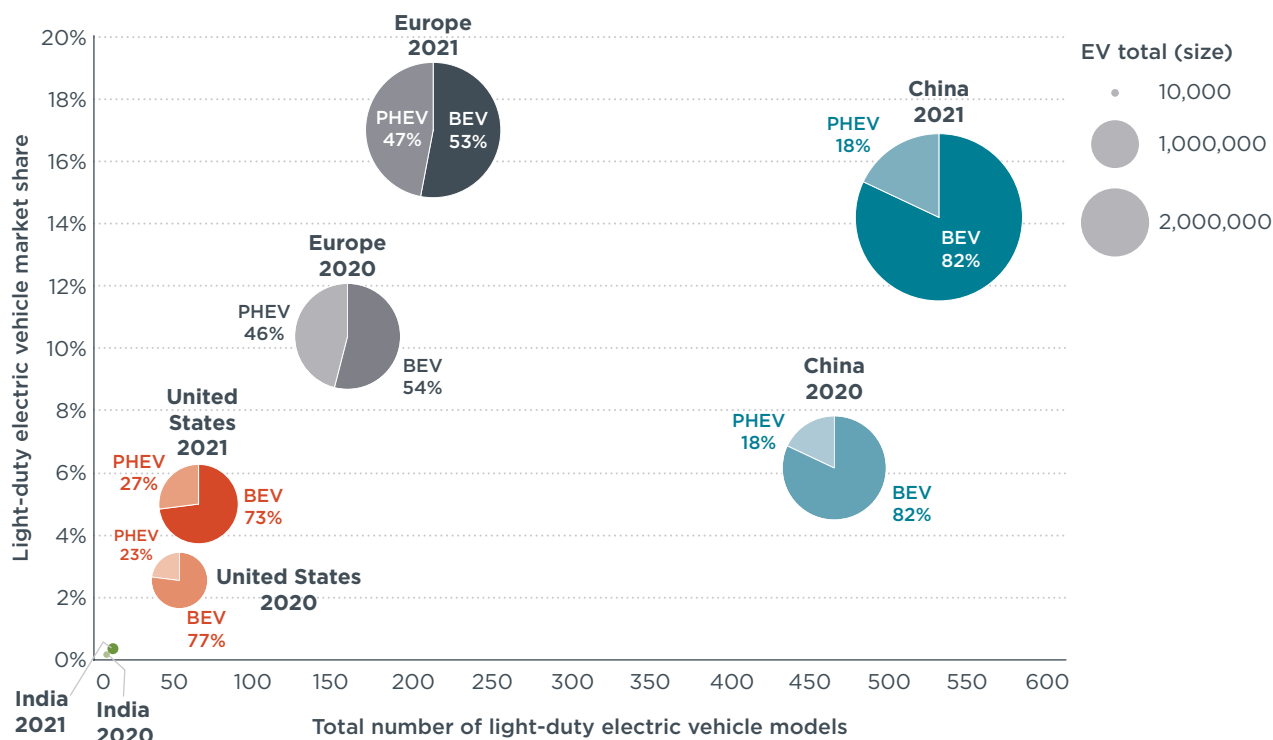


Figure 1. Light-duty EV market share, number of EV models for sale, and technology mix in the four regions.

Figure 2 presents the 10 best-selling BEV models and their corresponding shares of the market in each of the four regions in 2021. The gray bars reflect the absolute number of sales for each model and the teal circles reflect their combined market share starting from the number one bestseller to the tenth most popular model. While the 10 best-selling BEV models accounted for approximately 50% of the total BEV sales in China and Europe, they were almost all of the BEV sales in the United States and India (93% and 99%, respectively). In China, sales were mainly by three manufacturers: SAIC-GM-Wuling, which produces the Hongguang Mini, Tesla, and BYD. The two Tesla models on the list had about 300,000 in combined sales and BYD sold approximately 160,000 EVs in China in 2021. In the United States, Tesla recorded the most sales of

² The potential of PHEVs to reduce fuel consumption and greenhouse gas emissions depends on their real-world use in electric driving mode. A recent ICCT study found that the average real-world fuel consumption of PHEVs in Europe is three to five times higher than the WLTP type-approval values. See the full report: Patrick Plotz et al., “Real-World Usage of PHEVs in Europe: A 2022 Update on Fuel Consumption, Electric Driving, and CO₂ emissions,” (ICCT: Berlin, Germany, 2022), <https://theicct.org/publication/real-world-phev-use-jun22/>.

any manufacturer and its Model Y and Model 3 together accounted for 70% of all BEV sales. The Model 3 was also 11% of total BEV sales in Europe.

Volkswagen (VW) Group fared well in Europe in 2021. It ramped up EV production and four of its models, under brands VW and Škoda, were among the top 10 bestsellers. In India, the second largest auto manufacturer, Tata Motors, sold the most EVs in 2021, based on strong sales of its Nexon and Tigor models. Of approximately 12,000 EVs sold in India in 2021, the Tata Nexon alone was 70% of those sales, and was followed by the MG ZS, 22%, and the Tata Tigor, 6%.

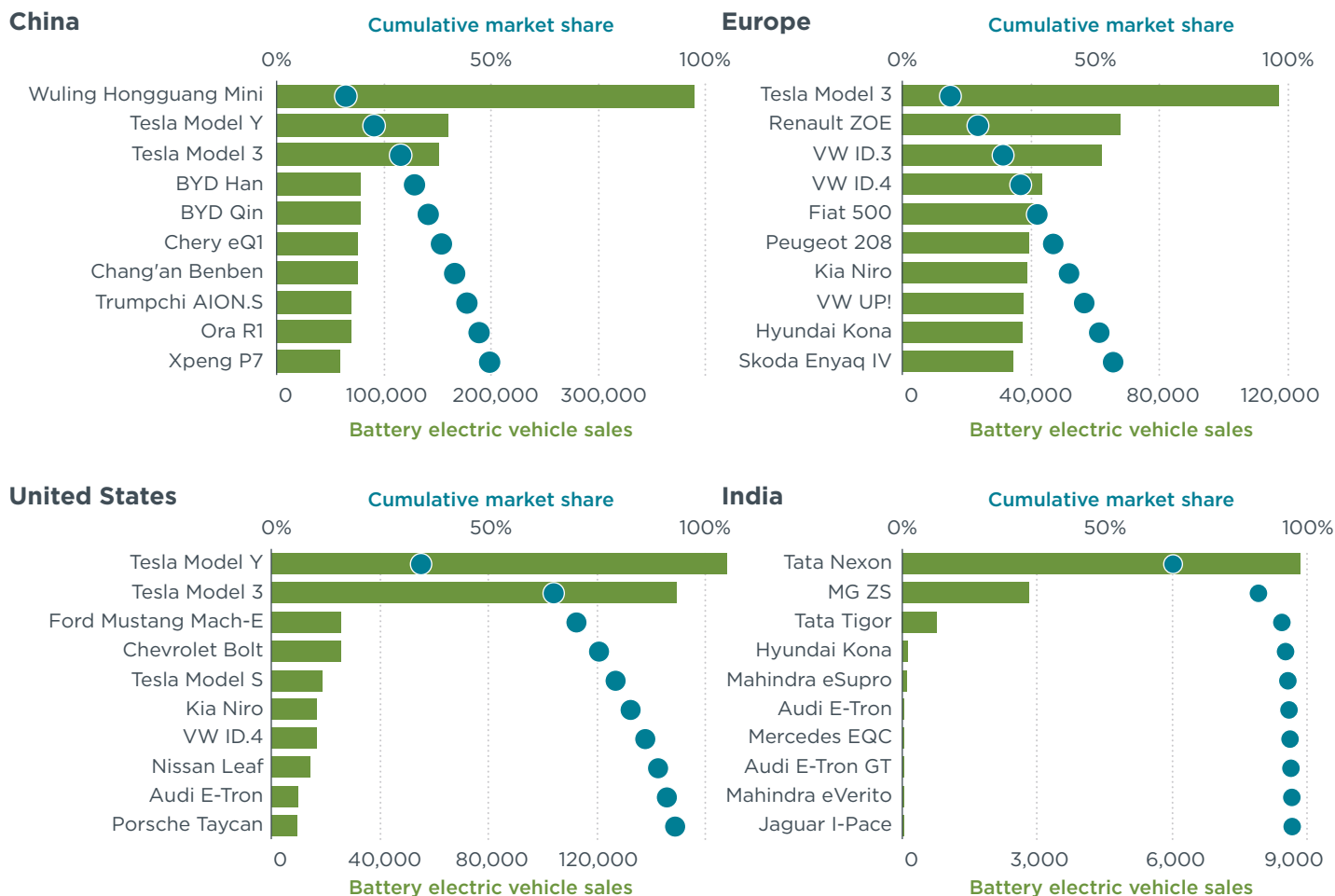


Figure 2. Top 10 best-selling battery electric vehicle models in the four regions in 2021.

