

## Global Automobiles

## EV tracker: Record Dec drive 10m BEV sales in 2023; Special: PHEV boom ahead?

Industry Overview

## Dec &amp; FY23: Another BEV sales record; no weakness

Weakness, what weakness? Global BEV sales reached a new high of 1.1m units in Dec-23 (+19% y/y), driving >14% penetration rate for the first time. China BEV sales are re-accelerating, with sales up +38% y/y in Dec (+32% y/y in Q4). EU was down -20% in Dec on a high base, driven by subsidy phase out effects last year. However, EU penetration rate was >22% in Dec, a new high. Looking back at 2023: It was again a year with strong growth (also driven by much lower prices in China). 10m global BEV sales (+30% y/y; +2.3m units), decelerating from 2022 (+60% y/y; +2.9m units). The US outperformed (+47% y/y), gaining 1.4ppts M/S (to c12%) while Europe grew 33% y/y, reaching 22.5% M/S (+0.6ppts). China grew just c20% y/y but keep in mind the comparison base is much higher there. In absolute terms, BEV sales grew in China by c1m units in 2023, accounting for c50% of global BEV growth, more than any other region of the world.

## BEV 2023a: BYD catches TSLA, most legacy OEMs struggle

2023 highlight by OEM: (1) **BYD** gained +3.8ppts of global M/S, selling more vehicles than **Tesla** in H2 23. (2) **Tesla** gained 1ppt y/y, remaining BEV market leader with 18.1% of global M/S (vs 15.7% for **BYD**). (3) EU: **VW** is the only EU mass market OEM which gained share (+0.1ppts). Particularly **STLA's** BEV sales weakened towards end of 2023 and the company lost share ahead of its model offensive in 2024. (3) EU premium OEMs outperform. **BMW** expands more and more its BEV leadership vs **MBG** (+0.9ppts vs +0.5ppts y/y), and the trend accelerated in Q4 as **BMW** held nearly twice as much share than its rival (4.2% vs 2.4%). (4) **GM** (+0.6ppts) outperforms **Ford** (-0.2ppts).

## PHEVs 2023a: Chinese/BYD dominate, gains appeal in US

We dive deep into the PHEV market (page 2-4) as growth concerns on BEVs increase. In 2023, global PHEV sales topped 4.2m units (+47% y/y; c5% of global LVS), exceeding BEV market growth but mainly driven by a lower comp base. In absolute terms, BEV sales continue to outperform PHEV unit growth (2m vs 1.3m y/y). China drove unit sales growth (c80% y/y) in 2023, resulting in 65% global M/S (+10ppts y/y), EU PHEV sales decreased by c2% y/y in 2023, mainly due to declining subsidies & limited emission benefit for OEMs, while US PHEV sales were boosted by the IRA scheme (+52% y/y).

## PHEV: Stronger sales possible FY24/25 but not long-term

PHEV accounted for c5% of global LVS (c4.2m units) in 2023. We still think PHEVs are mainly a bridging technology towards BEV. Their prices are in a lot of cases still below those BEVs and range is not an issue. Short-term we think PHEV sales growth can surprise on the upside (mainly in China & the US). Globally we anticipate PHEV to grow c29% in 2024 (+7ppts vs BEV), implying +1ppt penetration y/y (see Exhibit 6). Expansion should extend to 2025, before the market stabilizes in 2026-29 at c7.2% penetration as BEV/ICE pricing parity is achieved. China will drive growth on absolute terms, the US on a relative base while EU volumes should stay just flat. **More on details on p.2 & 3.**

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Refer to important disclosures on page 25 to 27.

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## Jargon buster

M/S = market share  
(B)EV = (Battery) electric vehicle  
PHEV = plug-in hybrid EV  
xEV = PHEVs and BEVs  
HEV: Hybrid EV  
LV(P) = light vehicle (production)  
OEM = original equipment manufacturer  
NMC = Nickel Manganese Cobalt  
LFP = lithium iron phosphate battery  
M/S: Market share  
PC: passenger cars  
CV: commercial vehicles  
NA = North America; APAC: Asia-Pacific  
STLA = Stellantis  
TSLA: Tesla  
IRA: Inflation Reduction Act

## PHEV: Some more upside just short-term

### China: PHEV % growth higher than BEV in 23a and 24e

In 2023, 4.2m PHEV unit sales were recorded (+47% y/y), exceeding BEVs' unit growth by 17ppts - albeit from a much lower 2022 base (2.9m vs 7.7m). In absolute terms, PHEVs and BEVs recorded roughly same growth in 2023. This shows PHEVs can be a good alternative to ICE & BEV vehicles. China accounted for c65% of the global PHEV market in 2023 (+10ppts y/y) and c90% of the volume gains y/y as the Chinese consumers perceive the practical advantages of the product. Interest soared relative to BEVs as the charging infrastructure lags in lower tier cities, PHEVs are often still more attractively priced (than BEVs). There is no range problem on long-haul routes but inner city the car can drive electrically. Nevertheless, when BEV prices continue to come down (due to cheaper batteries) and the charging infrastructure improves further, we expect BEVs to grow again more. PHEVs are still just a transition technology.

### US: IRA more a benefit for BEVs but PHEVs still grow

US PHEV sales soared 52% in 2023 (to c290k units; c2% penetration). Adoption was spurred by the IRA credits (available on 8 models) and by the practicality offered by the product given the weak BEV charging infrastructure in the US. Only 5 PHEV models are anymore eligible for the IRA credits in 2024 (Exhibit 4), benefitting mainly STLA (Jeep & Chrysler) & Ford. In 2024, we expect PHEV sales to grow though more than BEVs in relative terms (+67% y/y vs +46%), but in absolute terms the BEV sales growth should be higher (see Exhibit 6 & 7). Nevertheless, the forecast for the US market is not an easy exercise. In our view, BEVs are not very popular in the US since range anxiety is high. If IRA subsidies were changed after upcoming elections, PHEV sales growth could continue to surprise on the upside (see also: [US Year Ahead 2024](#)).

### EU: Limited growth due to reduced subsidies

In 2023, EU PHEV sales decreased for the second year in a row to 1m units (-2% y/y). In West & Central Europe PHEVs accounted for just 7% of total LV sales (vs c15% for BEVs). We think this lower growth has been due to i) PHEV subsidy phase-out spanning across European countries as new schemes solely focus on BEVs ii) the benefit of selling PHEVs from an emission standpoint is limited iii) lower range anxiety in Europe. OEMs have got also less incentive to push PHEV sales since they need to meet CO2 emission targets in Europe and a higher BEV share improves the CO2 footprint a lot more.

### Which OEMs benefit from higher PHEV sales ...

The global market is largely dominated by **BYD**, which holds c34% of the global M/S (Exhibit 1), underpinning its global dominance in xEV (+c70% sales vs Tesla). **Li Xiang** (Li Auto) became the 2<sup>nd</sup> largest player with c9% M/S (+4ppts y/y), while other Chinese OEMs gained share to the expense of EU OEMs. **STLA** was the most resilient amongst them, losing only c1ppts vs 2-3ppts for the Germans. According to S&P production data (Exhibit 2), STLA should gain back share in 2024 and gain back 2<sup>nd</sup> place, mainly driven by increase in Jeep PHEVs production in the US. **MBG** and **VW** will also increase production (mainly in EU – from low base), gaining share over **BMW**. Overall, most of the important model launches come from Chinese OEMs (ex-Toyota), most notably from Geely (Galaxy brand), Chery, BYD and Li Xiang/Li Auto (see Exhibit 3).

### Global PHEV trend to extend in ST, and peak in 2027-29

We show our new global PHEV forecast in Exhibit 6. We expect PHEV sales to grow by c1m units p.a. in FY24/25 with sales penetration rate increasing by c1% p.a. While there is some surprise potential on the upside in China and the US, the limited upside in Europe means that the overall PHEV sales growth should remain limited globally vs BEVs. Just the % growth might be higher in 2024 since the comparison base is smaller as PHEV sales were c60% below BEVs in 2023a. Longer term, PHEVs remain just a transition technology. We expect growth to fade as of FY26 and the market to peak already in FY29. This gives OEMs not much incentive to accelerate R&D in that area.

# Global PHEV market overview

## Exhibit 1: Global PHEV sales by OEM (ranked by Dec-23 sales)

The PHEV market is dominated by Chinese OEMs, particularly BYD, while Stellantis is the only Western OEM that limited M/S loss in 2023

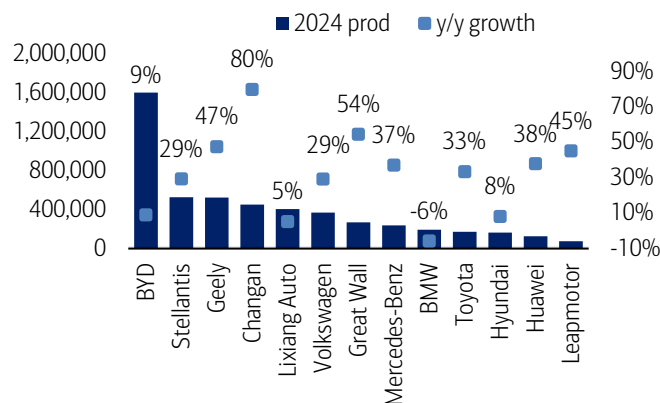
PHEV	2022	2023	3Q 22	4Q 22	1Q 23	2Q 23	3Q 23	4Q 23	Sep-23	Oct-23	Nov-23	Dec-23
Sales	2,860,873	4,197,094	723,413	961,984	772,382	983,503	1,098,968	1,342,241	398,796	410,055	431,860	500,326
BYD	944,496	1,441,682	276,930	353,054	283,843	349,235	388,679	419,925	135,903	132,524	131,582	155,819
Li Xiang	134,409	376,038	27,533	46,359	53,341	86,533	104,351	131,813	36,060	40,424	41,033	50,356
Geely Auto Group	85,545	182,235	31,837	23,138	16,802	28,111	51,220	86,102	20,450	25,716	29,385	31,001
VW Group	260,940	251,782	63,771	80,996	54,616	59,912	58,850	78,404	22,681	26,733	26,273	25,398
Stellantis	227,580	300,788	45,668	71,948	66,602	82,218	75,651	76,317	29,021	25,595	26,224	24,498
Changan Automobile Group	43,966	175,290	8,693	25,268	22,719	34,097	52,741	65,733	21,053	20,855	20,815	24,063
Great Wall Motors	27,911	163,646	7,731	15,663	10,451	38,275	48,458	66,462	13,415	21,732	22,649	22,081
Dongfeng Motor	15,301	74,505	6,148	3,811	6,448	11,857	18,614	37,586	8,324	9,945	9,998	17,643
BMW Group	214,376	184,181	44,254	63,710	46,339	49,729	42,857	45,256	15,535	13,615	16,063	15,578
Mercedes-Benz Group	174,104	160,921	41,377	53,274	38,643	39,091	39,379	43,808	15,119	14,220	14,962	14,626
Geely-Volvo Car Group	135,245	150,589	24,544	40,928	36,812	40,121	34,888	38,768	11,653	11,170	13,026	14,572
Market share												
BYD	33.0%	34.3%	38.3%	36.7%	36.7%	35.5%	35.4%	31.3%	34.1%	32.3%	30.5%	31.1%
Li Xiang	4.7%	9.0%	3.8%	4.8%	6.9%	8.8%	9.5%	9.8%	9.0%	9.9%	9.5%	10.1%
Geely Auto Group	3.0%	4.3%	4.4%	2.4%	2.2%	2.9%	4.7%	6.4%	5.1%	6.3%	6.8%	6.2%
VW Group	9.1%	6.0%	8.8%	8.4%	7.1%	6.1%	5.4%	5.8%	5.7%	6.5%	6.1%	5.1%
Stellantis	8.0%	7.2%	6.3%	7.5%	8.6%	8.4%	6.9%	5.7%	7.3%	6.2%	6.1%	4.9%
Changan Automobile Group	1.5%	4.2%	1.2%	2.6%	2.9%	3.5%	4.8%	4.9%	5.3%	5.1%	4.8%	4.8%
Great Wall Motors	1.0%	3.9%	1.1%	1.6%	1.4%	3.9%	4.4%	5.0%	3.4%	5.3%	5.2%	4.4%
Dongfeng Motor	0.5%	1.8%	0.8%	0.4%	0.8%	1.2%	1.7%	2.8%	2.1%	2.4%	2.3%	3.5%
BMW Group	7.5%	4.4%	6.1%	6.6%	6.0%	5.1%	3.9%	3.4%	3.9%	3.3%	3.7%	3.1%
Mercedes-Benz Group	6.1%	3.8%	5.7%	5.5%	5.0%	4.0%	3.6%	3.3%	3.8%	3.5%	3.5%	2.9%
Geely-Volvo Car Group	4.7%	3.6%	3.4%	4.3%	4.8%	4.1%	3.2%	2.9%	2.9%	2.7%	3.0%	2.9%
Penetration rate												
BYD	52.3%	53.3%	53.4%	54.6%	55.8%	54.1%	53.2%	51.1%	52.7%	51.4%	50.0%	51.9%
Geely Auto Group	6.0%	11.7%	9.0%	5.3%	5.0%	7.8%	12.7%	18.7%	13.7%	16.6%	17.4%	22.6%
VW Group	3.8%	3.3%	3.5%	4.4%	3.2%	3.1%	3.0%	3.8%	3.4%	4.3%	3.9%	3.3%
Stellantis	5.1%	6.5%	4.3%	6.5%	5.8%	6.5%	6.7%	7.0%	7.3%	7.1%	7.4%	6.6%
Changan Automobile Group	2.8%	10.5%	2.2%	5.3%	6.3%	8.8%	12.0%	13.6%	13.6%	12.3%	14.1%	14.6%
Great Wall Motors	3.7%	21.5%	3.9%	8.8%	8.2%	20.5%	22.2%	29.3%	17.2%	26.4%	30.5%	31.6%
Dongfeng Motor	0.7%	4.4%	1.1%	0.8%	1.9%	3.0%	4.3%	7.1%	5.4%	5.9%	6.1%	8.8%
BMW Group	11.5%	9.0%	9.7%	12.3%	10.0%	9.7%	8.5%	7.9%	8.9%	7.9%	8.4%	7.4%
Mercedes-Benz Group	10.5%	9.4%	9.9%	12.2%	9.6%	9.0%	9.0%	10.2%	9.4%	10.9%	11.1%	8.8%
Geely-Volvo Car Group	34.1%	33.9%	27.4%	32.7%	35.8%	35.5%	33.7%	30.9%	30.1%	28.7%	31.8%	32.0%

Source: BofA Global Research, EV volumes

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## Exhibit 2: 2024 global PHEV production & growth by OEM (S&P)

Stellantis is expected to become 2<sup>nd</sup> largest producer of PHEVs

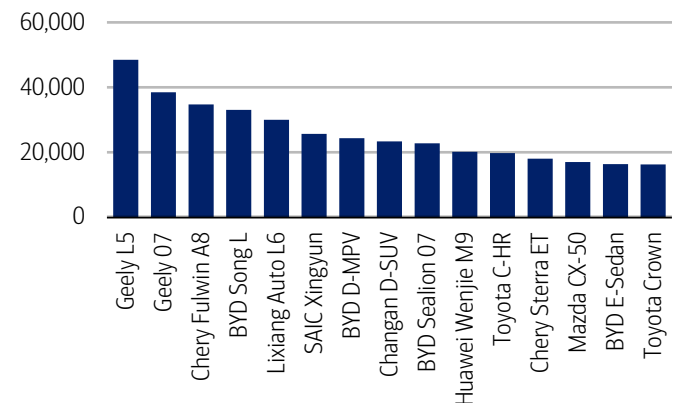


Source: BofA Global Research, S&P

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## Exhibit 3: New model launch 2024 production volume (S&P)

High volume launches are exclusively from Chinese OEMs (ex-Toyota)