CHINA

In 2021, sales of new light-duty EVs in China jumped to approximately 3 million. That was a nearly 160% increase from 2020 and EVs were 13.5% of all new LDV sales in the country. **Figure 3** shows the EV market trends in China at the manufacturer level. The left panel is the EV share of total LDV sales for each manufacturer, with the light blue portions of the bars representing the EV sales share in 2020 and the darker blue portions representing the increase in sales share in 2021. The middle panel illustrates the technology mix of those sales, with BEVs in green and PHEVs in gray, and the right panel shows the manufacturer's 2021 share of overall LDV market, including conventional combustion engine vehicles. In **Figure 4**, we show the 2021 fleet-average CO₂ emissions of each manufacturer against the nationwide fleet-average CO₂ emissions levels in both 2021 and 2020. The width of the bars represents the market share of the manufacturer in 2021.

Key highlights for China in 2021 include:

- » Except for Tesla, which has only ever sold BEVs, the EV sales share of all major manufacturers increased from 2020 to 2021, as shown in the left panel of **Figure 3**.³ Additionally, although BYD was second behind Tesla for the highest EV sales share at 73%, its share of the total LDV market was relatively low, 3%, as shown in the right panel of **Figure 3**. SAIC Motor, GWM, Chang'an, and DFM more than doubled their EV sales shares from 2020 to 2021, but still major manufacturers SAIC Motor, FAW Group, and DFM, which accounted for nearly half of the overall LDV market, had relatively low EV sales shares in 2021: 13%, 3%, and 5%, respectively.
- » In 2021, more than 70% of EV sales were BEVs. All manufacturers except Brilliance Group sold more BEVs than PHEVs, and nearly all EVs sold by Chery, GWM, and Chang'an in 2021 were BEVs.
- » Fleet-wide CO₂ emissions in China dropped from 176 g/km in 2020 to 149 g/km in 2021. In addition to Tesla and BYD, the Others group, which includes smaller manufacturers, was also below the fleet average. (**Figure 4**). The fleets of most of the remaining manufacturers had CO₂ emissions that were slightly above the nationwide fleet average.

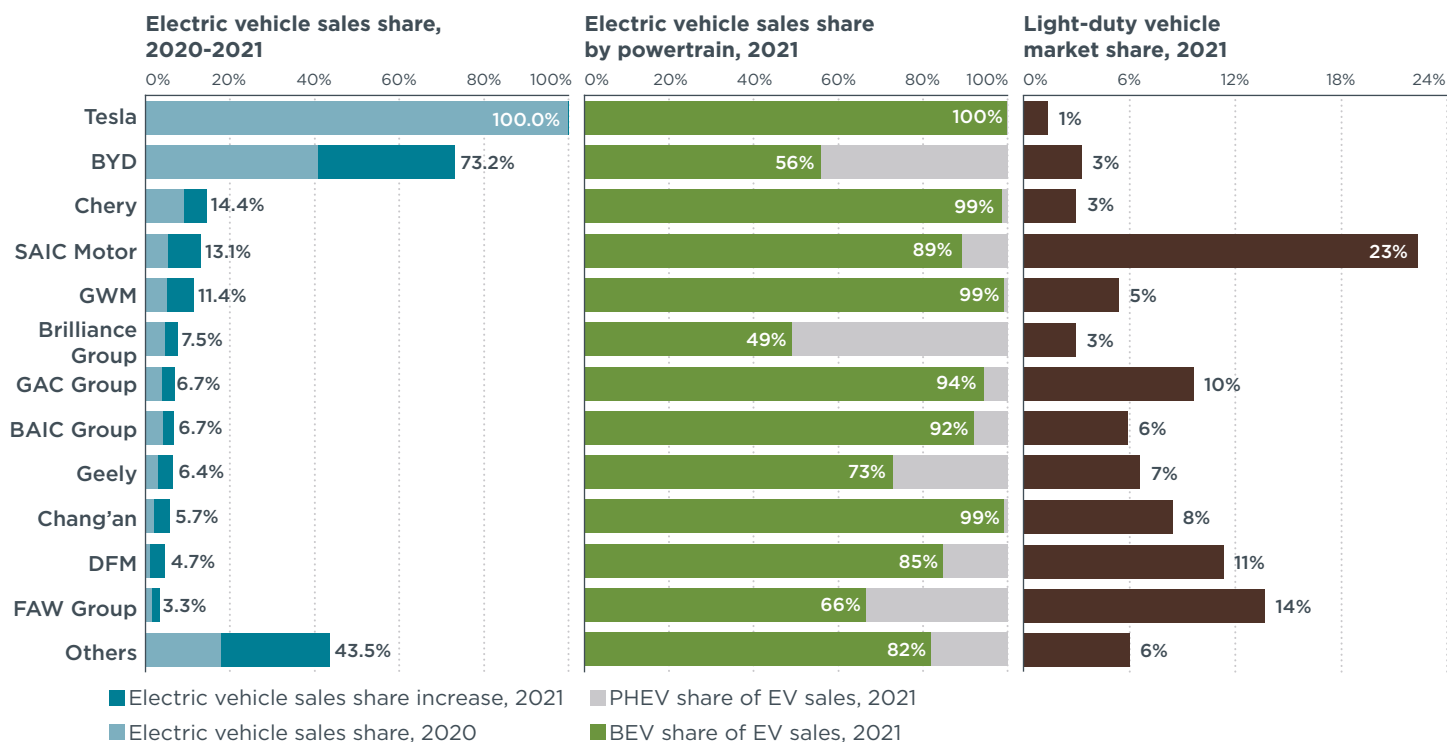


Figure 3. Light-duty electric vehicle sales share, technology mix, and market share by manufacturer in China, 2020 and 2021.

³ China groups manufacturers into auto groups according to joint ventures and Europe groups manufacturers according to compliance mechanism pooling. See Appendix B: Definitions, data sources, methodology, and assumptions for more details of manufacturer groups.

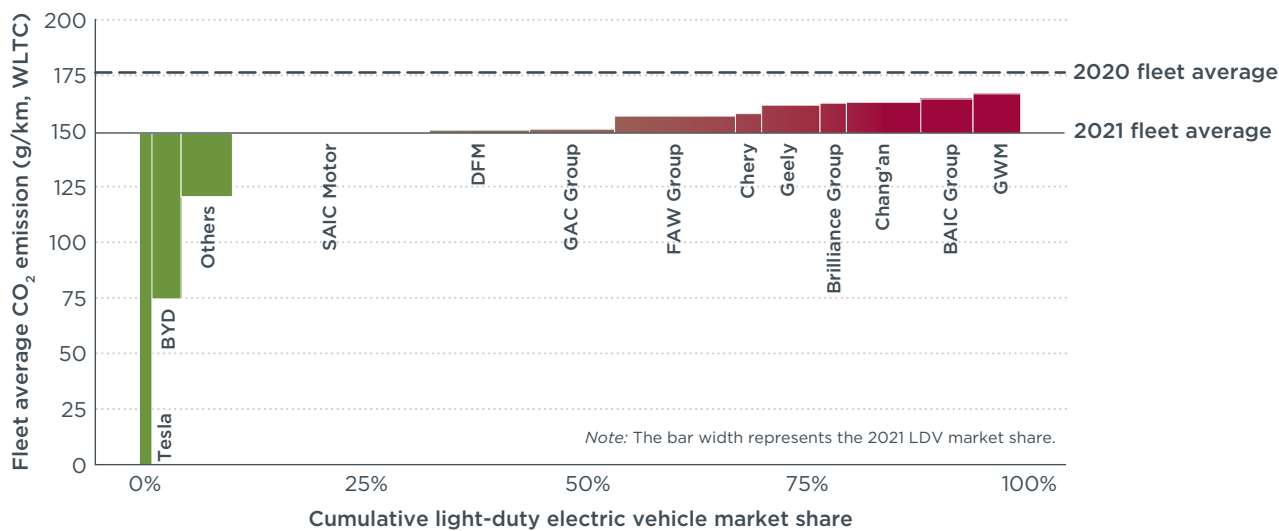


Figure 4. Fleet-average type-approval CO₂ emissions (g/km, WLTC) by manufacturer in China, 2021.

EUROPE

In 2021, Europe continued to lead the world in terms of EV market share, and approximately 17% of LDVs sold in Europe were electric, an increase from 10% in 2020. Of the 2 million EVs sold, 47% were PHEVs and 53% were BEVs. **Figure 5** shows the 2021 EV market trends in Europe at the manufacturer level. The left panel is the EV share of the total LDV sales for each manufacturer in 2021. The light blue portions of the bars represent the EV sales share in 2020 and the darker blue portions represent the increase in sales share from 2020 to 2021. The middle panel illustrates the technology mix of the sales, with BEVs in green and PHEVs in gray, and the right panel reflects the manufacturer's 2021 share of the overall LDV market. In **Figure 6**, we show the 2021 fleet-average CO₂ emissions of each manufacturer against the nationwide fleet-average CO₂ emissions levels in both 2021 and 2020. The width of the bars represents the market share of the manufacturer in 2021.

Key highlights for Europe in 2021 include:

- » As shown on the left panel in **Figure 5**, all auto manufacturing groups had a higher EV sales share in 2021 than in 2020. Tesla-Honda-JLR and Volvo led with EV sales shares of 63% and 46%, respectively, in 2021. Smaller manufacturers categorized under “Others,” including MG, Iveco, SsangYong, and Isuzu, followed close behind with nearly 32% of sales being electric on average. Two major manufacturers with high LDV market shares, VW Group and Stellantis, saw moderate increases in EV shares to approximately 17% and 10% of sales, respectively.
- » The PHEV sales share of the whole market grew in 2021, but manufacturers had different preferences between BEVs and PHEVs, as indicated in the middle panel of **Figure 5**. In 2021, Tesla-Honda-JLR, Renault-Nissan-Mitsubishi, VW Group, Hyundai, and Stellantis sold mostly BEVs, while higher-end manufacturers including Volvo, BMW, and Mercedes-Benz sold more PHEVs. Additionally, small manufacturers under the “Others” category sold slightly more PHEVs, as those were 51% of sales.
- » As shown in **Figure 6**, fleet-wide CO₂ emissions dropped by 11% in 2021 to 119 g/km. However, several manufacturers with larger LDV market shares, including VW Group and Stellantis, had higher-than-average CO₂ emissions.

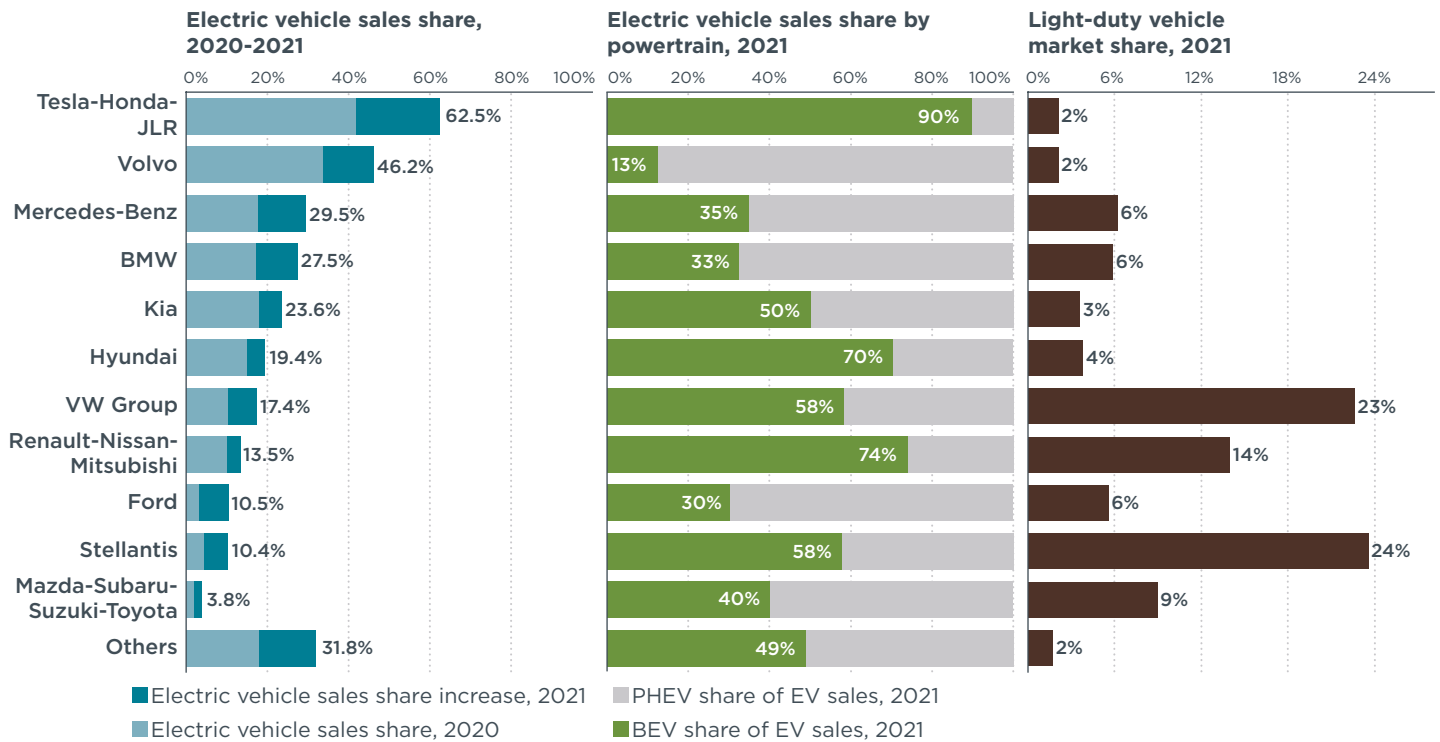


Figure 5. Light-duty electric vehicle sales share, technology mix, and market share by manufacturer in Europe, 2020 and 2021.

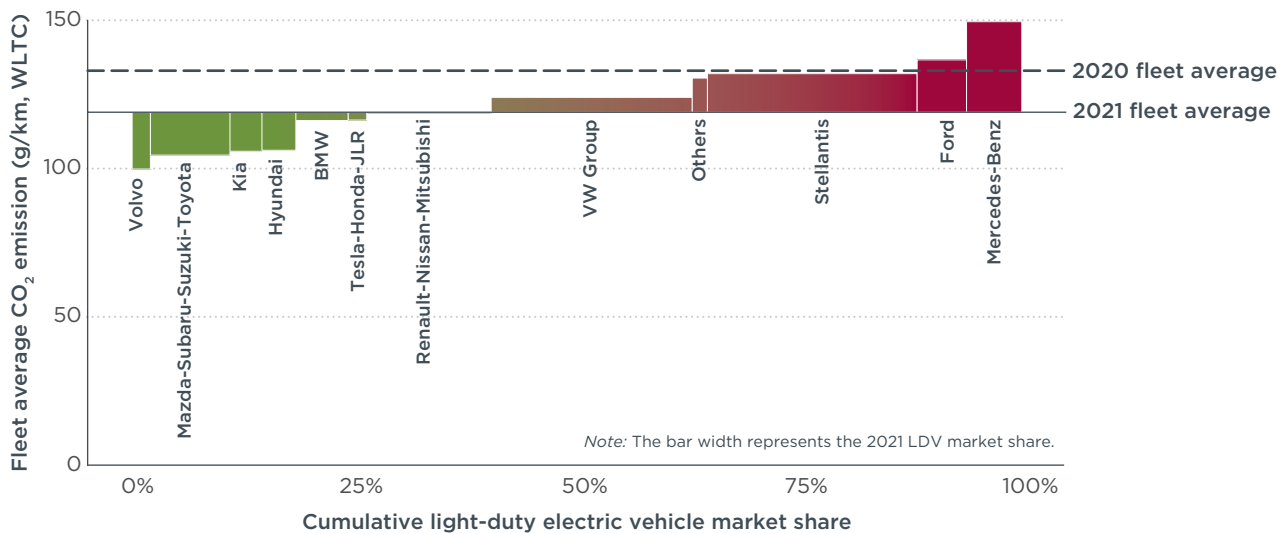


Figure 6. Fleet-average type-approval CO₂ emissions (g/km, WLTC) by manufacturer in Europe, 2021.