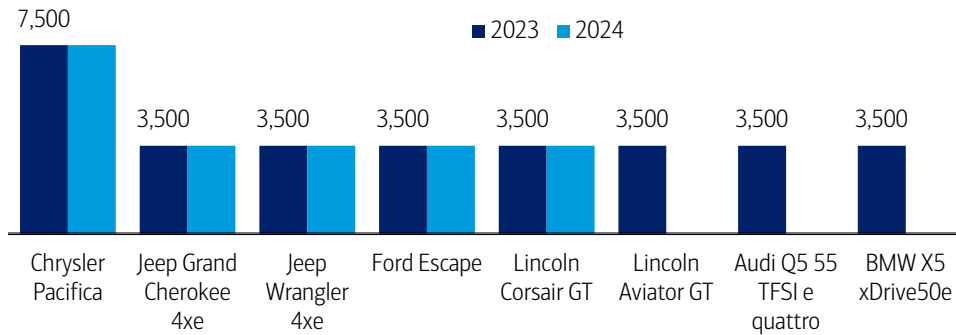


Source: BofA Global Research, S&P

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**Exhibit 4: IRA tax credit for PHEVs**

STLA brands (Chrysler and Jeep) and Ford (inc Lincoln) models will continue to benefit from IRA credits



Source: US Department of Energy

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**Exhibit 5: Global top models in terms of total production volumes (PHEV = plug-in hybrid electric vehicles)**

BYD is the undisputed PHEV leader, but Lixiang (Li Auto) gained a lot of share in 2023 with its L7/L8. STLA JEEP Cherokee will more than double volumes in 24

OEM Group	Sales brand	Global Nameplate	2023 (total)	2023 y-o-y	2024e (total)	2024e y-o-y	2025e (total)	2025e y-o-y
BYD	BYD	Song Plus	342,777	3,466	329,524	-13,253	328,541	-983
BYD	BYD	Qin Plus	328,888	131,856	323,363	-5,525	343,542	20,179
Stellantis	Jeep	Grand Cherokee	68,431	46,625	179,226	110,795	137,655	-41,571
BYD	BYD	Song Pro	203,913	130,357	175,860	-28,053	157,167	-18,693
Lixiang Auto	LI	L7	140,592	140,592	139,685	-907	148,394	8,709
BYD	BYD	Han	122,690	-9,783	128,603	5,913	123,389	-5,214
BYD	BYD	Tang	126,947	2,441	124,157	-2,790	124,674	517
Lixiang Auto	LI	L8	122,812	105,245	121,464	-1,348	113,835	-7,629
Stellantis	Jeep	Wrangler	85,634	18,684	111,581	25,947	112,047	466
Lixiang Auto	LI	L9	119,670	78,762	111,342	-8,328	105,706	-5,636
BYD	Denza	D9	113,948	104,118	108,953	-4,995	112,518	3,565
Geely	Lynk&Co	08	31,985	31,985	92,544	60,559	94,475	1,931
BYD	BYD	Destroyer 05	99,485	36,980	91,098	-8,387	91,476	378
Changan	Changan	Qiyuan A05	20,401	20,401	80,590	60,189	83,053	2,463
Geely	Geely	L7	67,766	67,766	79,711	11,945	70,402	-9,309
Huawei	Aito	Wenjie M7	68,578	45,753	78,048	9,470	95,451	17,403
Geely	Volvo	XC60	83,096	30,574	76,553	-6,543	66,268	-10,285
BYD	BYD	Frigate 07	72,398	70,098	72,877	479	74,342	1,465
BYD	BYD	Seal	44,713	44,713	69,408	24,695	75,504	6,096
Ford	Ford	Escape	74,949	-18,844	68,949	-6,000	60,178	-8,771
Changan	Deepal	S7	60,843	60,843	67,189	6,346	71,702	4,513
Changan	Changan	Qiyuan Q05	6,754	6,754	57,840	51,086	63,888	6,048
Changan	Deepal	SL03	52,885	30,900	56,242	3,357	65,451	9,209
BMW	BMW	X5	47,746	632	55,225	7,479	56,022	797
Stellantis	Chrysler	Pacifica/Voyager	38,815	20,717	54,759	15,944	44,444	-10,315
Geely	Geely	L5	0	0	48,487	48,487	60,405	11,918
Mercedes-Benz	Mercedes-Benz	E-Class	14,571	-24,454	48,309	33,738	59,905	11,596
Mercedes-Benz	Mercedes-Benz	C-Class	35,076	17,088	46,975	11,899	48,440	1,465
Great Wall	HAVAL	Menglong	14,129	14,129	46,272	32,143	51,110	4,838
Geely	Volvo	XC90	50,447	15,993	45,552	-4,895	38,951	-6,601
Hyundai	Kia	Sportage	45,714	27,616	43,615	-2,099	45,263	1,648
Leapmotor	Leapmotor	C11	32,140	32,140	43,367	11,227	46,000	2,633
Changan	Changan	Qiyuan A07	27,347	27,347	42,512	15,165	43,299	787
Toyota	Toyota	RAV4	40,757	-13,633	42,450	1,693	27,450	-15,000
Hyundai	Hyundai	Tucson	39,944	12,914	41,079	1,135	39,312	-1,767
Toyota	Toyota	Prius	27,716	11,290	40,671	12,955	30,687	-9,984
Great Wall	HAVAL	Xiaolong Max	38,219	38,219	39,331	1,112	37,634	-1,697
Geely	Lynk&Co	07	0	0	38,480	38,480	46,464	7,984
Hyundai	Kia	Niro	17,489	-6,719	37,147	19,658	34,518	-2,629

Source: BofA Global Research, S&P

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# BofA global xEV volume forecasts

## Exhibit 6: NEW Global PHEV Forecast

We expect similar market trends in 2024 than the ones observed in 2023, with growth led by China and North America while EU sales should remain stable

PHEV Sales by Region	2020	2021	2022	2023	2024E	2025E	2026E	2027E	2028E	2029E	2030E
Europe	625,916	1,056,852	1,026,864	1,006,691	1,049,142	1,064,733	1,037,591	937,313	845,502	722,436	535,553
West & Central Europe	623,893	1,054,013	1,026,011	993,122	995,199	972,484	936,551	810,339	707,910	561,454	346,697
Eastern Europe	2,023	2,839	853	13,569	53,943	92,249	101,040	126,974	137,592	160,982	188,856
North America	83,772	205,648	218,129	319,312	534,006	539,311	652,052	712,800	648,396	595,731	565,209
Greater China	239,211	623,688	1,519,938	2,715,683	3,444,691	4,312,127	4,622,803	4,946,265	5,248,704	5,528,999	5,572,612
Japan	14,617	22,596	37,260	53,454	85,000	178,000	198,330	216,028	235,778	259,859	290,000
Korea	6,559	19,029	12,731	11,787	11,272	11,835	12,427	13,048	13,701	14,386	15,105
Others	17,250	33,744	45,951	90,167	91,947	95,163	99,460	103,860	107,510	110,452	113,789
<b>Total</b>	<b>987,325</b>	<b>1,961,557</b>	<b>2,860,873</b>	<b>4,197,094</b>	<b>5,216,058</b>	<b>6,201,169</b>	<b>6,622,662</b>	<b>6,929,314</b>	<b>7,099,591</b>	<b>7,231,863</b>	<b>7,092,268</b>
PHEV as % of LV sales	2020	2021	2022	2023	2024E	2025E	2026E	2027E	2028E	2029E	2030E
Europe	3.7%	6.3%	6.9%	5.7%	6.0%	6.1%	5.8%	5.3%	4.8%	4.0%	3.1%
West & Central Europe	4.5%	7.6%	7.9%	6.7%	6.8%	6.5%	6.2%	5.4%	4.8%	3.7%	2.4%
Eastern Europe	0.1%	0.1%	0.0%	0.5%	2.0%	3.5%	3.8%	4.7%	4.9%	5.6%	6.5%
North America	0.5%	1.2%	1.3%	1.7%	2.8%	2.7%	3.1%	3.3%	3.0%	2.8%	2.7%
Greater China	1.0%	2.6%	6.2%	10.5%	13.0%	16.0%	16.9%	17.8%	18.7%	19.5%	19.4%
Japan	0.3%	0.5%	0.9%	1.1%	1.7%	3.5%	4.0%	4.5%	5.0%	5.5%	6.0%
Korea	0.4%	1.1%	0.8%	0.7%	0.7%	0.7%	0.8%	0.8%	0.8%	0.9%	0.9%
<b>Total</b>	<b>1.3%</b>	<b>2.4%</b>	<b>3.6%</b>	<b>4.9%</b>	<b>5.9%</b>	<b>6.9%</b>	<b>7.2%</b>	<b>7.4%</b>	<b>7.5%</b>	<b>7.6%</b>	<b>7.4%</b>
PHEV unit sales y/y change %	2020	2021	2022	2023	2024E	2025E	2026E	2027E	2028E	2029E	2030E
Europe	207%	69%	-3%	-2%	4.2%	1.5%	-2.5%	-9.7%	-9.8%	-14.6%	-25.9%
West & Central Europe	209%	69%	-3%	-3%	0.2%	-2.3%	-3.7%	-13.5%	-12.6%	-20.7%	-38.3%
North America	-16%	145%	6%	46%	67.2%	1.0%	20.9%	9.3%	-9.0%	-8.1%	-5.1%
Greater China	0%	161%	144%	79%	26.8%	25.2%	7.2%	7.0%	6.1%	5.3%	0.8%
Japan	-26%	55%	65%	43%	59.0%	109.4%	11.4%	8.9%	9.1%	10.2%	11.6%
Korea	191%	190%	-33%	-7%	-4.4%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
<b>Total</b>	<b>71%</b>	<b>99%</b>	<b>46%</b>	<b>47%</b>	<b>24.3%</b>	<b>18.9%</b>	<b>6.8%</b>	<b>4.6%</b>	<b>2.5%</b>	<b>1.9%</b>	<b>-1.9%</b>

Source: BofA Global Research, EV volumes, S&P

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## Exhibit 7: Global BEV Forecast

We update our BEV forecast to reflect the latest forecast published from the regional teams but global penetration rate forecast for 2024 remains unchanged

BEV Sales by Region	2020	2021	2022	2023	2024E	2025E	2026E	2027E	2028E	2029E	2030E
Europe	783,629	1,297,426	1,684,923	2,241,802	2,674,380	3,474,245	4,381,004	5,685,792	6,721,849	8,255,870	9,238,813
West & Central Europe	781,115	1,291,714	1,676,361	2,170,058	2,597,415	3,372,706	4,186,432	5,416,790	6,409,229	7,919,087	8,880,486
Eastern Europe	2,514	5,712	8,562	71,744	76,965	101,538	194,572	269,003	312,620	336,783	358,327
North America	290,949	542,470	886,181	1,297,233	1,896,569	2,477,361	3,181,467	3,793,892	4,712,047	5,524,578	6,852,208
Greater China	1,103,512	2,795,045	4,699,339	5,758,130	6,513,967	7,709,535	8,513,505	9,394,154	10,312,491	11,352,959	12,471,212
Japan	16,418	20,248	56,432	92,105	158,000	360,000	522,569	672,163	823,560	988,818	1,179,000
Korea	45,501	96,395	159,129	157,893	204,139	275,000	287,000	299,600	312,830	326,722	341,308
<b>Total</b>	<b>2,263,168</b>	<b>4,826,907</b>	<b>7,685,597</b>	<b>10,002,636</b>	<b>12,019,425</b>	<b>15,229,271</b>	<b>18,368,087</b>	<b>22,041,973</b>	<b>25,671,170</b>	<b>29,825,403</b>	<b>33,867,788</b>
BEV as % of LV sales	2020	2021	2022	2023	2024E	2025E	2026E	2027E	2028E	2029E	2030E
Europe	4.7%	7.7%	11.3%	12.6%	15.4%	19.8%	24.7%	32.2%	38.0%	46.1%	53.6%
West & Central Europe	5.6%	9.3%	12.9%	14.7%	17.7%	22.7%	27.7%	36.2%	43.1%	52.8%	62.0%
Eastern Europe	0.1%	0.2%	0.4%	2.4%	2.9%	3.8%	7.4%	9.9%	11.1%	11.7%	12.3%
North America	1.7%	3.1%	5.4%	7.0%	9.8%	12.2%	15.0%	17.8%	21.9%	26.0%	32.8%
Greater China	4.6%	11.5%	19.1%	22.2%	24.6%	28.7%	31.1%	33.8%	36.7%	40.0%	43.4%
Japan	0.4%	0.5%	1.4%	2.0%	3.1%	7.1%	10.5%	14.0%	17.5%	20.9%	24.4%
Korea	2.4%	5.7%	9.6%	9.1%	12.6%	16.9%	17.5%	18.2%	18.9%	19.6%	20.4%
<b>Total</b>	<b>2.9%</b>	<b>6.0%</b>	<b>9.7%</b>	<b>11.6%</b>	<b>13.7%</b>	<b>16.9%</b>	<b>19.9%</b>	<b>23.6%</b>	<b>27.1%</b>	<b>31.2%</b>	<b>35.4%</b>
BEV unit sales y/y change %	2020	2021	2022	2023	2024E	2025E	2026E	2027E	2028E	2029E	2030E
Europe	101%	66%	30%	33%	19.3%	29.9%	26.1%	29.8%	18.2%	22.8%	11.9%
West & Central Europe	101%	65%	30%	29%	19.7%	29.8%	24.1%	29.4%	18.3%	23.6%	12.1%
North America	9%	86%	63%	46%	46.2%	30.6%	28.4%	19.2%	24.2%	17.2%	24.0%
Greater China	13%	153%	68%	23%	13.1%	18.4%	10.4%	10.3%	9.8%	10.1%	9.8%
Japan	-31%	23%	179%	63%	71.5%	127.8%	45.2%	28.6%	22.5%	20.1%	19.2%
Korea	39%	112%	65%	-1%	29.3%	34.7%	4.4%	4.4%	4.4%	4.4%	4.5%
<b>Total</b>	<b>33%</b>	<b>113%</b>	<b>59%</b>	<b>30%</b>	<b>20.2%</b>	<b>26.7%</b>	<b>20.6%</b>	<b>20.0%</b>	<b>16.5%</b>	<b>16.2%</b>	<b>13.6%</b>

Source: BofA Global Research, EV volumes, S&P

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**Exhibit 8: Global xEV Forecast**

North America xEV sales should continue to outperform while China xEV will continue to outpace EU sales growth as it focused on both BEVs and PHEV