UNITED STATES

In 2021, the approximately 600,000 EVs sold in the United States were 4.8% of total LDV sales. EV sales increased from both legacy automakers, which are gradually electrifying existing models, and newer all-electric manufacturers such as Tesla and Rivian, both of which ramped-up production. **Figure 7** shows the 2021 EV market trends in the United States at the manufacturer level. The left panel shows the EV share of total LDV sales for each manufacturer in 2021, with the light blue portions of the bars representing the EV sales share in 2020 and the darker blue (or orange) portions representing the increase (or decrease, in the case of the orange) in sales

share from 2020 to 2021. The middle panel illustrates the technology mix of the sales, with BEVs in green and PHEVs in gray bar, and the right panel reflects the 2021 LDV market shares of each manufacturer. In **Figure 8**, we show the 2021 average CO₂ emissions of each manufacturer against the nationwide fleet-average CO₂ emissions level in both 2021 and 2020. The width of the bars represents the market share of the manufacturer in 2021.

Key highlights for the United States in 2021 include:

- » Volvo was second to Tesla in terms of the highest EV sales share in 2021 and its share was almost five times higher than that of VW Group and BMW, the next two highest-ranking manufacturers, as shown in the left panel of **Figure 7**. New all-electric vehicle manufacturers including Lucid, Rivian, and Karma, categorized under “Others” in the figure, accelerated sales in 2021. For Jaguar Land Rover (JLR), Honda, and Mercedes-Benz, their EV sales shares declined from 2020 to 2021. While Toyota, GM, and Ford, all major manufacturers with high LDV market shares, saw EV sales increase, their EV sales shares remained low at 2%, 1%, and 2%, respectively.
- » In 2021, most manufacturers sold more BEVs than PHEVs. Nonetheless, Stellantis, Toyota, Subaru, and Honda sold nearly entirely PHEVs, as shown on the middle panel of **Figure 7**. High-end manufacturers including Volvo and BMW also sold many more PHEVs than BEVs. For other manufacturers, though, including Tesla, GM, Nissan, and Mazda, their EVs sales in 2021 were all BEVs.
- » As shown in **Figure 8**, fleet-wide CO₂ emissions only dropped by 1% from 2020 to 2021. While the fleet-average CO₂ emissions were below-average for manufacturers that make up more than half of the LDV market, emissions were above average for a few larger manufacturers, namely Toyota, Ford, GM, and Stellantis.

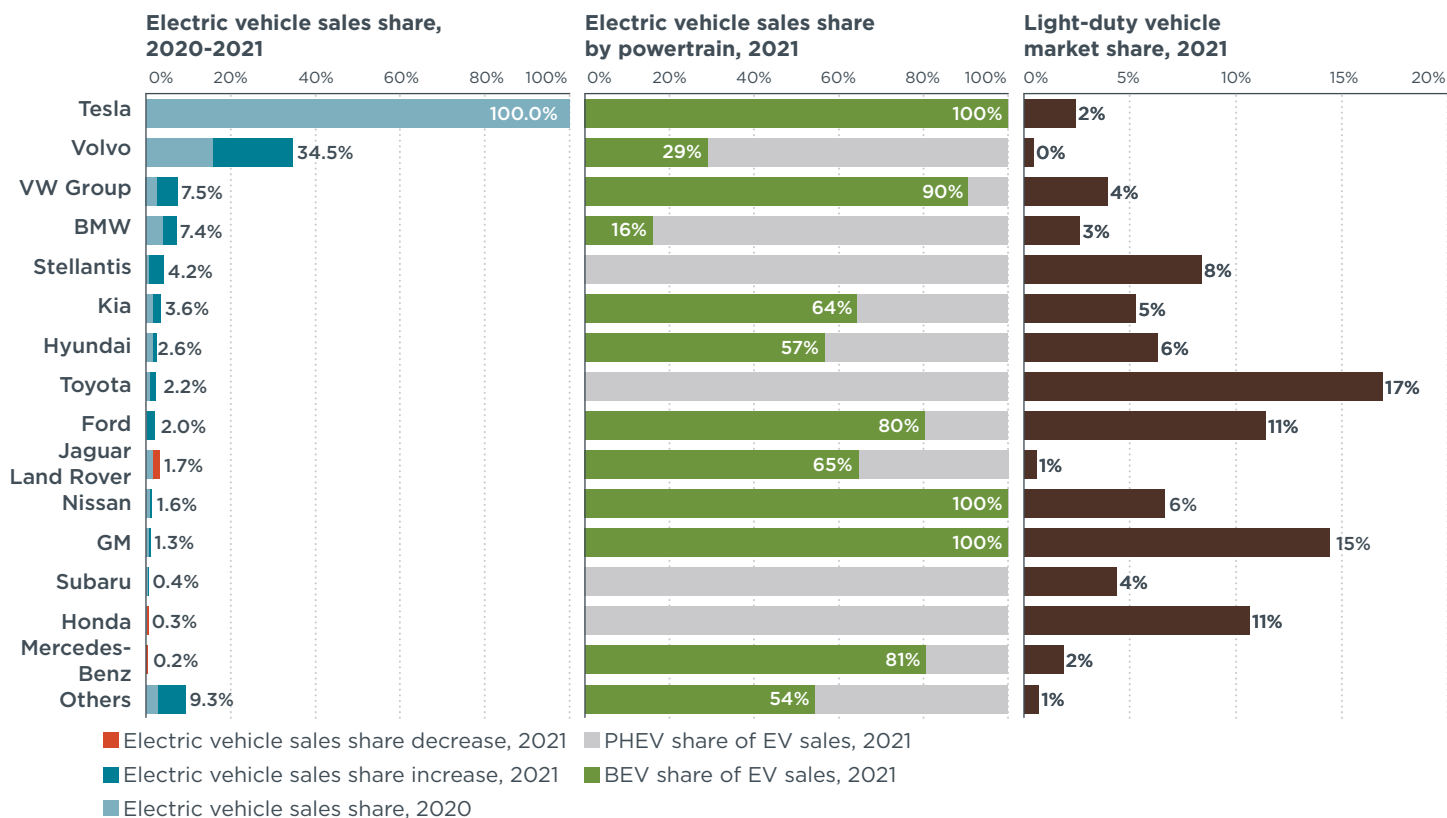


Figure 7. Light-duty electric vehicle sales share, technology mix, and market share by manufacturer in the United States, 2020 and 2021.