<b>xEV Sales by Region</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024E</b>	<b>2025E</b>	<b>2026E</b>	<b>2027E</b>	<b>2028E</b>	<b>2029E</b>	<b>2030E</b>
Europe	1,409,545	2,354,278	2,711,787	3,248,493	3,707,585	4,523,155	5,373,603	6,576,779	7,519,288	8,928,801	9,724,369
West & Central Europe	1,405,008	2,345,727	2,702,372	3,163,180	3,592,615	4,345,190	5,122,983	6,227,129	7,117,140	8,480,541	9,227,183
Eastern Europe	4,537	8,551	9,415	85,313	114,970	177,965	250,620	349,650	402,148	448,260	497,186
North America	374,721	748,118	1,104,310	1,616,545	2,430,575	3,016,672	3,833,519	4,506,691	5,360,443	6,120,309	7,417,416
Greater China	1,342,723	3,418,733	6,219,277	8,473,813	9,958,658	12,021,662	13,136,307	14,340,419	15,561,195	16,881,958	18,043,824
Japan	31,035	42,844	93,692	145,559	243,000	538,000	720,899	888,191	1,059,338	1,248,677	1,469,000
Korea	52,060	115,424	171,860	169,680	215,411	286,835	299,427	312,648	326,531	341,107	356,413
<b>Total</b>	<b>3,250,493</b>	<b>6,788,464</b>	<b>10,546,470</b>	<b>14,199,730</b>	<b>17,219,545</b>	<b>21,414,617</b>	<b>24,945,757</b>	<b>28,924,960</b>	<b>32,722,697</b>	<b>37,007,761</b>	<b>40,910,059</b>
<b>xEV as % of LV sales</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024E</b>	<b>2025E</b>	<b>2026E</b>	<b>2027E</b>	<b>2028E</b>	<b>2029E</b>	<b>2030E</b>
Europe	8.4%	14.1%	18.1%	18.3%	21.4%	25.8%	30.2%	37.2%	42.6%	49.9%	56.4%
West & Central Europe	10.2%	16.9%	20.8%	21.4%	24.5%	29.2%	33.9%	41.6%	47.9%	56.5%	64.4%
Eastern Europe	0.2%	0.3%	0.5%	2.9%	4.3%	6.7%	9.5%	12.9%	14.3%	15.5%	17.1%
North America	2.2%	4.2%	6.7%	8.7%	12.6%	14.9%	18.1%	21.1%	24.9%	28.8%	35.5%
Greater China	5.6%	14.0%	25.3%	32.6%	37.6%	44.7%	48.0%	51.7%	55.4%	59.5%	62.9%
Japan	0.7%	1.0%	2.3%	3.1%	4.8%	10.6%	14.6%	18.5%	22.5%	26.4%	30.4%
Korea	2.8%	6.8%	10.4%	9.8%	13.3%	17.6%	18.3%	19.0%	19.7%	20.5%	21.3%
<b>Total</b>	<b>4.2%</b>	<b>8.5%</b>	<b>13.4%</b>	<b>16.4%</b>	<b>19.6%</b>	<b>23.8%</b>	<b>27.0%</b>	<b>30.9%</b>	<b>34.6%</b>	<b>38.7%</b>	<b>42.8%</b>
<b>xEV unit sales y/y (%)</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024E</b>	<b>2025E</b>	<b>2026E</b>	<b>2027E</b>	<b>2028E</b>	<b>2029E</b>	<b>2030E</b>
Europe	138%	67%	15%	20%	14.1%	22.0%	18.8%	22.4%	14.3%	18.7%	8.9%
West & Central Europe	138%	67%	15%	17%	13.6%	20.9%	17.9%	21.6%	14.3%	19.2%	8.8%
Eastern Europe	51%	88%	10%	806%	34.8%	54.8%	40.8%	39.5%	15.0%	11.5%	10.9%
North America	2%	100%	48%	46%	50.4%	24.1%	27.1%	17.6%	18.9%	14.2%	21.2%
Greater China	11%	155%	82%	36%	17.5%	20.7%	9.3%	9.2%	8.5%	8.5%	6.9%
Japan	-28%	38%	119%	55%	66.9%	121.4%	34.0%	23.2%	19.3%	17.9%	17.6%
Korea	49%	122%	49%	-1%	27.0%	33.2%	4.4%	4.4%	4.4%	4.5%	4.5%
<b>Total</b>	<b>43%</b>	<b>109%</b>	<b>55%</b>	<b>35%</b>	<b>21.3%</b>	<b>24.4%</b>	<b>16.5%</b>	<b>16.0%</b>	<b>13.1%</b>	<b>13.1%</b>	<b>10.5%</b>

Source: BofA Global Research, EV volumes, S&P

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**Exhibit 9: BofAe Global sales forecast by region**

We update our regional forecast reflecting recent publication from regional teams, but our 2024e global growth forecast remains stable

<b>Sales forecasts</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>Q1 2024e</b>	<b>Q2 2024e</b>	<b>Q3 2024e</b>	<b>Q4 2024e</b>	<b>2024E</b>	<b>2025E</b>	<b>2026E</b>	<b>2027E</b>
<b>West Europe</b>	<b>12,501,525</b>	<b>12,468,153</b>	<b>11,689,337</b>	<b>13,339,565</b>	<b>3,380,324</b>	<b>3,413,737</b>	<b>3,185,798</b>	<b>3,256,561</b>	<b>13,236,419</b>	<b>13,408,227</b>	<b>13,619,157</b>	<b>13,432,516</b>
y-o-y %	-23.6%	-0.3%	-6.2%	14.1%	1.0%	-1.7%	-0.9%	-1.5%	-0.8%	1.3%	1.6%	-1.4%
<b>Central Europe</b>	<b>1,336,649</b>	<b>1,390,916</b>	<b>1,305,720</b>	<b>1,467,049</b>	<b>352,495</b>	<b>369,113</b>	<b>368,991</b>	<b>362,306</b>	<b>1,452,905</b>	<b>1,464,389</b>	<b>1,507,544</b>	<b>1,521,688</b>
y-o-y %	-22.8%	4.1%	-6.1%	12.4%	-4.4%	-3.1%	4.6%	-0.6%	-1.0%	0.8%	2.9%	0.9%
<b>EU 28</b>	<b>13,838,174</b>	<b>13,859,069</b>	<b>12,995,057</b>	<b>14,806,614</b>	<b>3,732,819</b>	<b>3,782,850</b>	<b>3,554,789</b>	<b>3,618,866</b>	<b>14,689,324</b>	<b>14,872,616</b>	<b>15,126,701</b>	<b>14,954,205</b>
y-o-y %	-23.6%	0.2%	-6.2%	13.9%	0.5%	-1.8%	-0.4%	-1.4%	-0.8%	1.2%	1.7%	-1.1%
<b>East Europe</b>	<b>2,901,033</b>	<b>2,895,737</b>	<b>1,968,840</b>	<b>2,929,974</b>	<b>559,234</b>	<b>612,595</b>	<b>674,256</b>	<b>829,697</b>	<b>2,675,783</b>	<b>2,652,406</b>	<b>2,640,550</b>	<b>2,710,098</b>
y-o-y %	5.8%	-0.2%	-32.0%	48.8%	2.3%	-16.0%	-13.1%	-5.6%	-8.7%	-0.9%	-0.4%	2.6%
<b>North America</b>	<b>17,094,716</b>	<b>17,749,302</b>	<b>16,496,597</b>	<b>18,518,668</b>	<b>4,494,104</b>	<b>5,042,018</b>	<b>4,852,108</b>	<b>4,964,518</b>	<b>19,352,749</b>	<b>20,281,902</b>	<b>21,169,050</b>	<b>21,360,342</b>
y-o-y %	-15.8%	3.8%	-7.1%	12.3%	5.5%	2.6%	1.6%	8.5%	4.5%	4.8%	4.4%	0.9%
<b>Asia ex-China</b>	<b>11,769,283</b>	<b>12,608,338</b>	<b>13,762,181</b>	<b>14,671,236</b>	<b>3,955,341</b>	<b>3,304,716</b>	<b>3,770,023</b>	<b>4,007,196</b>	<b>15,037,276</b>	<b>15,443,906</b>	<b>15,808,395</b>	<b>16,153,765</b>
y-o-y %	-15.5%	7.1%	9.2%	6.6%	2.9%	-4.0%	3.9%	6.7%	2.5%	2.7%	2.4%	2.2%
<b>China</b>	<b>24,135,222</b>	<b>24,368,132</b>	<b>24,556,604</b>	<b>25,957,649</b>	<b>6,344,354</b>	<b>6,341,397</b>	<b>6,287,732</b>	<b>7,530,547</b>	<b>26,504,030</b>	<b>26,903,435</b>	<b>27,390,727</b>	<b>27,754,544</b>
y-o-y %	-4.5%	1.0%	0.8%	5.7%	21.4%	2.8%	-7.5%	-3.0%	2.1%	1.5%	1.8%	1.3%
<b>Asia-Pacific (incl China)</b>	<b>35,904,505</b>	<b>36,976,470</b>	<b>38,318,785</b>	<b>40,628,885</b>	<b>10,299,695</b>	<b>9,646,113</b>	<b>10,057,755</b>	<b>11,537,743</b>	<b>41,541,306</b>	<b>42,347,340</b>	<b>43,199,122</b>	<b>43,908,308</b>
y-o-y %	-8.4%	3.0%	3.6%	6.0%	13.6%	0.4%	-3.6%	0.2%	2.2%	1.9%	2.0%	1.6%
<b>South America</b>	<b>3,222,880</b>	<b>3,763,004</b>	<b>3,839,571</b>	<b>3,936,622</b>	<b>871,338</b>	<b>921,475</b>	<b>1,061,926</b>	<b>1,079,030</b>	<b>3,933,769</b>	<b>4,119,468</b>	<b>4,328,289</b>	<b>4,594,565</b>
y-o-y %	-27.8%	16.8%	2.0%	2.5%	-0.9%	-2.4%	3.3%	-0.6%	-0.1%	4.7%	5.1%	6.2%
<b>MEA</b>	<b>3,228,119</b>	<b>3,834,788</b>	<b>4,137,210</b>	<b>4,170,611</b>	<b>1,116,018</b>	<b>978,893</b>	<b>1,076,504</b>	<b>1,121,165</b>	<b>4,292,581</b>	<b>4,446,444</b>	<b>4,645,492</b>	<b>4,805,794</b>
y-o-y %	-16.9%	18.8%	7.9%	0.8%	0.2%	-3.5%	7.1%	8.0%	2.9%	3.6%	4.5%	3.5%
<b>Oceania</b>	<b>1,017,027</b>	<b>1,202,243</b>	<b>1,215,355</b>	<b>1,336,850</b>	<b>323,218</b>	<b>354,677</b>	<b>324,797</b>	<b>335,426</b>	<b>1,338,119</b>	<b>1,290,087</b>	<b>1,240,043</b>	<b>1,180,123</b>
y-o-y %	-15.0%	18.2%	1.1%	10.0%	7.9%	1.3%	-3.4%	-4.5%	0.1%	-3.6%	-3.9%	-4.8%
<b>Global LV Sales</b>	<b>77,206,454</b>	<b>80,280,613</b>	<b>78,971,415</b>	<b>86,328,224</b>	<b>21,396,426</b>	<b>21,338,622</b>	<b>21,602,137</b>	<b>23,486,445</b>	<b>87,823,630</b>	<b>90,010,264</b>	<b>92,349,247</b>	<b>93,513,434</b>
y-o-y %	-14.1%	4.0%	-1.6%	9.3%	7.6%	-0.4%	-1.4%	1.6%	1.7%	2.5%	2.6%	1.3%

Source: BofA Global Research, S&P

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# Global BEV sales and market share (I)

## Exhibit 10: Global EV volumes by OEMs (sorted by highest sales in the latest month)

Tesla remains global market leader but BYD outsold the US company in H2 23. VW maintains position as the third largest BEV player globally

BEV	2022	2023	3Q 22	4Q 22	1Q 23	2Q 23	3Q 23	4Q 23	Sep-23	Oct-23	Nov-23	Dec-23
Global unit sales	7,685,634	10,002,636	2,085,202	2,441,784	1,877,524	2,403,845	2,667,823	3,053,444	934,955	923,075	1,008,288	1,122,081
Tesla Inc.	1,314,470	1,808,652	343,893	405,320	422,742	466,012	435,176	484,722	154,095	114,991	174,466	195,265
BYD	913,992	1,571,247	258,103	329,366	264,257	352,589	432,979	521,422	151,200	168,204	169,440	183,778
VW Group	578,397	758,053	151,283	208,462	137,262	179,751	206,456	234,584	70,606	72,692	76,523	85,369
Wuling	455,836	430,129	115,095	121,801	77,634	97,469	101,105	153,921	37,593	45,889	48,889	59,143
BMW Group	218,933	377,608	50,726	89,014	65,206	89,782	93,939	128,681	32,171	36,250	41,239	51,192
GAC	288,072	499,495	87,234	96,908	82,917	138,703	152,098	125,777	51,902	41,953	38,700	45,124
Geely Auto Group	275,576	419,328	87,052	102,999	74,717	99,196	112,373	133,042	36,780	43,867	46,236	42,939
SAIC	203,190	293,713	48,441	66,622	53,693	67,621	74,489	97,910	27,981	26,893	32,115	38,902
Stellantis	301,623	341,041	70,228	89,626	75,193	95,202	93,286	77,360	35,210	24,941	24,335	28,084
GM	112,815	211,048	38,950	36,197	31,556	40,282	60,204	79,006	22,262	23,855	28,686	26,465
Mercedes-Benz Group	153,805	247,651	35,682	52,616	45,762	61,160	66,801	73,928	25,489	22,100	25,499	26,329
Changan Automobile Group	201,589	219,163	50,053	80,493	46,162	44,482	55,992	72,527	19,594	23,072	23,593	25,862
Chery Automobile	257,084	124,246	78,550	58,578	18,697	27,357	30,165	48,027	12,241	11,948	15,513	20,566
Xiaopeng	122,825	142,156	29,659	22,365	18,261	23,252	40,396	60,247	15,449	20,018	20,124	20,105
NIO Inc.	124,704	162,767	32,342	40,515	31,379	25,499	55,467	50,422	15,457	16,077	16,167	18,178
Leap Motor	110,438	114,491	35,610	23,561	10,752	23,694	34,251	45,794	13,268	14,758	13,094	17,942
Hyundai Motor	211,153	240,995	51,131	57,708	50,944	66,627	67,236	56,188	19,046	19,900	18,551	17,737
Kia	161,142	176,577	40,470	33,527	37,642	42,865	49,745	46,325	15,002	15,634	14,837	15,854
Geely-Volvo Car Group	117,973	170,255	21,548	52,930	40,556	47,180	38,678	43,841	14,304	13,851	14,733	15,257
Renault	161,158	160,202	38,133	55,637	38,143	37,676	39,840	44,543	12,479	15,238	14,234	15,071
Ford	105,589	114,181	29,376	34,274	18,501	24,659	33,829	37,192	12,564	10,660	12,513	14,019
Market share												
Tesla Inc.	17.1%	18.1%	16.5%	16.6%	22.5%	19.4%	16.3%	15.9%	16.5%	12.5%	17.3%	17.4%
BYD	11.9%	15.7%	12.4%	13.5%	14.1%	14.7%	16.2%	17.1%	16.2%	18.2%	16.8%	16.4%
VW Group	7.5%	7.6%	7.3%	8.5%	7.3%	7.5%	7.7%	7.7%	7.6%	7.9%	7.6%	7.6%
Wuling	5.9%	4.3%	5.5%	5.0%	4.1%	4.1%	3.8%	5.0%	4.0%	5.0%	4.8%	5.3%
BMW Group	2.8%	3.8%	2.4%	3.6%	3.5%	3.7%	3.5%	4.2%	3.4%	3.9%	4.1%	4.6%
GAC	3.7%	5.0%	4.2%	4.0%	4.4%	5.8%	5.7%	4.1%	5.6%	4.5%	3.8%	4.0%
Geely Auto Group	3.6%	4.2%	4.2%	4.2%	4.0%	4.1%	4.2%	4.4%	3.9%	4.8%	4.6%	3.8%
SAIC	2.6%	2.9%	2.3%	2.7%	2.9%	2.8%	2.8%	3.2%	3.0%	2.9%	3.2%	3.5%
Stellantis	3.9%	3.4%	3.4%	3.7%	4.0%	4.0%	3.5%	2.5%	3.8%	2.7%	2.4%	2.5%
GM	1.5%	2.1%	1.9%	1.5%	1.7%	1.7%	2.3%	2.6%	2.4%	2.6%	2.8%	2.4%
Mercedes-Benz Group	2.0%	2.5%	1.7%	2.2%	2.4%	2.5%	2.5%	2.6%	2.7%	2.4%	2.5%	2.3%
Changan Automobile Group	2.6%	2.2%	2.4%	3.3%	2.5%	1.9%	2.1%	2.4%	2.1%	2.5%	2.3%	2.3%
Chery Automobile	3.3%	1.2%	3.8%	2.4%	1.0%	1.1%	1.1%	1.6%	1.3%	1.3%	1.5%	1.8%
Xiaopeng	1.6%	1.4%	1.4%	0.9%	1.0%	1.0%	1.5%	2.0%	1.7%	2.2%	2.0%	1.8%
NIO Inc.	1.6%	1.6%	1.6%	1.7%	1.7%	1.1%	2.1%	1.7%	1.7%	1.7%	1.6%	1.6%
Leap Motor	1.4%	1.1%	1.7%	1.0%	0.6%	1.0%	1.3%	1.5%	1.4%	1.6%	1.3%	1.6%
Hyundai Motor	2.7%	2.4%	2.5%	2.4%	2.7%	2.8%	2.5%	1.8%	2.0%	2.2%	1.8%	1.6%
Kia	2.1%	1.8%	1.9%	1.4%	2.0%	1.8%	1.9%	1.5%	1.6%	1.7%	1.5%	1.4%
Geely-Volvo Car Group	1.5%	1.7%	1.0%	2.2%	2.2%	2.0%	1.4%	1.4%	1.5%	1.5%	1.5%	1.4%
Renault	2.1%	1.6%	1.8%	2.3%	2.0%	1.6%	1.5%	1.5%	1.3%	1.7%	1.4%	1.3%
Ford	1.4%	1.1%	1.4%	1.4%	1.0%	1.0%	1.3%	1.2%	1.3%	1.2%	1.2%	1.2%
Penetration rate												
BYD	50.6%	58.1%	49.7%	50.9%	51.9%	54.6%	59.3%	63.5%	58.7%	65.2%	64.4%	61.2%
VW Group	8.4%	9.9%	8.4%	11.4%	8.1%	9.3%	10.7%	11.3%	10.5%	11.6%	11.4%	11.1%
BMW Group	11.7%	18.4%	11.1%	17.2%	14.1%	17.5%	18.7%	22.4%	18.4%	21.1%	21.5%	24.3%
GAC	12.2%	20.9%	13.8%	15.4%	17.6%	21.0%	24.9%	19.3%	24.1%	18.9%	19.0%	19.8%
Geely Auto Group	19.4%	27.0%	24.6%	23.4%	22.3%	27.7%	28.0%	28.9%	24.7%	28.4%	27.3%	31.3%
SAIC	5.8%	9.3%	5.0%	7.1%	8.4%	8.8%	9.0%	10.5%	9.8%	9.4%	10.7%	11.1%
Stellantis	6.8%	7.4%	6.6%	8.2%	6.5%	7.6%	8.3%	7.1%	8.9%	6.9%	6.9%	7.6%
GM	3.2%	5.6%	4.2%	3.7%	3.8%	4.0%	6.0%	8.6%	6.7%	8.2%	9.5%	8.3%
Mercedes-Benz Group	9.3%	14.5%	8.6%	12.1%	11.4%	14.1%	15.3%	17.2%	15.9%	17.0%	18.9%	15.9%
Changan Automobile Group	12.8%	13.1%	12.9%	16.8%	12.9%	11.4%	12.7%	15.0%	12.6%	13.6%	16.0%	15.6%
Chery Automobile	33.5%	14.4%	34.3%	27.4%	13.4%	15.4%	12.9%	15.5%	13.7%	12.6%	15.7%	17.5%
Hyundai Motor	6.6%	7.2%	6.3%	7.0%	6.4%	7.8%	8.1%	6.6%	6.8%	7.5%	6.2%	6.1%