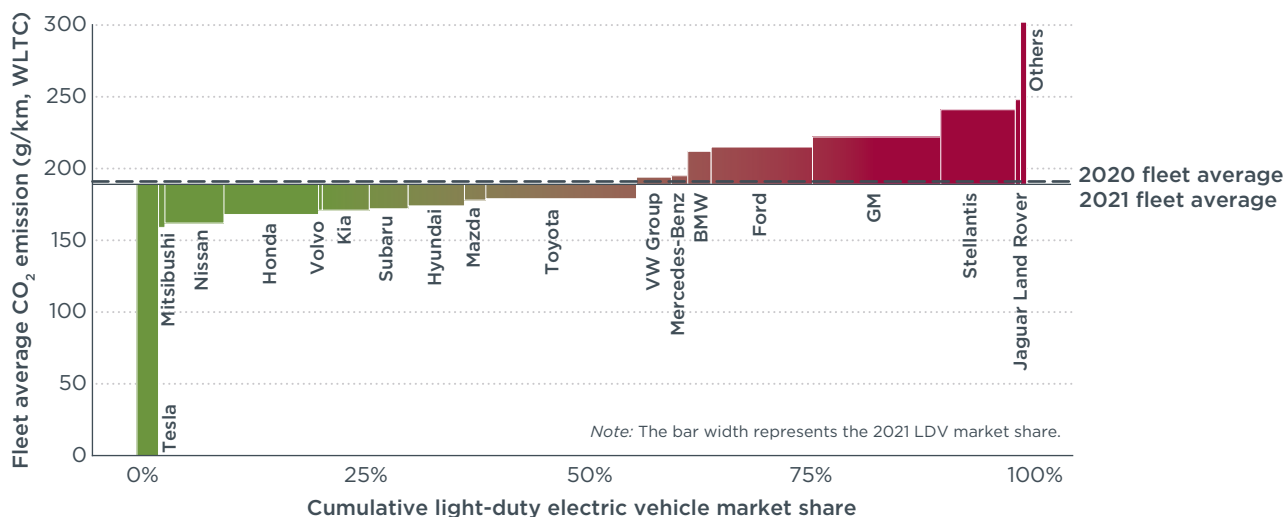


Figure 8. Fleet-average type-approval CO₂ emissions (g/km, WLTC) by manufacturer in the United States, 2021.

INDIA

India lagged the other major markets in light-duty EV sales in 2021 and only about 12,000 EVs were sold that year. While that was a 176% increase from the previous year, EVs were only 0.4% of the total LDV market in 2021. **Figure 9** shows the 2021 EV market trends in India at the manufacturer level. The left panel shows the EV share of the total LDV sales for each manufacturer in 2021. The light blue portions of the bars represent the EV sales share in 2020, and the darker blue (or orange) portions represent the increase (or decrease, if orange) in sales share from 2020 to 2021. The middle panel illustrates the technology mix of the sales, with BEVs in green and PHEVs in gray, and the right panel reflects the corresponding 2021 LDV market share of each manufacturer. In **Figure 10**, we show the 2021 fleet-average CO₂ emissions of each manufacturer against the nationwide fleet-average CO₂ emissions level in both 2021 and 2020. The width of the bars represents the market share of the manufacturer in 2021.

Key highlights for India in 2021 include:

- » Only five of the top 12 manufacturers had any EV sales at all in 2021, as shown on the left panel of **Figure 9**. Three manufacturers saw an increase in sales share from 2020 to 2021 and two of them, Mahindra and Hyundai, saw a decline. MG led the pack with a nearly 7% EV sales share in 2021. While Tata Motors (Tata) ranked second in terms of EV sales share with 2%, it is one of the largest manufacturers in India and was 75% of all electric LDV sales nationally in 2021. Luxury brands including Stellantis, Mercedes-Benz, BMW, and Volvo, which are categorized under “Others,” sold all BEVs in 2021, as shown on the middle panel of **Figure 9**.
- » As shown in **Figure 10**, fleet-wide emissions dropped by only 1% in 2021. Most manufacturers remained above the fleet-average CO₂ emissions level, including those with the highest EV sales shares like Tata Motors, Mahindra, Toyota, and Kia.

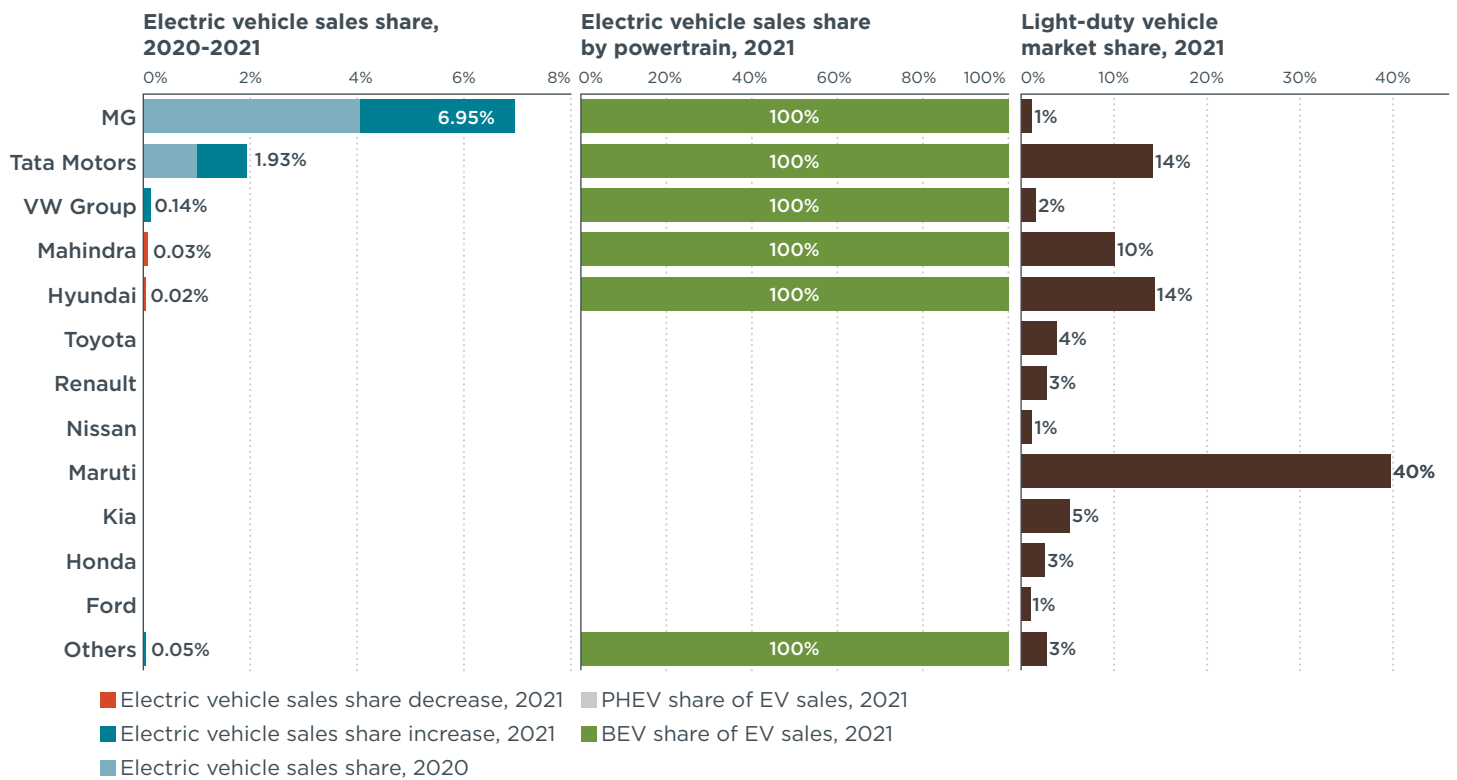


Figure 9. Light-duty electric vehicle sales share, technology mix, and market share by manufacturer in India, 2020 and 2021.