Source: BofA Global Research, EV volumes

BofA GLOBAL RESEARCH

# EV OEMs/Models in focus for investors

## Exhibit 11: Unit sales of certain BEV models and OEMs which we think investors have a special focus

Let us know if you have special requests, we have the data

Model	2021	2022	Q1-23	Q2-23	Jul-23	Aug-23	Sep-23	Q3-23	Oct-23	Nov-23	Dec-23	Q4-23	2023
<b>VW Group</b>	455,985	578,397	137,262	179,751	66,321	69,529	70,606	206,456	72,692	76,523	85,369	234,584	758,053
VW ID.3	76,329	77,866	23,211	25,867	13,381	13,178	13,793	40,352	15,724	16,253	17,861	49,838	139,268
VW ID.4	121,719	174,387	35,250	51,321	17,143	16,601	17,850	51,594	17,319	17,243	19,959	54,521	192,686
VW ID.6	18,788	37,974	3,100	5,918	1,684	1,227	1,384	4,295	1,433	1,266	1,155	3,854	17,167
VW ID.5	0	20,421	5,294	7,936	2,492	2,847	2,303	7,642	1,484	1,977	2,796	6,257	27,129
Audi Q4 e-tron	21,051	53,762	21,429	26,928	8,274	9,665	11,321	29,260	11,350	10,392	11,260	33,002	110,619
Audi Q8 e-tron	0	21	6,381	9,483	3,873	4,181	4,975	13,029	4,590	5,086	6,312	15,988	44,881
Cupra Born	3,412	32,633	8,045	9,770	3,817	5,330	4,267	13,414	4,176	3,913	5,067	13,156	44,385
Skoda Enyaq	44,438	53,946	12,144	19,013	7,462	8,331	7,490	23,283	8,565	9,228	8,466	26,259	80,699
Porsche	40,610	35,035	9,358	9,135	3,385	2,814	3,038	9,237	3,331	4,004	4,814	12,149	39,879
Porsche Taycan	40,610	35,035	9,358	9,135	3,385	2,814	3,038	9,237	3,331	4,004	4,814	12,149	39,879
<b>Mercedes-Benz Group</b>	101,605	153,805	45,762	61,160	20,333	20,979	25,489	66,801	22,100	25,499	26,329	73,928	247,651
Mercedes EQS	1,607	21,215	5,149	4,961	1,042	1,034	1,110	3,186	1,114	1,400	1,401	3,915	17,211
Mercedes EQE	0	13,852	7,347	10,090	2,855	2,888	3,693	9,436	3,396	3,928	3,845	11,169	38,042
Mercedes EQS SUV	0	943	3,064	4,269	1,062	1,072	1,097	3,231	1,163	1,342	1,518	4,023	14,587
<b>BMW Group</b>	104,715	218,933	65,206	89,782	27,224	34,544	32,171	93,939	36,250	41,239	51,192	128,681	377,608
BMW 3-Series L (i3)	0	17,793	10,130	11,797	2,402	5,290	5,274	12,966	5,763	6,141	5,786	17,690	52,583
BMW iX3	38,670	54,385	15,597	19,191	5,237	6,817	7,027	19,081	6,146	6,433	6,979	19,558	73,427
BMW i4	496	40,825	14,146	22,329	6,838	7,051	5,558	19,447	7,168	9,143	11,203	27,514	83,436
BMW iX	4,418	38,960	9,434	11,925	4,409	4,940	4,814	14,163	3,611	4,851	7,027	15,489	51,011
BMW i7	0	1,177	1,137	1,869	775	1,108	1,124	3,007	1,094	1,171	1,624	3,889	9,902
Stellantis	216,887	301,623	75,193	95,202	25,099	32,977	35,210	93,286	24,941	24,335	28,084	77,360	341,041
Fiat 500	44,733	67,012	14,145	18,587	5,164	5,925	6,285	17,374	5,139	4,690	6,742	16,571	66,677
Peugeot e-208	44,624	49,283	13,816	13,870	3,231	4,219	7,103	14,553	3,136	3,232	2,708	9,076	51,315
<b>Renault Group</b>	142,047	161,083	41,467	39,498	13,932	15,118	13,410	42,460	16,242	15,228	15,816	47,286	170,711
Renault Megane	45	33,151	11,079	11,947	3,399	4,585	3,268	11,252	4,527	4,298	3,914	12,739	47,017
Dacia Spring	27,309	49,035	14,353	12,851	6,034	6,013	4,890	16,937	6,193	5,518	5,437	17,148	61,289
<b>Hyundai Motor</b>	245,670	372,295	88,586	109,492	39,647	43,286	34,048	116,981	35,534	33,388	33,591	102,513	417,572
Hyundai Ioniq 5	45,757	99,636	21,618	26,723	9,599	10,407	8,570	28,576	8,930	8,433	7,681	25,044	101,961
Kia EV6	19,095	78,706	16,484	22,784	7,685	9,550	6,970	24,205	6,667	5,431	4,727	16,825	80,298
<b>Toyota Motor Corp.</b>	18,942	25,304	19,674	29,303	6,728	11,870	10,365	28,963	9,090	9,273	8,097	26,460	104,400
Toyota BZ4X	0	8,333	12,911	13,398	3,834	4,383	3,621	11,838	3,288	3,198	3,395	9,881	48,028
<b>GM</b>	504,420	568,651	109,190	137,751	52,298	49,156	59,855	161,309	69,744	77,575	85,608	232,927	641,177
Chevrolet Bolt EUV	3,851	32,533	15,307	12,537	4,030	4,701	4,687	13,418	4,358	3,780	3,389	11,527	52,789
<b>Ford</b>	55,848	105,589	18,501	24,659	10,033	11,232	12,564	33,829	10,660	12,513	14,019	37,192	114,181
Ford F-150 Lightning	76	15,627	4,432	4,594	1,599	1,056	985	3,640	3,761	4,448	3,853	12,062	24,728
<b>Tesla Inc.</b>	936,310	1,314,470	422,742	466,012	113,610	167,471	154,095	435,176	114,991	174,466	195,265	484,722	1,808,652
Tesla Model 3	500,386	476,470	131,936	147,443	33,747	46,593	26,043	106,383	32,013	54,616	56,896	143,525	529,287
Tesla Model Y	410,982	771,297	280,101	299,275	75,699	115,715	121,358	312,772	78,252	112,791	128,410	319,453	1,211,601
<b>Rivian Automotive</b>	938	20,342	8,066	13,192	5,269	5,469	5,492	16,230	4,569	4,755	5,231	14,555	52,043
Rivian R1T	913	16,074	3,893	4,466	1,234	1,143	1,104	3,481	1,036	1,137	1,303	3,476	15,316
<b>Lucid Motors</b>	125	4,477	1,462	1,511	418	528	605	1,551	514	537	574	1,625	6,149
Lucid Air	125	4,477	1,462	1,511	418	528	605	1,551	514	537	574	1,625	6,149
<b>Xpeng</b>	98,701	122,825	18,261	23,252	11,143	13,804	15,449	40,396	20,018	20,124	20,105	60,247	142,156
Xpeng P7	60,607	59,441	6,370	13,716	5,014	4,347	4,719	14,080	3,989	3,130	4,291	11,410	45,576
<b>NIO Inc.</b>	93,482	124,704	31,379	25,499	19,430	20,580	15,457	55,467	16,077	16,167	18,178	50,422	162,767
NIO et5	0	11,813	18,806	12,762	5,493	7,132	3,935	16,560	4,675	5,233	5,558	15,466	63,594
NIO es6	42,235	41,958	4,573	5,999	10,252	9,335	7,921	27,508	5,688	5,700	6,977	18,365	56,445
<b>Polestar</b>	28,723	49,282	11,083	14,967	5,752	5,572	4,874	16,198	3,768	4,175	4,920	12,863	55,111
Polestar 2	28,723	49,282	11,083	14,967	5,752	5,572	4,874	16,198	3,768	4,175	4,920	12,863	55,111
<b>BYD</b>	327,267	913,955	264,257	352,589	137,749	144,030	151,200	432,979	168,204	169,440	183,778	521,422	1,571,247
BYD Yuan Plus / Atto-3	1	201,772	94,253	108,567	30,254	32,701	35,594	98,549	47,059	32,859	37,707	117,625	418,994
BYD Dolphin	29,590	205,248	70,567	88,002	31,830	32,298	27,211	91,339	32,871	41,302	30,510	104,683	354,591
BYD Seagull	0	0	0	32,360	28,001	34,841	35,012	97,854	37,837	44,603	50,525	132,965	263,179
<b>Geely Auto Group</b>	71,165	275,576	74,717	99,196	36,820	38,773	36,780	112,373	43,867	46,236	42,939	133,042	419,328
Geely Panda Mini	0	19	18,050	25,068	6,691	8,832	10,221	25,744	13,052	15,188	12,538	40,778	109,640
Zeekr X	0	0	0	2,750	4,035	4,165	1,725	9,925	2,654	4,714	2,345	9,713	22,388
<b>Volvo</b>	25,725	68,691	29,473	32,213	5,942	7,108	9,430	22,480	10,083	10,558	10,337	30,978	115,144
Volvo XC40	24,570	44,682	20,750	19,692	3,832	4,879	6,633	15,344	7,089	7,451	6,583	21,123	76,909

Source: BofA Global Research, EV volumes

BofA GLOBAL RESEARCH



# Global BEV sales and market share (II)

## Exhibit 12: Global & US, Europe, China xEV volumes and penetration rate

Global China's xEV penetration rate increased the most as strong PHEV sales compensated lacklustre BEV sales

	2022	2023	3Q 22	4Q 22	1Q 23	2Q 23	3Q 23	4Q 23	Sep-23	Oct-23	Nov-23	Dec-23
<b>BEV Units sales</b>												
Europe	1,684,923	2,241,802	378,948	610,118	472,225	552,271	594,632	622,674	211,319	181,525	208,794	232,355
USA	801,185	1,177,442	209,076	247,902	254,174	289,760	310,993	322,515	105,985	100,990	102,167	119,358
China	4,663,436	5,705,699	1,341,315	1,409,921	968,019	1,339,644	1,543,621	1,854,415	538,158	561,131	609,912	683,372
<b>Global</b>	<b>7,685,634</b>	<b>10,002,636</b>	<b>2,085,202</b>	<b>2,441,784</b>	<b>1,877,524</b>	<b>2,403,845</b>	<b>2,667,823</b>	<b>3,053,444</b>	<b>934,955</b>	<b>923,075</b>	<b>1,008,288</b>	<b>1,122,081</b>
<b>BEV Penetration Rate (%)</b>												
Europe	13.1%	15.6%	12.4%	17.8%	12.8%	14.4%	16.8%	18.8%	15.9%	15.3%	19.4%	22.2%
USA	5.8%	7.5%	6.1%	6.9%	7.1%	7.0%	7.8%	8.2%	7.9%	8.3%	8.2%	8.2%
China	19.9%	21.9%	21.3%	22.0%	18.4%	21.1%	22.9%	24.3%	22.3%	23.2%	24.7%	24.8%
<b>Global</b>	<b>9.9%</b>	<b>11.7%</b>	<b>10.5%</b>	<b>11.8%</b>	<b>9.7%</b>	<b>11.3%</b>	<b>12.2%</b>	<b>13.3%</b>	<b>12.1%</b>	<b>12.5%</b>	<b>13.4%</b>	<b>14.1%</b>
<b>PHEV Units sales</b>												
Europe	1,026,864	1,006,691	215,034	332,415	231,298	254,332	245,212	275,849	94,046	91,799	93,309	90,741
USA	189,284	287,964	41,463	57,397	55,817	74,208	77,845	80,094	28,635	23,319	26,238	30,537
China	1,517,400	2,707,177	435,220	541,797	440,607	607,423	724,695	934,452	257,796	279,040	292,998	362,414
<b>PHEV Penetration Rate (%)</b>												
Europe	8.0%	7.0%	7.1%	9.7%	6.3%	6.6%	6.9%	8.3%	7.1%	7.7%	8.7%	8.7%
USA	1.4%	1.8%	1.2%	1.6%	1.5%	1.8%	1.9%	2.0%	2.1%	1.9%	2.1%	2.1%
China	6.5%	10.4%	6.9%	8.4%	8.4%	9.6%	10.8%	12.2%	10.7%	11.5%	11.9%	13.2%
<b>Global</b>	<b>3.7%</b>	<b>4.9%</b>	<b>3.6%</b>	<b>4.6%</b>	<b>4.0%</b>	<b>4.6%</b>	<b>5.0%</b>	<b>5.9%</b>	<b>5.2%</b>	<b>5.5%</b>	<b>5.8%</b>	<b>6.3%</b>
<b>xEV Units sales</b>												
Europe	2,711,787	3,248,493	593,982	942,533	703,523	806,603	839,844	898,523	305,365	273,324	302,103	323,096
USA	990,469	1,465,406	250,539	305,299	309,991	363,968	388,838	402,609	134,620	124,309	128,405	149,895
China	6,180,836	8,412,876	1,776,535	1,951,718	1,408,626	1,947,067	2,268,316	2,788,867	795,954	840,171	902,910	1,045,786
<b>Global xEV unit sales</b>	<b>10,546,507</b>	<b>14,199,730</b>	<b>2,808,615</b>	<b>3,403,768</b>	<b>2,649,906</b>	<b>3,387,348</b>	<b>3,766,791</b>	<b>4,395,685</b>	<b>1,333,751</b>	<b>1,333,130</b>	<b>1,440,148</b>	<b>1,622,407</b>
<b>xEV Penetration Rate (%)</b>												
Europe	21.0%	22.6%	19.5%	27.4%	19.0%	21.1%	23.8%	27.1%	22.9%	23.0%	28.1%	30.8%
USA	7.1%	9.4%	7.3%	8.4%	8.6%	8.8%	9.7%	10.3%	10.0%	10.3%	10.3%	10.2%
China	26.4%	32.4%	28.2%	30.4%	26.7%	30.7%	33.7%	36.5%	33.0%	34.7%	36.5%	38.0%
<b>Global</b>	<b>13.6%</b>	<b>16.6%</b>	<b>14.2%</b>	<b>16.4%</b>	<b>13.6%</b>	<b>15.9%</b>	<b>17.2%</b>	<b>19.2%</b>	<b>17.3%</b>	<b>18.0%</b>	<b>19.2%</b>	<b>20.3%</b>

Source: BofA Global Research, EV-volumes

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## Exhibit 13: Global BEV Sales by Model – Top selling models (sorted by highest sales in the latest month)

Tesla Model Y and 3 are the best-selling cars of 2023, but the BYD Seagull was the most successful launch this year

Global BEV Sales by Model	2022	2023	3Q 22	4Q 22	1Q 23	2Q 23	3Q 23	4Q 23	Sep-23	Oct-23	Nov-23	Dec-23
Tesla Model Y	771,297	1,211,601	207,970	248,438	280,101	299,275	312,772	319,453	121,358	78,252	112,791	128,410
Tesla Model 3	476,470	529,287	117,253	139,702	131,936	147,443	106,383	143,525	26,043	32,013	54,616	56,896
BYD Seagull	0	263,179	0	0	0	32,360	97,854	132,965	35,012	37,837	44,603	50,525
BYD Yuan Plus / Atto-3	201,772	418,994	61,452	85,357	94,253	108,567	98,549	117,625	35,594	47,059	32,859	37,707
BYD Dolphin	205,248	354,591	68,977	77,678	70,567	88,002	91,339	104,683	27,211	32,871	41,302	30,510
Wuling Bingo	0	169,157	0	0	3,312	41,178	48,048	76,619	19,606	23,744	24,024	28,851
Wuling HongGuang Mini	424,035	237,919	108,425	107,778	69,850	52,204	47,496	68,369	16,148	20,343	22,991	25,035
Aion Y	119,725	235,861	36,964	38,502	31,068	60,966	71,589	72,238	27,004	27,140	22,381	22,717
VW ID.4	174,387	192,686	51,550	59,350	35,250	51,321	51,594	54,521	17,850	17,319	17,243	19,959
VW ID.3	77,866	139,268	19,326	31,401	23,211	25,867	40,352	49,838	13,793	15,724	16,253	17,861
Aion S / Aion S Plus	116,165	220,915	32,071	44,165	48,314	67,292	66,635	38,674	21,548	11,730	11,728	15,216
BYD Qin Plus	119,943	126,469	34,329	35,628	23,850	30,964	34,969	36,686	11,844	9,390	12,089	15,207
MG 4 / Mulan	10,508	98,324	1,128	8,929	16,930	21,140	26,596	33,658	10,232	10,103	10,591	12,964
Geely Panda Mini	19	109,640	0	19	18,050	25,068	25,744	40,778	10,221	13,052	15,188	12,538
Changan Lumin	60,273	139,193	21,620	36,786	24,033	28,890	41,569	44,701	14,494	15,538	16,679	12,484
Audi Q4 e-tron	53,762	110,619	12,179	23,061	21,429	26,928	29,260	33,002	11,321	11,350	10,392	11,260
BMW i4	40,825	83,436	10,083	20,184	14,146	22,329	19,447	27,514	5,558	7,168	9,143	11,203
BYD Seal	51,200	79,999	9,199	42,001	19,573	22,519	15,940	21,967	7,369	7,348	3,835	10,784
Hongqi E-QM5 / E-QM5 Plus	27,960	77,746	11,568	10,114	7,486	16,585	24,654	29,021	9,152	10,021	8,400	10,600
LP C11	40,681	53,822	13,420	8,199	5,292	11,452	17,917	19,161	6,323	6,333	3,678	9,150
Ora R3 / Good Cat	66,533	91,806	21,759	10,128	9,186	26,365	27,073	29,182	9,904	9,240	10,797	9,145
BMW iX1	1,802	52,917	0	1,802	5,668	12,155	13,445	21,649	4,426	5,737	7,137	8,775

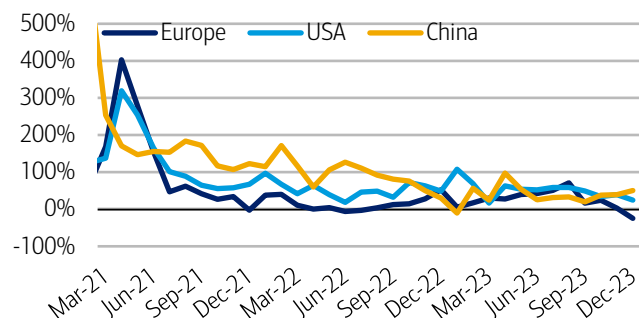
Source: BofA Global Research, EV-volumes

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# Global EV sales data by region

## Exhibit 14: Global BEV+PHEV Y/Y changes

Global xEV sales grew 23% y/y, mainly driven by the China growth of c50%

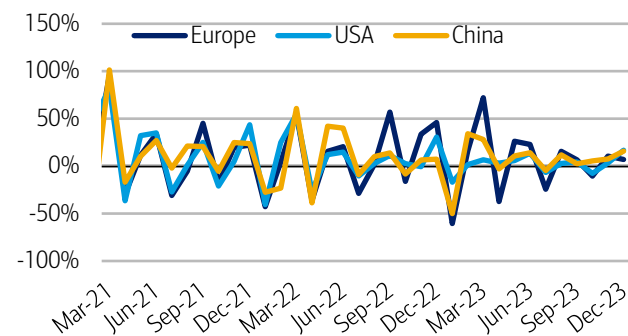


Source: EV-volumes, BofA Global Research

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## Exhibit 15: Global BEV+PHEV M/M changes

Volumes were up across regions, with China leading the gains (+16%)

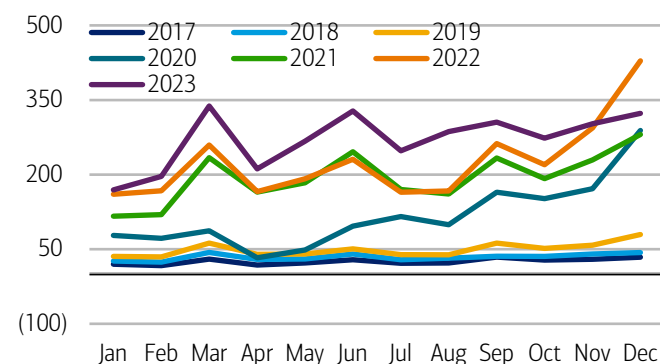


Source: EV-volumes, BofA Global Research

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## Exhibit 16: Europe monthly (BEV+PHEV) sales volumes

EU xEV sales declined by c25% y/y to 323k units

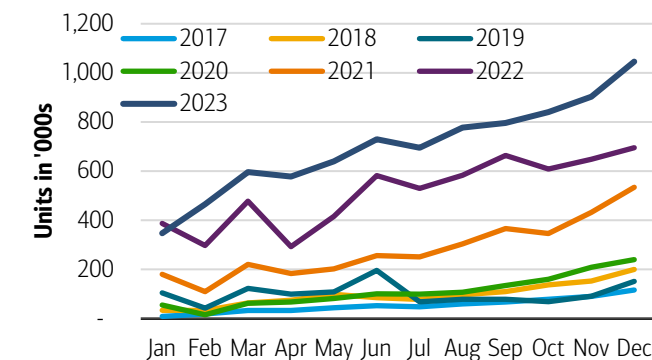


Source: EV-volumes, BofA Global Research

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## Exhibit 17: China monthly (BEV+PHEV) sales volumes

China xEV sales topped 1046k units, up c50% y/y

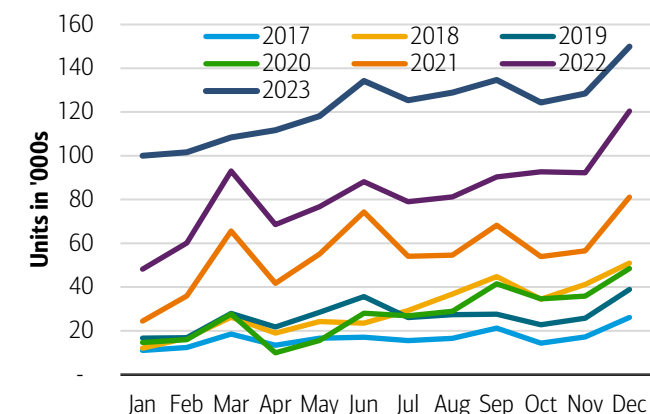


Source: EV-volumes, BofA Global Research

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## Exhibit 18: US monthly (BEV+PHEV) sales volumes

US xEV sales stood at 150k in Dec, up c24% y/y

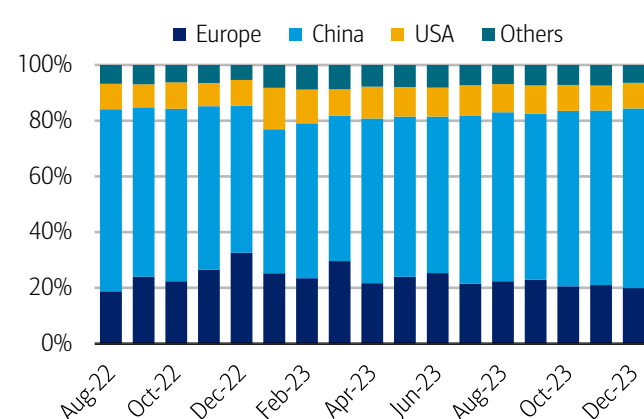


Source: EV-volumes, BofA Global Research

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## Exhibit 19: Global BEV+PHEV sales contribution by regions

China gained some share over EU in Dec m/m



Source: EV-volumes, BofA Global Research

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## Top-10 BEV OEMs models sales by regions in 2023

### Exhibit 20: EU Top-10 BEV sales OEMs YTD (Units in '000s)

VW remains market leader in Europe, but the market is competitive

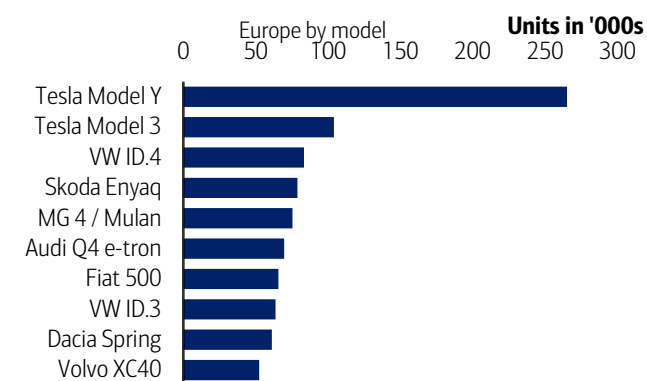


Source: EV-volumes, BofA Global Research

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### Exhibit 21: EU Top-10 sales models YTD (Units in '000s)

Tesla mass market models dominates, followed by VW Group models

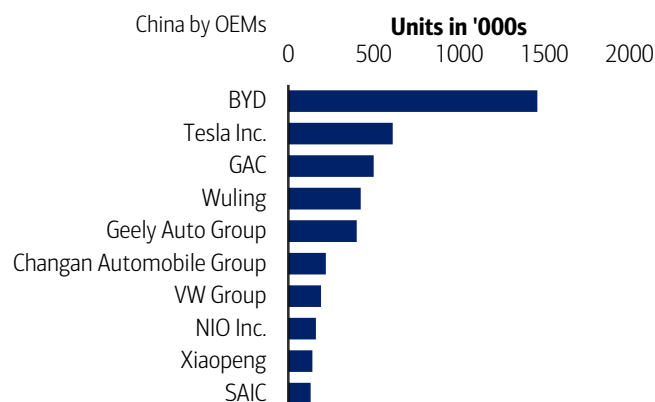


Source: EV-volumes, BofA Global Research

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### Exhibit 22: China Top-10 BEV sales OEMs YTD (Units in '000s)

BYD is the no 1 OEM by sales in China, with VW down in 7<sup>th</sup> only

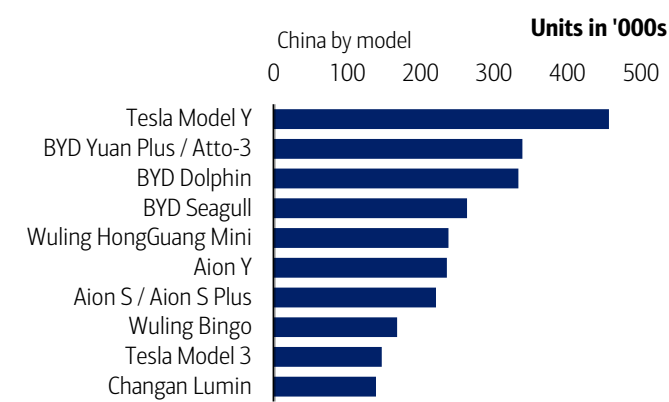


Source: EV-volumes, BofA Global Research

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### Exhibit 23: China Top-10 sales models YTD (Units in '000s)

The Model Y still leads in China, with no EU OEMs model in the top 10

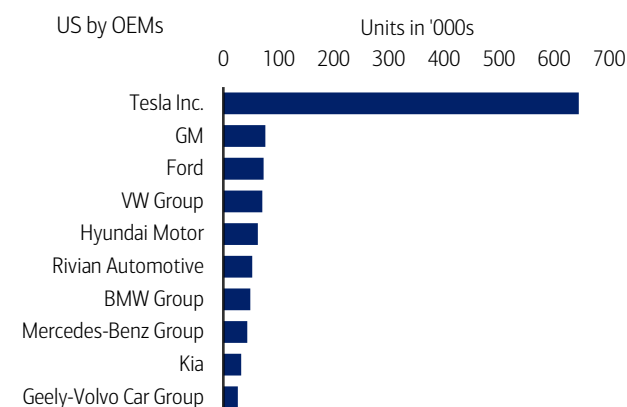


Source: EV-volumes, BofA Global Research

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### Exhibit 24: US Top-10 sales OEMs YTD (Units in '000s)

Tesla is by far the largest BEV player in the US

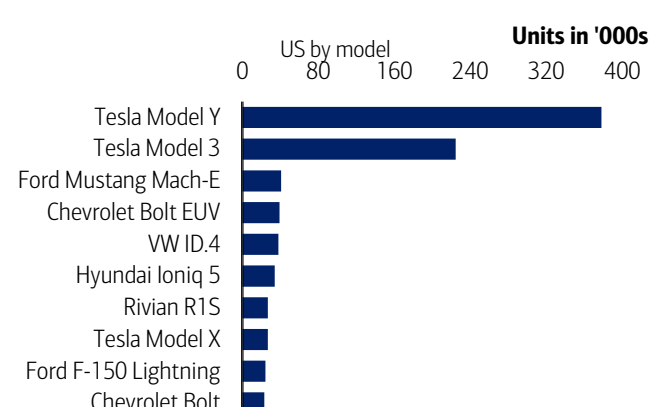


Source: EV-volumes, BofA Global Research

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### Exhibit 25: US Top-10 sales models YTD (Units in '000s)

Tesla's models dominate the market, with the premium model X also in the top 10 in the US



Source: EV-volumes, BofA Global Research

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# BEV production vs sales tracker

In the table below, we compare reported global BEV unit sales for 2023 (Source: EV Volumes) vs the estimated production figures by S&P. Our comparison shows that Tesla, BYD, Volvo Cars, RNO and STLA had a good balance of production (supply) & sales (demand). **Mercedes, Ford and Hyundai produced too many EVs in 2023.** In general, the fear remains that too high inventories lead to higher price discounts on some BEVs and that the EV price war from China will spill over to the US and Europe too.