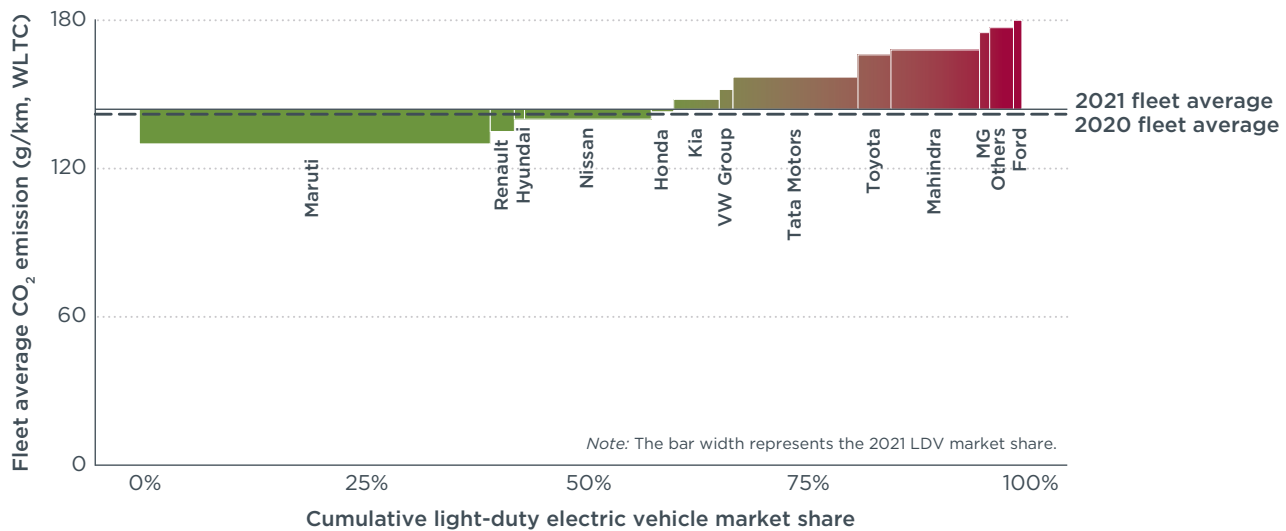


Figure 10. Fleet-average type-approval CO₂ emissions (g/km, WLTC) by manufacturer in India, 2021.

APPENDIX A. LIGHT-DUTY ELECTRIC VEHICLE MARKET PERFORMANCE AND FLEET-AVERAGE CO₂ EMISSIONS BY REGION

Table A1 presents electric light-duty vehicle (LDV) market shares by segment and by technology in all four major markets for 2021 and 2020. PC is passenger car and LCV is light commercial vehicle. Note that the electric vehicle (EV) market share across technology and segment might not add up to the total LDV EV market share due to rounding. The subsequent tables, A2 through A9, show EV market performance and fleet-average type-approval CO₂ emissions across manufacturers in the four markets, also for 2021 and 2020. Note that *EV sales share* refers to the EV percentage of the total LDV sales for each manufacturer. For example, Tesla's EV sales share is 100% because it only sells battery electric vehicles (BEVs). *EV market share* refers to a given manufacturer's EV sales share of the entire EV market in the region and *LDV market share* reflects the share of LDV sales of each manufacturer in each region. To illustrate, Tesla's sales are 11% of the EV market in China but are only 1% of China's broader LDV market. All CO₂ values shown are under the Worldwide harmonized Light vehicles Test Cycle (WLTC) and reflect the sales-weighted, fleet-average, type-approved CO₂ values; they do not account for manufacturer use of any of the performance credits and adjustments that are allowed as compliance mechanisms.

Table A1. Market shares of light-duty electric vehicles by region, segment, and technology

Region	2021						2020					
	PC		LCV		LDV		PC		LCV		LDV	
	BEV	PHEV	BEV	PHEV	BEV	PHEV	BEV	PHEV	BEV	PHEV	BEV	PHEV
China	12%	3%	4%	0%	11%	2%	5%	1%	1%	0%	5%	1%
Europe	10%	9%	3%	0%	9%	8%	6%	5%	2%	0.1%	6%	5%
United States	4%	1%	3%	2%	4%	1%	2%	1%	2%	1%	2%	1%
India	0.4%	0%	0.02%	0%	0.4%	0%	0.2%	0%	0%	0%	0.2%	0%
Global	8%	3%	2%	1%	6%	2%	4%	2%	1%	0%	3%	1%

Table A2. Light-duty electric vehicle market performance and fleet-average CO₂ emissions in China, 2021

China light duty vehicles 2021									
Manufacturer	EV sales share		Percentage point change of EV sales shares from 2020		Number of EV models		LDV market share	EV market share	Fleet average CO ₂ (g/km) WLTC
	BEV	PHEV	BEV	PHEV	BEV	PHEV			
Tesla	100%	0%	0 pp	0 pp	2	0	1%	11%	0
BYD	41%	32%	+12 pp	+20 pp	18	10	3%	18%	75
Chery	14%	0%	+5 pp	0 pp	19	2	3%	3%	158
SAIC Motor	12%	1%	+8 pp	0 pp	40	13	23%	22%	148
GWM	11%	0%	+6 pp	0 pp	9	2	5%	4%	167
GAC Group	6%	0%	+2 pp	0 pp	14	5	10%	5%	151
BAIC Group	6%	1%	+2 pp	+1 pp	28	5	6%	3%	164
Chang'an	6%	0%	+4 pp	0 pp	31	5	8%	4%	163
Geely	5%	2%	+3 pp	+1 pp	17	17	7%	3%	162
DFM	4%	1%	+3 pp	+1 pp	32	7	11%	4%	150
Brilliance Group	4%	4%	+4 pp	-1 pp	2	2	3%	1%	163
FAW Group	2%	1%	+1 pp	0 pp	17	5	14%	3%	157
Others	36%	8%	+22 pp	+5 pp	224	7	6%	19%	121
Fleet	11%	2%	+6 pp	+1 pp	453	80	100%	100%	149

Table A3. Light-duty electric vehicle market performance and fleet-average CO₂ emissions in China, 2020

China light duty vehicles 2020							
Manufacturer	EV sales share		Number of EV models		LDV market share	EV market share	Fleet average CO ₂ (g/km) WLTC
	BEV	PHEV	BEV	PHEV			
Tesla	100%	0%	2	0	1%	12%	0
BYD	29%	12%	19	7	2%	13%	133
Chery	9%	0%	16	0	2%	4%	187
GWM	5%	0%	5	2	5%	5%	191
SAIC Motor	4%	1%	29	18	23%	23%	175
BAIC Group	4%	0%	31	4	7%	5%	184
GAC Group	4%	0%	13	7	10%	7%	172
Geely	2%	1%	18	15	6%	3%	185
Chang'an	2%	0%	28	2	8%	3%	188
DFM	1%	0%	30	5	12%	3%	171
FAW Group	1%	1%	11	5	16%	4%	176
Brilliance Group	0%	5%	1	4	3%	2%	190
Others	14%	3%	187	8	5%	16%	174
Fleet	5%	1%	390	77	100%	100%	176

Table A4. Light-duty electric vehicle market performance and fleet-average CO₂ emissions in Europe, 2021

Europe light duty vehicles 2021									
Manufacturer	EV sales share		Percentage point change of EV sales shares from 2020		Number of EV models		LDV market share	EV market share	Fleet average CO ₂ (g/km) WLTC
	BEV	PHEV	BEV	PHEV	BEV	PHEV			
Tesla-Honda-JLR	56%	6%	+17 pp	+3 pp	7	7	2%	8%	116
Hyundai	14%	6%	0 pp	+5 pp	2	3	4%	4%	106
Kia	12%	12%	+3 pp	+3 pp	3	4	3%	5%	106
Mercedes-Benz	10%	19%	+5 pp	+6 pp	12	9	6%	11%	150
VW Group	10%	7%	+4 pp	+3 pp	24	23	23%	23%	124
Renault-Nissan-Mitsubishi	10%	4%	+2 pp	+2 pp	12	4	14%	11%	118
BMW	9%	19%	+4 pp	+6 pp	5	10	6%	10%	116
Stellantis	6%	4%	+3 pp	+2 pp	30	15	23%	14%	132
Volvo	6%	40%	+4 pp	+8 pp	3	8	2%	6%	100
Ford	3%	7%	+3 pp	+4 pp	1	3	6%	3%	137
Mazda-Subaru-Suzuki-Toyota	2%	2%	0 pp	+3 pp	3	3	9%	2%	105
Others	16%	16%	0 pp	+14 pp	18	5	2%	3%	131
Fleet	9%	8%	+3 pp	+3 pp	120	94	100%	100%	119

Table A5. Light-duty electric vehicle market performance and fleet-average CO₂ emissions in Europe, 2020