## Exhibit 26: EV sales & production since Q1 2022

TSLA and BYD 's production closely precedes sales while Ford & Mercedes seem to have produced too many EVs

OEM		Q1-22	Q2-22	Q3-22	Q4-22	2022	Q1-23	Q2-23	Q3-23	Q4-23	2023
BMW	Production	40,282	58,292	62,699	90,430	251,703	83,993	96,569	106,792	124,636	411,990
	Sales	37,372	41,821	50,726	89,012	218,931	65,206	89,782	93,939	128,681	377,608
	<b>Delta prod/sales</b>	<b>2,910</b>	<b>16,471</b>	<b>11,973</b>	<b>1,418</b>	<b>32,772</b>	<b>18,787</b>	<b>6,787</b>	<b>12,853</b>	<b>-4,045</b>	<b>34,382</b>
	as % sales	7%	28%	19%	2%	13%	22%	7%	12%	-3%	8%
BYD	Production	147,921	182,477	262,803	326,603	919,804	272,179	368,885	440,057	512,041	1,593,162
	Sales	144,439	182,088	258,105	329,367	913,999	264,257	352,589	432,979	521,422	1,571,247
	<b>Delta prod/sales</b>	<b>3,482</b>	<b>389</b>	<b>4,698</b>	<b>-2,764</b>	<b>5,805</b>	<b>7,922</b>	<b>16,296</b>	<b>7,078</b>	<b>-9,381</b>	<b>21,915</b>
	as % sales	2%	0%	2%	-1%	1%	3%	4%	2%	-2%	1%
Ford	Production	24,618	27,396	34,415	39,989	126,418	25,677	55,063	47,271	40,559	168,570
	Sales	17,462	24,477	29,376	34,272	105,587	18,501	24,659	33,829	37,192	114,181
	<b>Delta prod/sales</b>	<b>7,156</b>	<b>2,919</b>	<b>5,039</b>	<b>5,717</b>	<b>20,831</b>	<b>7,176</b>	<b>30,404</b>	<b>13,442</b>	<b>3,367</b>	<b>54,389</b>
	as % sales	29%	11%	15%	14%	16%	28%	55%	28%	8%	32%
Hyundai motors	Production	85,497	83,850	90,935	110,567	370,849	132,479	143,386	116,239	130,785	522,889
	Sales	91,340	98,119	91,601	91,233	372,293	88,586	109,492	116,981	102,513	417,572
	<b>Delta prod/sales</b>	<b>-5,843</b>	<b>-14,269</b>	<b>-666</b>	<b>19,334</b>	<b>-1,444</b>	<b>43,893</b>	<b>33,894</b>	<b>-742</b>	<b>28,272</b>	<b>105,317</b>
	as % sales	-7%	-17%	-1%	17%	0%	33%	24%	-1%	22%	20%
MBG	Production	40,881	36,620	51,354	77,847	206,702	98,811	97,703	78,585	84,903	360,002
	Sales	31,997	33,510	36,388	61,170	163,065	45,762	61,160	66,801	73,928	247,651
	<b>Delta prod/sales</b>	<b>8,884</b>	<b>3,110</b>	<b>14,966</b>	<b>16,677</b>	<b>43,637</b>	<b>53,049</b>	<b>36,543</b>	<b>11,784</b>	<b>10,975</b>	<b>112,351</b>
	as % sales	22%	8%	29%	21%	21%	54%	37%	15%	13%	31%
STLA	Production	61,225	73,460	68,620	84,120	287,425	90,820	92,610	79,915	84,970	348,315
	Sales	62,116	79,653	70,228	89,605	301,602	75,193	95,202	93,286	77,360	341,041
	<b>Delta prod/sales</b>	<b>-891</b>	<b>-6,193</b>	<b>-1,608</b>	<b>-5,485</b>	<b>-14,177</b>	<b>15,627</b>	<b>-2,592</b>	<b>-13,371</b>	<b>7,610</b>	<b>7,274</b>
	as % sales	-1%	-8%	-2%	-7%	-5%	17%	-3%	-17%	9%	2%
TSLA	Production	305,407	258,580	365,923	439,701	1,369,611	440,808	479,700	430,488	469,920	1,820,916
	Sales	310,173	255,084	343,893	405,317	1,314,467	422,742	466,012	435,176	484,722	1,808,652
	<b>Delta prod/sales</b>	<b>-4,766</b>	<b>3,496</b>	<b>22,030</b>	<b>34,384</b>	<b>55,144</b>	<b>18,066</b>	<b>13,688</b>	<b>-4,688</b>	<b>-14,802</b>	<b>12,264</b>
	as % sales	-2%	1%	6%	8%	4%	4%	3%	-1%	-3%	1%
VW Group	Production	95,486	148,406	165,362	208,638	617,892	221,117	216,182	185,935	184,408	807,642
	Sales	99,472	119,184	151,283	208,462	578,401	137,262	179,751	206,456	234,584	758,053
	<b>Delta prod/sales</b>	<b>-3,986</b>	<b>29,222</b>	<b>14,079</b>	<b>176</b>	<b>39,491</b>	<b>83,855</b>	<b>36,431</b>	<b>-20,521</b>	<b>-50,176</b>	<b>49,589</b>
	as % sales	-4%	20%	9%	0%	6%	38%	17%	-11%	-27%	6%
RNO	Production	27,081	44,004	53,150	57,093	181,328	44,326	47,298	33,023	34,464	159,111
	Sales	29,770	37,618	38,133	55,637	161,158	38,143	37,676	39,840	44,543	160,202
	<b>Delta prod/sales</b>	<b>-2,689</b>	<b>6,386</b>	<b>15,017</b>	<b>1,456</b>	<b>20,170</b>	<b>6,183</b>	<b>9,622</b>	<b>-6,817</b>	<b>-10,079</b>	<b>-1,091</b>
	as % sales	-10%	15%	28%	3%	11%	14%	20%	-21%	-29%	-1%
Volvo Cars	Production	24,792	22,844	30,901	50,341	128,878	45,195	44,322	39,212	45,400	174,129
	Sales	21,101	22,394	21,548	52,928	117,971	40,556	47,180	38,678	43,841	170,255
	<b>Delta prod/sales</b>	<b>3,691</b>	<b>450</b>	<b>9,353</b>	<b>-2,587</b>	<b>10,907</b>	<b>4,639</b>	<b>-2,858</b>	<b>534</b>	<b>1,559</b>	<b>3,874</b>
	as % sales	15%	2%	30%	-5%	8%	10%	-6%	1%	3%	2%

Source: BofA Global Research, EV Volumes, S&P Global production; \* Hyundai Motor = Hyundai & Kia brand

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## Europe: BEV + PHEV sales

### Exhibit 27: Europe BEV sales by OEMs (units)

VW is the BEV market leader in Europe followed by Tesla and Stellantis. TSLA, BMW and Toyota gained the most share to the expense of STLA & RNO

BEV unit sales	2021	2022	2023	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23
<b>EU OEMs</b>															
VW Group	310,208	357,910	462,806	82,953	143,537	94,449	118,443	122,663	127,251	39,501	45,231	37,931	39,495	42,459	45,297
Stellantis	194,689	284,703	325,985	64,854	83,926	72,476	90,489	90,143	72,877	24,317	31,828	33,998	23,569	22,639	26,669
BMW Group	76,082	131,297	185,875	29,677	47,596	30,368	41,670	45,925	67,912	13,924	16,746	15,255	18,733	20,957	28,222
Renault	139,482	156,575	157,718	37,025	54,727	37,456	37,237	39,280	43,745	12,956	14,146	12,178	15,044	14,025	14,676
Mercedes-Benz Group	89,283	111,712	146,965	23,232	39,081	29,406	33,924	41,927	41,708	11,807	13,120	17,000	12,545	14,787	14,376
<b>US OEMs</b>															
Tesla Inc.	170,115	233,059	378,981	53,549	93,743	94,609	93,249	94,948	96,175	18,953	36,918	39,077	19,127	37,400	39,648
Ford	23,417	29,175	31,445	7,312	9,745	5,771	8,092	9,200	8,382	2,300	2,957	3,943	2,835	2,725	2,822
<b>Asian OEMs</b>															
Hyundai Motor	74,115	86,637	83,219	19,865	24,939	19,186	20,631	23,544	19,858	7,519	9,939	6,086	6,224	6,645	6,989
Kia	62,778	72,649	78,708	15,447	15,702	15,471	19,221	24,093	19,923	7,075	9,005	8,013	6,823	7,313	5,787
Nissan	41,974	35,974	32,508	8,358	13,734	7,582	7,246	8,654	9,026	2,083	2,693	3,878	3,103	2,660	3,263
Toyota Motor Corp.	8,836	13,508	31,145	2,520	5,707	7,115	8,058	7,957	8,015	2,295	3,126	2,536	2,391	2,327	3,297
Honda Motor	3,477	2,120	1,926	336	386	215	223	642	846	56	309	277	325	187	334
<b>Others</b>															
Geely-Volvo Car Group	35,780	80,305	110,904	12,285	41,368	27,277	29,440	24,327	29,860	7,187	7,851	9,289	9,312	9,890	10,658
<b>Total BEV</b>	<b>1,283,322</b>	<b>1,684,923</b>	<b>2,241,802</b>	<b>378,948</b>	<b>610,118</b>	<b>472,225</b>	<b>552,271</b>	<b>594,632</b>	<b>622,674</b>	<b>166,086</b>	<b>217,227</b>	<b>211,319</b>	<b>181,525</b>	<b>208,794</b>	<b>232,355</b>
<b>EU Market Share (%)</b>															
<b>EU OEMs</b>															
VW Group	24.2%	21.2%	20.6%	21.9%	23.5%	20.0%	21.4%	20.6%	20.4%	23.8%	20.8%	17.9%	21.8%	20.3%	19.5%
Stellantis	15.2%	16.9%	14.5%	17.1%	13.8%	15.3%	16.4%	15.2%	11.7%	14.6%	14.7%	16.1%	13.0%	10.8%	11.5%
BMW Group	5.9%	7.8%	8.3%	7.8%	7.8%	6.4%	7.5%	7.7%	10.9%	8.4%	7.7%	7.2%	10.3%	10.0%	12.1%
Renault	10.9%	9.3%	7.0%	9.8%	9.0%	7.9%	6.7%	6.6%	7.0%	7.8%	6.5%	5.8%	8.3%	6.7%	6.3%
Mercedes-Benz Group	7.0%	6.6%	6.6%	6.1%	6.4%	6.2%	6.1%	7.1%	6.7%	7.1%	6.0%	8.0%	6.9%	7.1%	6.2%
<b>US OEMs</b>															
Tesla Inc.	13.3%	13.8%	16.9%	14.1%	15.4%	20.0%	16.9%	16.0%	15.4%	11.4%	17.0%	18.5%	10.5%	17.9%	17.1%
Ford	1.8%	1.7%	1.4%	1.9%	1.6%	1.2%	1.5%	1.5%	1.3%	1.4%	1.4%	1.9%	1.6%	1.3%	1.2%
<b>Asian OEMs</b>															
Hyundai Motor	5.8%	5.1%	3.7%	5.2%	4.1%	4.1%	3.7%	4.0%	3.2%	4.5%	4.6%	2.9%	3.4%	3.2%	3.0%
Kia	4.9%	4.3%	3.5%	4.1%	2.6%	3.3%	3.5%	4.1%	3.2%	4.3%	4.1%	3.8%	3.8%	3.5%	2.5%
Nissan	3.3%	2.1%	1.5%	2.2%	2.3%	1.6%	1.3%	1.5%	1.4%	1.3%	1.2%	1.8%	1.7%	1.3%	1.4%
Toyota Motor Corp.	0.7%	0.8%	1.4%	0.7%	0.9%	1.5%	1.5%	1.3%	1.3%	1.4%	1.4%	1.2%	1.3%	1.1%	1.4%
Honda Motor	0.3%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.1%	0.1%	0.0%	0.1%	0.1%	0.2%	0.1%	0.1%
<b>Others</b>															
Geely-Volvo Car Group	2.8%	4.8%	4.9%	3.2%	6.8%	5.8%	5.3%	4.1%	4.8%	4.3%	3.6%	4.4%	5.1%	4.7%	4.6%

Source: EV-volumes, BofA Global Research

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### Exhibit 28: Europe Top 15 BEV sales by model (sorted by highest sales in the latest month)

Tesla Model 3/Y dominate the EU market as well, followed by the VW ID.4 (weak relative Dec) and Skoda Enyaq. The Togg T10X was the best EU launch in 2023

Europe unit sales	Q3 22	Q4 22	Q1 23	Q2 23	Q3 23	Q4 23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	2022	2023
Tesla Model Y	38,409	54,734	72,555	66,048	70,124	56,297	12,173	23,575	34,376	11,577	19,124	25,596	111,757	265,024
Tesla Model 3	15,132	35,750	19,784	23,342	23,110	37,747	6,407	13,005	3,698	7,077	17,523	13,147	58,469	103,983
MG 4 / Mulan	757	6,703	12,767	18,590	20,679	23,232	6,437	6,735	7,507	6,950	6,716	9,566	7,460	75,268
Skoda Enyaq	14,205	16,190	11,735	18,519	22,760	25,733	7,227	8,137	7,396	8,455	8,901	8,377	43,655	78,747
BMW i4	5,240	12,672	7,661	12,538	10,268	19,507	3,437	3,846	2,985	5,308	6,193	8,006	23,120	49,974
BMW iX1	0	1,802	5,365	10,572	12,110	17,847	3,457	4,801	3,852	4,629	5,715	7,503	1,802	45,894
VW ID.4	17,448	27,405	16,252	25,569	23,065	18,352	8,698	8,465	5,902	5,503	5,722	7,127	57,507	83,238
Fiat 500	14,137	19,379	13,992	18,291	17,061	16,202	5,102	5,854	6,105	5,066	4,604	6,532	52,758	65,546
Togg T10X	0	0	0	808	4,796	13,979	627	1,965	2,204	3,567	4,401	6,011	0	19,583
Audi Q4 e-tron	8,676	15,492	15,419	16,748	16,961	20,401	4,653	5,442	6,866	7,764	7,121	5,516	31,625	69,529
Dacia Spring	11,709	17,405	14,282	12,752	16,880	17,069	6,007	5,997	4,876	6,170	5,492	5,407	39,810	60,983
Mini Cooper SE	8,220	11,439	7,487	8,610	8,888	12,575	2,775	3,254	2,859	3,797	3,739	5,039	27,169	37,560
Cupra Born	9,561	14,673	8,035	9,604	12,993	12,813	3,731	5,214	4,048	4,026	3,794	4,993	30,427	43,445
VW ID.3	11,817	24,027	17,444	17,999	15,309	12,785	4,288	6,878	4,143	3,912	4,213	4,660	44,781	63,537
Volvo XC40	5,289	17,294	14,394	13,247	9,673	14,936	2,276	3,008	4,389	5,152	5,270	4,514	26,540	52,250

Source: EV-volumes, BofA Global Research

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**Exhibit 29: Europe PHEV sales by OEM (units)**

EU PHEV sales appear to have peaked with no notable end of year volume rally, hinting to further weakness into 2024

PHEV unit sales	2021	2022	2023	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23
<b>EU OEMs</b>															
VW Group	238,727	186,206	194,309	42,118	63,665	36,161	42,791	48,037	67,320	15,959	13,031	19,047	23,477	22,681	21,162
Mercedes-Benz Group	149,340	134,494	127,667	31,114	42,770	29,038	30,288	30,548	37,793	9,711	8,678	12,159	12,000	12,700	13,093
BMW Group	153,832	142,983	133,462	28,206	42,863	30,475	34,904	32,549	35,534	10,441	10,226	11,882	10,500	13,015	12,019
Stellantis	123,583	148,130	143,313	24,922	46,935	36,432	41,527	34,765	30,589	11,244	9,654	13,867	12,542	10,519	7,528
Tata-JLR	29,058	25,183	44,773	5,641	6,553	13,298	9,935	11,162	10,378	4,154	2,896	4,112	3,408	3,600	3,370
Renault	37,600	16,448	10,904	3,347	3,041	3,330	1,889	2,883	2,802	901	888	1,094	1,028	1,009	765
<b>US OEMs</b>															
Ford	55,116	58,907	54,953	10,042	24,910	12,973	14,195	14,858	12,927	4,973	4,428	5,457	4,344	4,153	4,430
<b>Asian OEMs</b>															
Kia	54,702	67,255	58,002	19,025	18,702	12,590	14,828	15,190	15,394	4,922	4,615	5,653	5,669	5,342	4,383
Toyota Motor Corp.	24,477	26,637	31,395	5,722	6,816	5,162	8,019	9,307	8,907	2,784	2,785	3,738	2,861	2,732	3,314
Hyundai Motor	27,445	36,920	30,311	10,049	10,421	7,045	8,608	7,290	7,368	2,725	2,059	2,506	2,547	2,481	2,340
SAIC	14,775	22,189	12,881	3,201	5,050	3,761	3,085	2,098	3,937	512	378	1,208	886	991	2,060
<b>Others</b>															
Geely-Volvo Car Group	115,380	89,298	96,252	14,913	29,843	23,538	27,017	21,608	24,089	9,019	5,422	7,167	6,699	8,180	9,210
<b>TOTAL PHEV</b>	<b>1,057,414</b>	<b>1,026,864</b>	<b>1,006,691</b>	<b>215,034</b>	<b>332,415</b>	<b>231,298</b>	<b>254,332</b>	<b>245,212</b>	<b>275,849</b>	<b>81,864</b>	<b>69,302</b>	<b>94,046</b>	<b>91,799</b>	<b>93,309</b>	<b>90,741</b>
<b>Market Share</b>															
<b>EU OEMs</b>															
VW Group	22.6%	18.1%	19.3%	19.6%	19.2%	15.6%	16.8%	19.6%	24.4%	19.5%	18.8%	20.3%	25.6%	24.3%	23.3%
Mercedes-Benz Group	14.1%	13.1%	12.7%	14.5%	12.9%	12.6%	11.9%	12.5%	13.7%	11.9%	12.5%	12.9%	13.1%	13.6%	14.4%
BMW Group	14.5%	13.9%	13.3%	13.1%	12.9%	13.2%	13.7%	13.3%	12.9%	12.8%	14.8%	12.6%	11.4%	13.9%	13.2%
Stellantis	11.7%	14.4%	14.2%	11.6%	14.1%	15.8%	16.3%	14.2%	11.1%	13.7%	13.9%	14.7%	13.7%	11.3%	8.3%
Tata-JLR	2.7%	2.5%	4.4%	2.6%	2.0%	5.7%	3.9%	4.6%	3.8%	5.1%	4.2%	4.4%	3.7%	3.9%	3.7%
Renault	3.6%	1.6%	1.1%	1.6%	0.9%	1.4%	0.7%	1.2%	1.0%	1.1%	1.3%	1.2%	1.1%	1.1%	0.8%
<b>US OEMs</b>															
Ford	5.2%	5.7%	5.5%	4.7%	7.5%	5.6%	5.6%	6.1%	4.7%	6.1%	6.4%	5.8%	4.7%	4.5%	4.9%
<b>Asian OEMs</b>															
Kia	5.2%	6.5%	5.8%	8.8%	5.6%	5.4%	5.8%	6.2%	5.6%	6.0%	6.7%	6.0%	6.2%	5.7%	4.8%
Toyota Motor Corp.	2.3%	2.6%	3.1%	2.7%	2.1%	2.2%	3.2%	3.8%	3.2%	3.4%	4.0%	4.0%	3.1%	2.9%	3.7%
Hyundai Motor	2.6%	3.6%	3.0%	4.7%	3.1%	3.0%	3.4%	3.0%	2.7%	3.3%	3.0%	2.7%	2.8%	2.7%	2.6%
SAIC	1.4%	2.2%	1.3%	1.5%	1.5%	1.6%	1.2%	0.9%	1.4%	0.6%	0.5%	1.3%	1.0%	1.1%	2.3%
<b>Others</b>															
Geely-Volvo Car Group	10.9%	8.7%	9.6%	6.9%	9.0%	10.2%	10.6%	8.8%	8.7%	11.0%	7.8%	7.6%	7.3%	8.8%	10.1%

Source: EV-volumes, BofA Global Research

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**Exhibit 30: Europe xEV unit sales (sorted by highest sales in the latest month)**

EU OEMs lost xEV market share in Europe, except VW, as TSLA gains share

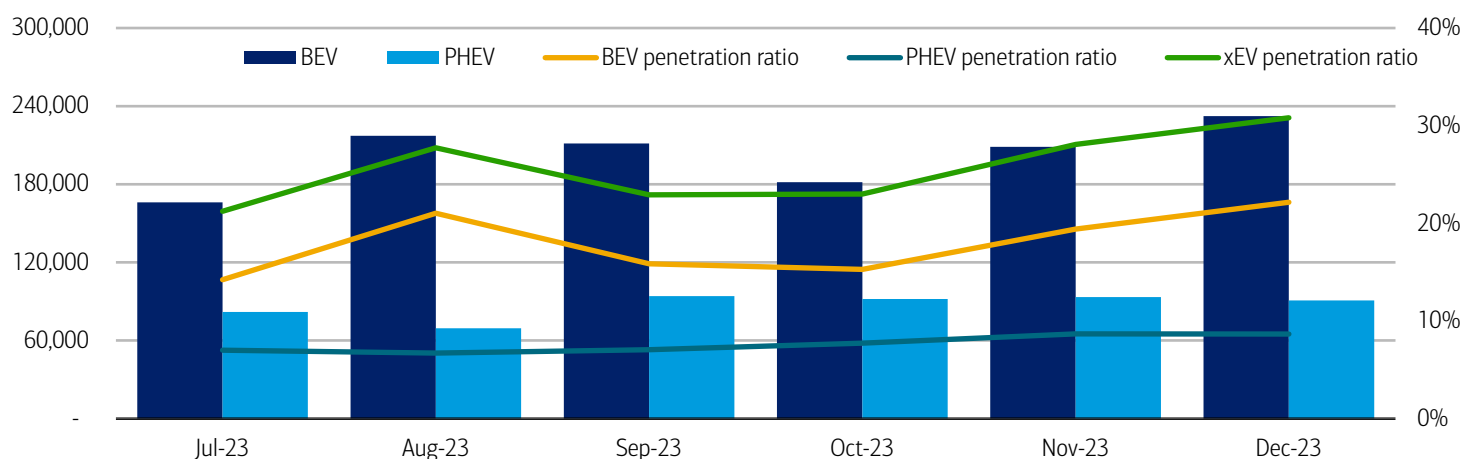
EUROPE xEV	2021	2022	2023	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23
VW Group	548,935	544,116	657,115	125,071	207,202	130,610	161,234	170,700	194,571	55,460	58,262	56,978	62,972	65,140	66,459
BMW Group	229,914	274,280	319,337	57,883	90,459	60,843	76,574	78,474	103,446	24,365	26,972	27,137	29,233	33,972	40,241
Tesla Inc.	170,115	233,059	378,981	53,549	93,743	94,609	93,249	94,948	96,175	18,953	36,918	39,077	19,127	37,400	39,648
Stellantis	318,272	432,833	469,298	89,776	130,861	108,908	132,016	124,908	103,466	35,561	41,482	47,865	36,111	33,158	34,197
Mercedes-Benz Group	238,623	246,206	274,632	54,346	81,851	58,444	64,212	72,475	79,501	21,518	21,798	29,159	24,545	27,487	27,469
Geely-Volvo Car Group	151,160	169,603	207,156	27,198	71,211	50,815	56,457	45,935	53,949	16,206	13,273	16,456	16,011	18,070	19,868
Renault	177,082	173,023	168,622	40,372	57,768	40,786	39,126	42,163	46,547	13,857	15,034	13,272	16,072	15,034	15,441
Kia	117,480	139,904	136,710	34,472	34,404	28,061	34,049	39,283	35,317	11,997	13,620	13,666	12,492	12,655	10,170
Hyundai Motor	101,560	123,557	113,530	29,914	35,360	26,231	29,239	30,834	27,226	10,244	11,998	8,592	8,771	9,126	9,329
Ford	78,533	88,082	86,398	17,354	34,655	18,744	22,287	24,058	21,309	7,273	7,385	9,400	7,179	6,878	7,252
<b>Europe xEV</b>	<b>2,340,736</b>	<b>2,711,787</b>	<b>3,248,493</b>	<b>593,982</b>	<b>942,533</b>	<b>703,523</b>	<b>806,603</b>	<b>839,844</b>	<b>898,523</b>	<b>247,950</b>	<b>286,529</b>	<b>305,365</b>	<b>273,324</b>	<b>302,103</b>	<b>323,096</b>
<b>Market Share</b>															
VW Group	23.5%	20.1%	20.2%	21.1%	22.0%	18.6%	20.0%	20.3%	21.7%	22.4%	20.3%	18.7%	23.0%	21.6%	20.6%
BMW Group	9.8%	10.1%	9.8%	9.7%	9.6%	8.6%	9.5%	9.3%	11.5%	9.8%	9.4%	8.9%	10.7%	11.2%	12.5%
Tesla Inc.	7.3%	8.6%	11.7%	9.0%	9.9%	13.4%	11.6%	11.3%	10.7%	7.6%	12.9%	12.8%	7.0%	12.4%	12.3%
Stellantis	13.6%	16.0%	14.4%	15.1%	13.9%	15.5%	16.4%	14.9%	11.5%	14.3%	14.5%	15.7%	13.2%	11.0%	10.6%
Mercedes-Benz Group	10.2%	9.1%	8.5%	9.1%	8.7%	8.3%	8.0%	8.6%	8.8%	8.7%	7.6%	9.5%	9.0%	9.1%	8.5%
Geely-Volvo Car Group	6.5%	6.3%	6.4%	4.6%	7.6%	7.2%	7.0%	5.5%	6.0%	6.5%	4.6%	5.4%	5.9%	6.0%	6.1%
Renault	7.6%	6.4%	5.2%	6.8%	6.1%	5.8%	4.9%	5.0%	5.2%	5.6%	5.2%	4.3%	5.9%	5.0%	4.8%
Kia	5.0%	5.2%	4.2%	5.8%	3.7%	4.0%	4.2%	4.7%	3.9%	4.8%	4.8%	4.5%	4.6%	4.2%	3.1%
Hyundai Motor	4.3%	4.6%	3.5%	5.0%	3.8%	3.7%	3.6%	3.7%	3.0%	4.1%	4.2%	2.8%	3.2%	3.0%	2.9%
Ford	3.4%	3.2%	2.7%	2.9%	3.7%	2.7%	2.8%	2.9%	2.4%	2.9%	2.6%	3.1%	2.6%	2.3%	2.2%
<b>Penetration rate</b>															
VW Group	18.6%	8.9%	19.8%	18.3%	27.2%	15.9%	18.3%	21.2%	24.1%	19.8%	24.2%	20.1%	24.5%	23.4%	24.3%
BMW Group	26.8%	15.9%	35.0%	31.4%	39.6%	29.1%	32.6%	36.7%	40.9%	33.9%	41.9%	34.9%	38.5%	39.2%	44.4%
Stellantis	13.4%	10.4%	22.1%	18.8%	26.8%	18.9%	23.2%	24.7%	21.7%	22.2%	28.5%	23.8%	20.0%	20.7%	25.1%
Mercedes-Benz Group	35.1%	18.2%	39.2%	36.0%	46.0%	34.0%	37.7%	42.9%	42.1%	42.0%	45.2%	41.9%	43.5%	44.2%	39.1%
Geely-Volvo Car Group	52.2%	31.9%	72.6%	59.1%	86.9%	72.7%	76.8%	76.0%	66.1%	76.8%	87.4%	68.1%	64.7%	68.4%	65.2%
Renault	16.2%	7.4%	13.4%	16.3%	19.6%	12.8%	11.5%	15.0%	14.7%	14.5%	18.1%	13.0%	15.6%	14.7%	13.8%
Kia	23.4%	12.5%	23.9%	26.0%	29.5%	18.9%	21.8%	27.4%	28.4%	24.4%	36.7%	24.0%	27.0%	28.9%	29.7%
Hyundai Motor	19.7%	11.7%	21.2%	22.6%	28.9%	19.6%	21.3%	23.3%	20.7%	21.5%	30.4%	18.9%	20.3%	20.2%	21.8%
Ford	15.0%	8.5%	16.7%	14.1%	25.7%	13.5%	16.3%	19.0%	18.4%	17.5%	21.3%	18.5%	17.4%	17.7%	20.5%

Source: EV-volumes, BofA Global Research

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**Exhibit 31: Europe BEV vs PHEV volumes (units) and penetration rate (rhs)**

xEV penetration rates exceeded 30% in Europe in December



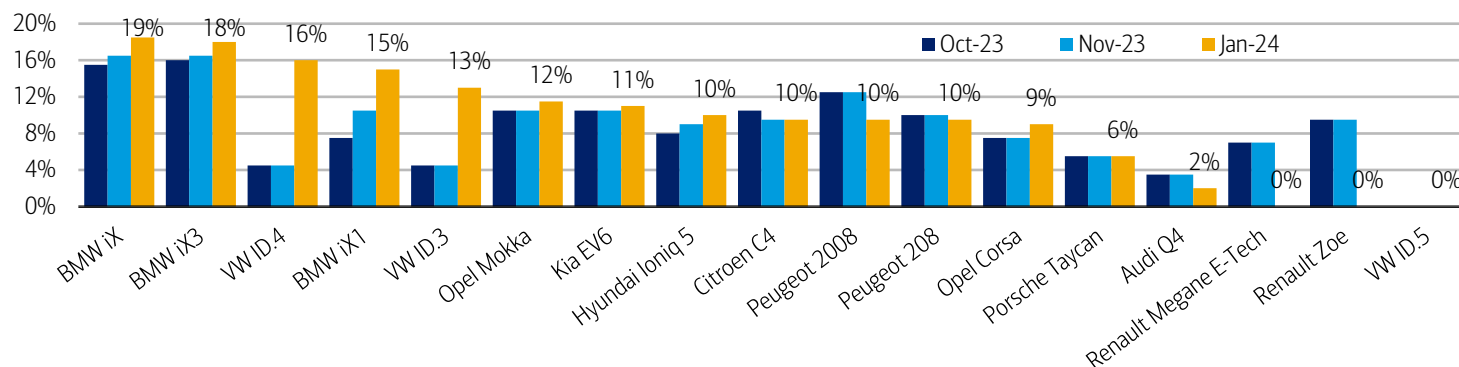
Source: EV-volumes, BofA Global Research

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## EV pricing in Europe

### Exhibit 32: Average incentives on BEVs in Europe (sorted by Jan-24)

Incentives are generally trending higher, especially for BMW and VW but lower for Peugeot and Audi; Renault lowered BEV list prices in Jan 24