Europe light duty vehicles 2020							
Manufacturer	EV sales share		Number of EV models		LDV market share	EV market share	Fleet average CO ₂ (g/km) WLTC
	BEV	PHEV	BEV	PHEV			
Tesla-Honda-JLR	39%	3%	7	5	2%	7%	130
Hyundai	14%	1%	4	2	3%	5%	117
Kia	9%	9%	2	4	3%	5%	117
Renault-Nissan-Mitsubishi	8%	2%	5	4	15%	15%	134
VW Group	6%	4%	16	18	24%	24%	137
Mercedes-Benz	5%	13%	6	9	7%	12%	160
BMW	5%	13%	3	10	6%	10%	135
Stellantis	3%	2%	19	9	23%	10%	142
Volvo	2%	32%	2	8	2%	7%	119
Mazda-Subaru-Suzuki-Toyota	1%	1%	2	3	8%	1%	115
Ford	0%	3%	1	5	6%	2%	147
Others	16%	2%	13	3	1%	2%	176
Fleet	6%	5%	80	80	100%	100%	133

Table A6. Light-duty electric vehicle market performance and fleet average CO₂ emissions in the United States, 2021

US light duty vehicles 2021									
Manufacturer	EV sales share		Percentage point change of EV sales shares from 2020		Number of EV models		LDV market share	EV market share	Fleet average CO ₂ (g/km) WLTC
	BEV	PHEV	BEV	PHEV	BEV	PHEV			
Tesla	100%	0%	0 pp	0 pp	4	0	2%	51%	0
Volvo	10%	24%	+10 pp	+8 pp	2	2	0%	6%	171
VW Group	7%	1%	5 pp	+1 pp	6	6	4%	0%	194
Kia	2%	1%	+1 pp	0 pp	1	1	5%	2%	171
Ford	2%	0%	+2 pp	0 pp	1	3	11%	4%	215
Nissan	2%	0%	+1 pp	0 pp	1	0	6%	4%	162
Hyundai	1%	1%	0 pp	0 pp	2	2	6%	4%	174
GM	1%	0%	0 pp	0 pp	1	0	15%	4%	222
BMW	1%	6%	0 pp	+3 pp	2	7	3%	5%	212
Jaguar Land Rover	1%	1%	-1 pp	0 pp	1	2	1%	1%	248
Mercedes-Benz	0%	0%	0 pp	0 pp	1	0	2%	3%	195
Mazda	0%	0%	0 pp	0 pp	1	0	3%	7%	178
Stellantis	0%	4%	0 pp	+3 pp	0	3	8%	8%	241
Toyota	0%	2%	0 pp	+1 pp	0	3	17%	0%	179
Subaru	0%	0%	0 pp	0 pp	0	1	4%	0%	172
Honda	0%	0%	0 pp	-1 pp	0	1	11%	0%	168
Mitsubishi	0%	0%	0 pp	0 pp	0	0	1%	0%	159
Others	5%	4%	+5 pp	+1 pp	4	8	1%	1%	302
Fleet	4%	1%	+2 pp	0 pp	27	39	100%	100%	189

Table A7. Light-duty electric vehicle market performance and fleet average CO₂ emissions in the United States, 2020

US light duty vehicles 2020							
Manufacturer	EV sales share		Number of EV models		LDV market share	EV market share	Fleet average CO ₂ (g/km) WLTC
	BEV	PHEV	BEV	PHEV			
Tesla	100%	0%	4	0	2%	60%	0
VW Group	2%	0%	3	4	4%	4%	193
Jaguar Land Rover	2%	1%	1	2	1%	1%	234
Nissan	1%	0%	1	0	6%	3%	169
Kia	1%	1%	2	2	5%	3%	170
GM	1%	0%	1	1	17%	6%	213
Hyundai	1%	1%	2	1	5%	4%	174
BMW	1%	3%	2	6	2%	4%	203
Ford	0%	0%	1	3	13%	2%	211
Honda	0%	1%	1	1	10%	2%	165
Volvo	0%	16%	0	2	0%	2%	190
Stellantis	0%	1%	1	1	9%	2%	231
Toyota	0%	1%	0	1	16%	5%	184
Subaru	0%	0%	0	1	4%	1%	173
Mercedes-Benz	0%	0%	0	3	2%	0%	198
Mazda	0%	0%	0	0	2%	0%	176
Mitsubishi	0%	0%	0	0	1%	0%	166
Others	0%	3%	1	6	1%	1%	285
Fleet	2%	1%	20	34	100%	100%	191

Table A8. Light-duty electric vehicle market performance and fleet average CO₂ emissions in India, 2021

India light duty vehicles 2021									
Manufacturer	EV sales share		Percentage point change of EV sales shares from 2020		Number of EV models		LDV market share	EV market share	Fleet average CO ₂ (g/km) WLTC
	BEV	PHEV	BEV	PHEV	BEV	PHEV			
MG	7%	0%	+3 pp	0 pp	1	0	1%	22%	175
Tata Motors	2%	0%	+1 pp	0 pp	2	0	14%	75%	157
VW Group	0.1%	0%	0 pp	0 pp	3	0	2%	1%	152
Mahindra	0.03%	0%	0 pp	0 pp	2	0	10%	1%	168
Hyundai	0.02%	0%	0 pp	0 pp	1	0	14%	1%	140
Maruti	0%	0%	0 pp	0 pp	0	0	40%	0%	130
Kia	0%	0%	0 pp	0 pp	0	0	5%	0%	148
Toyota	0%	0%	0 pp	0 pp	0	0	4%	0%	166
Renault	0%	0%	0 pp	0 pp	0	0	2%	0%	135
Honda	0%	0%	0 pp	0 pp	0	0	3%	0%	143
Nissan	0%	0%	0 pp	0 pp	0	0	1%	0%	140
Ford	0%	0%	0 pp	0 pp	0	0	1%	0%	180
Others	0.05%	0%	0 pp	0 pp	2	0	3%	0%	177
Fleet	0.4%	0%	0 pp	0 pp	11	0	100%	100%	144

Table A9. Light-duty electric vehicle market performance and fleet average CO₂ emissions in India, 2020

India light duty vehicles 2020							
Manufacturer	EV sales share		Number of EV models		LDV market share	EV market share	Fleet average CO ₂ (g/km) WLTC ²
	BEV	PHEV	BEV	PHEV			
MG	4%	0%	1	0	1%	0%	170
Tata Motors	1%	0%	2	0	10%	65%	146
Mahindra	0.1%	0%	3	0	11%	5%	166
Hyundai	0.1%	0%	1	0	15%	5%	140
Maruti	0%	0%	0	0	44%	0%	131
Kia	0%	0%	0	0	5%	0%	151
Renault	0%	0%	0	0	3%	0%	136
Toyota	0%	0%	0	0	3%	0%	167
Honda	0%	0%	0	0	3%	0%	144
Ford	0%	0%	0	0	0%	0%	151
VW Group	0%	0%	0	0	2%	0%	153
Nissan	0%	0%	0	0	1%	25%	135
Others	0.02%	0%	1	0	2%	0%	176
Fleet	0.2%	0%	8	0	100%	100%	142

APPENDIX B. DEFINITIONS, DATA SOURCES, METHODOLOGY, AND ASSUMPTIONS

DEFINITIONS OF LIGHT-DUTY VEHICLES

China, Europe, and India: LDVs are PCs and LCVs. PCs are motor vehicles with at least four wheels designed for the carriage of passengers that have no more than eight seats excluding the driver's seat and a maximum weight below 3.5 tons (these are the M1 category). LCVs are motor vehicles with at least four wheels designed for the carriage of goods (goods and passenger vehicles with more than nine seats for China) with a maximum weight below 3.5 tons; they are the N1 category in Europe and India and the N1 and M2 categories in China.

United States: LDVs are PCs, which are vehicles with gross vehicle weight rating (GVWR) below 6,000 lbs, and LCVs, which are vehicles with GVWR between 6,001 and 10,000 lbs (vehicle class 2) and SUVs with four-wheel drive.

DATA SOURCES

EV refers to battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs) in all regions.

China: Sales, model information, and CO₂ emissions data comes from insurance data from China EV100 and ZEDATA. Sales are based on new registrations of LDVs because the insurance data for new registrations is a close proxy for retail sales.

Europe: Sales and 2020 CO₂ emissions data are from Dataforce, model information is from Marklines, and the 2021 CO₂ emissions values are from ICCT's 2021 EU Market Monitor.⁴ Sales are based on new registrations of LDVs. Europe covers the European Union (EU) countries except for Bulgaria and Malta, which are excluded due to data limitations, and Iceland and Norway are included. The United Kingdom is excluded from the analysis, and Liechtenstein is also excluded, due to limited data availability. Hungary, Lithuania, Poland, Portugal, and Romania are excluded from the CO₂ emissions values due to incomplete data.

United States: Sales, model information, and CO₂ emissions data are from Atlas Public Policy.⁵ Sales numbers are based on new registrations, but we excluded vehicles that did not have matching fuel economy values.

India: Sales, model information, and CO₂ emissions data are from Segment Y.⁶

Global: Sales data is from the EV-Volumes database.⁷

METHODOLOGY AND ASSUMPTIONS

China, United States, and India: The CO₂ emissions of individual models were converted from type-approval fuel economy or fuel consumption values using the conversion factors listed in Tables B1 to B3. Then the fleet-average CO₂ emission values were converted from the country-specific test cycle, the New European Drive Cycle (NEDC) in China and India and Corporate Average Fuel Economy in the United States, to WLTC based on ICCT's conversion tool.⁸

4 Peter Mock et al., "Market Monitor: European Passenger Car and Light Commercial Vehicle Registrations, January–December 2021," (ICCT: Berlin, Germany, 2022), <https://theicct.org/wp-content/uploads/2022/02/557440160-Market-Monitor-EU-Jan-to-Dec-Feb22.pdf>.

5 Atlas Public Policy, (2022), <https://atlaspolicy.com/>.

6 Segment Y, (2022), <https://www.segmenty.com/>.

7 EV-Volumes, (EV Data Center, 2022), <http://www.ev-volumes.com/datacenter/>.

8 ICCT conversion tool, <https://theicct.org/wp-content/uploads/2022/03/Conversion-tool-20141121-Protect.xlsx>.

Europe: Conversion from NEDC to WLTC utilized manufacturer-specific factors based on the 2020 market data.⁹

Table B1. China CO₂ emission factors by fuel type

Fuel type	CO ₂ emission factor (kg/l)	Source
Gasoline	2.37	National standard GB 27999-2019 ^a
Diesel	2.6	
CNG	1.54	U.S. Environmental Protection Agency (EPA) ^b
Methanol	1.66	<i>China Economic Weekly</i> ^c

^aMinistry of Industry and Information Technology of the People's Republic of China, "Fuel Consumption Evaluation Methods and Targets for Passenger Cars," December 2019, <https://openstd.samr.gov.cn/bzgk/gb/newGbInfo?hcno=A0D5C7C6DE851F1FB293B6CA09C757EB>

^b U.S. Environmental Protection Agency (EPA), "Emission Factors for Greenhouse Gas Inventories," (2021), https://www.epa.gov/sites/default/files/2021-04/documents/emission-factors_apr2021.pdf.

^c Lv Jiangtao, "Will Methanol Cars Take Off After Battery Electric and Hydrogen Fuel Cell Cars in China?," *China Economic Weekly*, April 15, 2022, <https://finance.sina.com.cn/chanjing/cyxw/2022-04-15/doc-imcwiwst2023519.shtml>.

Table B2. U.S. CO₂ emission factors by fuel type

Fuel type	CO ₂ emission factor (g/gal)
Gasoline	8,887
Diesel	10,180
Ethanol-85	6,226
CNG	8,887

Source: U.S. EPA, "The 2021 EPA Automotive Trends Report," November 2021, <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P1013L10.pdf>.

Table B3. India CO₂ emission factors by fuel type

Fuel type	CO ₂ emission factor (g/l)
Gasoline	0.04217
Diesel	0.03766
LPG	0.0165
CNG	0.03467

Source: Ministry of Power of the Government of India, "Ministerial Notification on Energy Consumption Standards for Motor Vehicles," April 2015, <https://beeindia.gov.in/sites/default/files/Fuel%20Efficiency%20Notification%20%2823April2015%29.pdf>

⁹ We applied the methodology outlined in Mock et al., "Market Monitor, January-December 2021."

MANUFACTURER GROUPS

China: For joint ventures, manufacturers are grouped under the name of the dominant shareholder. For example, there are two manufacturers under BYD, and we group them under BYD in this analysis.

Europe: We used the pooling list for CO₂ target compliance.¹⁰ The tables below summarize the manufacturer pooling and the corresponding brands in each region.

Table B4. Manufacturers and corresponding main brands in China

Light-duty vehicles in China	
Manufacturer	Main brands
Tesla	Tesla
BYD	BYD
Chery	Chery, Jaguar, Jetour, Karry, Land Rover, Exeed
SAIC Motor	Maxus, Shac, Wuling, Yuejing
GWM	Great Wall, Haval, Wey
Brilliance Group	BMW, Zhonghua
GAC Group	Trumpchi, Hongda, Fiat, Toyota, Jeep, Mitsubishi
BAIC Group	Beijing, Suzuki, Foton, Heibao
Geely	Geely, Volvo, Lynkco
Chang'an	Chang'an
DFM	Dongfeng, Nissan
FAW Group	Hongqi, Audi, Volkswagen, Toyota, Jetta, Mazda, Bestune

Table B5. Manufacturers and corresponding main brands in Europe

Light-duty vehicles in Europe	
Manufacturer	Main brands
VW Group	Audi, MG, Porsche, Seat, Škoda, Volkswagen
Stellantis	Alfa Romeo, Citroën, DS Automobiles, Fiat, Jeep, Lancia, Opel, Peugeot, Vauxhall
Renault-Nissan-Mitsubishi	Dacia, Mitsubishi, Nissan, Renault
Mazda-Subaru-Suzuki-Toyota	Mazda, Subaru, Suzuki, Toyota
BMW	BMW, MINI
Mercedes-Benz	Mercedes-Benz, Smart
Hyundai	Hyundai
Ford	Ford
Kia	Kia
Volvo	Volvo
Tesla-Honda-JLR	Tesla, Honda, Jaguar, Land Rover
Others	MG, Iveco, SsangYong, Isuzu

¹⁰ Europe: Manufacturers are allowed to form pools to jointly meet the CO₂ targets. We refer to the European Commission's M1 and N1 pooling list as of December 20, 2021.

Table B6. Manufacturers and corresponding main brands in the United States

Light-duty vehicles in the United States	
Manufacturer	Main brands
Toyota	Toyota, Lexus
Honda	Honda, Acura
Nissan	Nissan
Hyundai	Hyundai, Infiniti
Kia	Kia
GM	Chevrolet, GMC, Buick, Cadillac
Ford	Ford, Lincoln
VW Group	Volkswagen, Audi, Porsche, Bentley
BMW	BMW, MINI
Tesla	Tesla
Subaru	Subaru
Mercedes-Benz	Mercedes-Benz
Stellantis	Jeep, Dodge, Fiat, Alfa Romeo, Chrysler, Maserati, RAM
Mazda	Mazda
Mitsubishi	Mitsubishi
Jaguar Land Rover	Jaguar Land Rover
Volvo	Volvo
Others	Karma, Rivian, Lucid, McLaren

Table B7. Manufacturers and corresponding main brands in India.

Light-duty vehicles in India	
Manufacturer	Main brands
MG	MG
VW Group	Volkswagen, Audi, Škoda
Tata Motors	Jaguar Land Rover, Tata
Hyundai	Hyundai
Mahindra	Mahindra & Mahindra, Mahindra electric
Maruti	Maruti, Suzuki
Kia	Kia
Toyota	Toyota, Lexus
Renault	Renault
Honda	Honda
Nissan	Nissan, Datsun
Ashok Leyland	Ashok Leyland
Force	Force
Others	Stellantis, Mercedes-Benz, BMW, Volvo