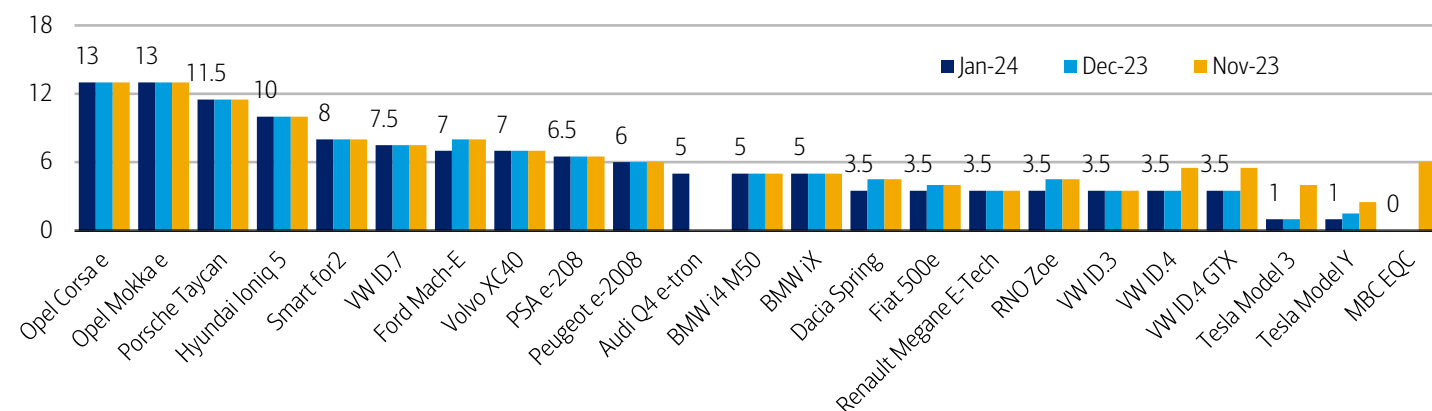


Source: BofA Global Research, MeinAuto.de, Note: 0% = 'Not available', MBC = Mercedes Benz Cars, \*Models added in Aug so no historical

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### Exhibit 33: Germany: Waiting period for new EV (months); sorted by Jan-24

Waiting periods for new EVs are trending slightly lower, including for the Ford Mach-E, RNO Zoe, Fiat 500e and Tesla Models

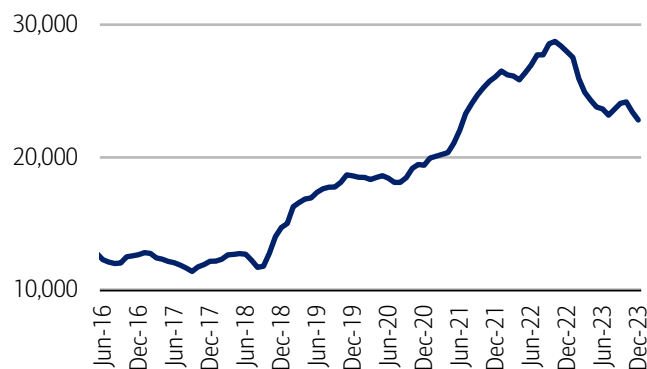


Source: BofA Global Research, carwow.de, Note: 0 = Temporary order stop

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### Exhibit 34: Auto Trader Used Car Price Index for BEV (mass)

Volume BEV prices continue to drop in Dec, -2.6% m/m

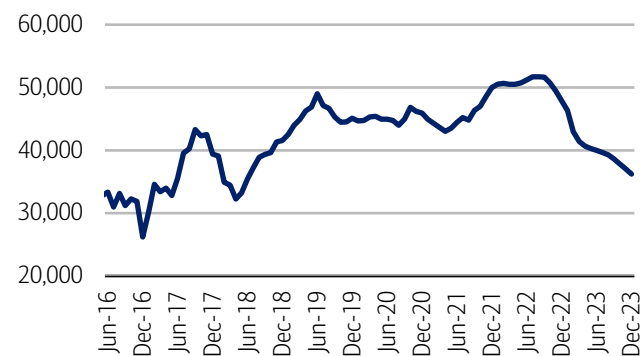


Source: BofA Global Research, Auto Trader. BEV brands included: Citroen, Dacia, Fiat, Ford, Honda, Hyundai, Jeep, Kia, MG, Mazda, Mitsubishi, Nissan, Peugeot, Renault, Seat, Skoda, Smart, Subaru, Suzuki, Toyota, Vauxhall and Volkswagen

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### Exhibit 35: Auto Trader Used Car Price Index for BEV (premium)

Premium BEV prices fell for the 16<sup>th</sup> straight month in Dec (-1.5% m/m)



Source: BofA Global Research, Auto Trader. BEV brands included: Abarth, Alfa Romeo, Audi, BMW, DS Automobiles, Jaguar, Land Rover, Lexus, Mercedes-Benz, Mini, Tesla and Volvo

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# EU EV model launch calendar

## Exhibit 36: Expected start of production of new European EVs

New EVs' production in Europe is expected to accelerate from Q1 24e. If you need launch calendar by OEM, feel free to reach out, we have the data!

Quarter/Year	2023				2024				2025				2026			
Q1	Fiat	Ducato	HVAN	Van	Ford	Transit Custom	D	Van	Ford	Puma	B	SUV	Aston Martin	DB13	F	SPORT
	Jeep	Avenger	B	SUV	Renault	Master	HVAN	Van	Ford	Transit Connect	C	Van	Volvo	ES60	D	Car
	Opel	Astra	C	Car	Maserati	GranCabrio	E	SPORT	Kia	EV4	C	Car	Mercedes-Benz	EQC	D	Car
					Maserati	GranTurismo	E	SPORT	Renault	4	B	SUV	Mercedes-Benz	EQS SUV	E	SUV
					Maserati	Grecale	D	SUV	Maserati	MC20	F	SPORT	Alfa Romeo	Giulia	D	Car
					Peugeot	3008	C	SUV	Land Rover	Range Rover Velar	D	SUV	Audi	R8	E	SPORT
					Porsche	Macan	D	SUV	Skoda	Elroq	C	SUV	Cupra	Raval	B	Car
Q2	BYD	Han	E	Car	Mini	Countryman	C	SUV	Nissan	Leaf	C	SUV	Hyundai	B-Hatch EV	B	Car
	Kia	EV6	D	SUV	Ford	Explorer	C	SUV	Citroen	C5 Aircross	C	SUV	Hyundai	Ioniq 4	C	Car
					Mercedes-Benz	EQG	E	SUV	Jaguar	XJ	E	Car	Nissan	Juke	B	SUV
					Renault	5	B	Car					DS	DS7	C	SUV
					Citroen	C3	B	Car					Ram	ProMaster City	D	Van
					DS	DS4	C	Car					Volkswagen	ID.2	B	Car
					Fiat	Panda	B	Car								
					Lancia	Ypsilon	B	Car								
Q3	BMW	i5	E	Car	Ford	Capri	C	SUV	Alpine	A390	C	SUV	BMW	i8	E	Car
	Rolls-Royce	Spectre	F	Car	Nissan	Interstar	E	Van	Nissan	Micra	B	Car	Mini	Cooper	B	Car
	Renault	Trafic	D	Van	Nissan	Interstar	HVAN	Van	Alfa Romeo	Stelvio	D	SUV	LEVC	TX	D	Car
	Fiat	600	B	SUV	Alfa Romeo	Milano	B	SUV	Jeep	Compass	C	SUV	Lotus	Exige	D	SPORT
	Peugeot	308	C	Car	Citroen	C3 Aircross	B	SUV	Land Rover	Defender Sport	C	SUV	Mercedes-Benz	EQA SUV	C	SUV
	Volkswagen	ID.7	D	Car	DS	DS9	D	SUV					Nissan	Primastar	D	Van
					Opel	Crossland	B	SUV					Lancia	Gamma	C	SUV
					Opel	Grandland	C	SUV					Maserati	Levante	E	SUV
Q4					Peugeot	408	C	Car					Opel	Manta	D	SUV
					Toyota	Proace Max	E	Van					Suzuki	A-MPV EV	A	MPV
					Toyota	Proace Max	HVAN	Van					Skoda	7S	D	SUV
					Audi	Q6 Sportback e-tron	D	SUV					Skoda	B-CUV EV	B	SUV
					Volkswagen	Transporter	D	Van					Volkswagen	ID.2 X	B	SUV
									BMW	iX3	D	SUV	BMW	i3	D	Car
									Ferrari	E-Coupe EV	F	SPORT	BMW	iX4	D	SUV
									Volvo	EX30	B	SUV	BYD	Dolphin	B	Car
Q4	BMW	iX2	C	SUV	Ford	Transit Courier	B	Van	Volvo	EX60	D	SUV	Volvo	EX40	C	SUV
	Mercedes-Benz	Sprinter	HVAN	Van	Mercedes-Benz	EQA	C	Car	Kia	EV2	B	SUV	Jaguar	E-CUV EV	E	SUV
	Renault	Scenic	C	SUV	Alpine	A290	B	Car	Mercedes-Benz	AMG GT-4	E	SPORT	Tesla	C-CUV EV	C	SUV
					Citroen	Jumper	E	Van	Mercedes-Benz	EQB SUV	C	SUV	Audi	Q2 e-tron	C	SUV
					Opel	Movano	E	Van	Mercedes-Benz	EQC SUV	D	SUV	Bentley	Bentayga	E	SUV
					Peugeot	Boxer	E	Van	Mitsubishi	C-CUV EV	C	SUV	Volkswagen	ID.3 X	C	SUV
					Land Rover	Range Rover	E	SUV	Maserati	Quattroporte	E	Car				
					Land Rover	Range Rover Sport	E	SUV	Porsche	718	D	SPORT				
					Audi	A6 e-tron	E	Car	Porsche	Cayenne	E	SUV				
					Volkswagen	Caddy	C	Van								

Source: BofA Global Research, S&P

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# China BEV sales at a glance

## Exhibit 37: China BEV unit sales (sorted by highest sales in the latest month)

Tesla gains back share in China in 2023 despite BYD expanding share by c6ppts. VW maintains BEV share, while BMW gains 0.8ppts and GM 0.7ppts

China BEV unit sales	2021	2022	2023	3Q 22	4Q 22	1Q 23	2Q 23	3Q 23	4Q 23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23
BYD	323,267	896,199	1,458,063	255,385	317,135	245,557	330,501	403,995	478,010	130,189	133,356	140,450	155,649	154,677	167,684
Tesla Inc.	320,863	440,968	610,311	121,712	121,619	137,900	159,480	141,223	171,708	31,741	65,328	44,154	28,735	65,265	77,708
Wuling	439,462	447,746	422,591	112,372	116,438	77,083	96,331	99,512	149,665	31,420	31,308	36,784	45,014	47,882	56,769
GAC	124,714	287,931	499,204	87,190	96,852	82,869	138,660	152,011	125,664	46,371	53,784	51,856	41,931	38,664	45,069
Geely Auto Group	76,298	268,455	399,748	84,859	100,229	71,125	95,583	106,377	126,663	35,579	35,647	35,151	41,817	44,136	40,710
VW Group	96,307	157,163	190,205	51,425	43,004	21,606	40,739	54,857	73,003	18,591	14,837	21,429	23,372	23,282	26,349
Changan Automobile Group	103,400	201,380	218,816	49,950	80,442	46,031	44,438	55,903	72,444	19,587	16,744	19,572	23,044	23,560	25,840
Chery Automobile	105,622	256,242	123,499	77,812	58,509	18,599	27,217	29,950	47,733	8,472	9,329	12,149	11,793	15,439	20,501
SAIC	125,460	133,847	129,738	30,934	37,091	24,624	26,809	29,672	48,633	8,656	9,967	11,049	11,740	16,691	20,202
Xiaopeng	98,166	122,080	140,027	29,579	22,204	18,230	23,205	39,994	58,598	11,008	13,690	15,296	19,710	19,474	19,414
GM	34,028	64,412	116,979	19,627	16,290	7,624	19,747	34,215	55,393	12,580	8,152	13,483	15,339	21,401	18,653
NIO Inc.	93,402	123,500	160,336	32,111	40,055	31,044	24,993	54,664	49,635	19,330	20,057	15,277	15,664	15,959	18,012
Leap Motor	44,945	110,381	113,069	35,608	23,506	10,509	23,244	33,989	45,327	9,025	11,787	13,177	14,692	12,908	17,727
FAW	41,652	60,578	105,548	23,865	21,519	12,859	27,312	30,897	34,480	11,381	8,527	10,989	11,523	10,683	12,274
Dongfeng Motor	94,208	221,476	112,511	68,513	66,343	20,595	30,093	31,860	29,963	9,455	10,098	12,307	9,155	8,667	12,141
BMW Group	23,671	47,359	102,289	9,173	24,706	20,328	25,643	23,799	32,519	5,493	9,334	8,972	9,729	10,783	12,007
BAIC	53,283	71,299	91,460	20,718	29,460	16,912	22,249	22,781	29,518	4,613	8,777	9,391	8,007	10,202	11,309
Great Wall Motors	136,610	99,915	90,588	24,457	15,778	11,980	27,138	23,537	27,933	7,027	7,214	9,296	9,396	10,378	8,159
Hozon Auto	70,228	148,760	102,459	46,683	38,946	20,570	29,295	27,143	25,451	6,388	10,752	10,003	9,131	9,716	6,604
Mercedes-Benz	7,214	15,877	28,165	6,098	2,001	3,390	8,283	7,073	9,419	2,739	1,767	2,567	2,538	3,541	3,340
Jiangling Motors	4,781	9,460	11,263	1,474	2,928	1,953	1,462	1,553	6,295	548	330	675	1,651	1,653	2,991
Market share															
BYD	11.7%	19.2%	25.6%	19.0%	22.5%	25.4%	24.7%	26.2%	25.8%	27.6%	25.0%	26.1%	27.7%	25.4%	24.5%
Tesla Inc.	11.6%	9.5%	10.7%	9.1%	8.6%	14.2%	11.9%	9.1%	9.3%	6.7%	12.2%	8.2%	5.1%	10.7%	11.4%
Wuling	15.9%	9.6%	7.4%	8.4%	8.3%	8.0%	7.2%	6.4%	8.1%	6.7%	5.9%	6.8%	8.0%	7.9%	8.3%
GAC	4.5%	6.2%	8.7%	6.5%	6.9%	8.6%	10.4%	9.8%	6.8%	9.8%	10.1%	9.6%	7.5%	6.3%	6.6%
Geely Auto Group	2.8%	5.8%	7.0%	6.3%	7.1%	7.3%	7.1%	6.9%	6.8%	7.5%	6.7%	6.5%	7.5%	7.2%	6.0%
VW Group	3.5%	3.4%	3.3%	3.8%	3.1%	2.2%	3.0%	3.6%	3.9%	3.9%	2.8%	4.0%	4.2%	3.8%	3.9%
Changan Automobile Group	3.7%	4.3%	3.8%	3.7%	5.7%	4.8%	3.3%	3.6%	3.9%	4.1%	3.1%	3.6%	4.1%	3.9%	3.8%
Chery Automobile	3.8%	5.5%	2.2%	5.8%	4.1%	1.9%	2.0%	1.9%	2.6%	1.8%	1.7%	2.3%	2.1%	2.5%	3.0%
SAIC	4.5%	2.9%	2.3%	2.3%	2.6%	2.5%	2.0%	1.9%	2.6%	1.8%	1.9%	2.1%	2.1%	2.7%	3.0%
Xiaopeng	3.5%	2.6%	2.5%	2.2%	1.6%	1.9%	1.7%	2.6%	3.2%	2.3%	2.6%	2.8%	3.5%	3.2%	2.8%
GM	1.2%	1.4%	2.1%	1.5%	1.2%	0.8%	1.5%	2.2%	3.0%	2.7%	1.5%	2.5%	2.7%	3.5%	2.7%
NIO Inc.	3.4%	2.6%	2.8%	2.4%	2.8%	3.2%	1.9%	3.5%	2.7%	4.1%	3.8%	2.8%	2.8%	2.6%	2.6%
Leap Motor	1.6%	2.4%	2.0%	2.7%	1.7%	1.1%	1.7%	2.2%	2.4%	1.9%	2.2%	2.4%	2.6%	2.1%	2.6%
FAW	1.5%	1.3%	1.8%	1.8%	1.5%	1.3%	2.0%	2.0%	1.9%	2.4%	1.6%	2.0%	2.1%	1.8%	1.8%
Dongfeng Motor	3.4%	4.7%	2.0%	5.1%	4.7%	2.1%	2.2%	2.1%	1.6%	2.0%	1.9%	2.3%	1.6%	1.4%	1.8%
BMW Group	0.9%	1.0%	1.8%	0.7%	1.8%	2.1%	1.9%	1.5%	1.8%	1.2%	1.7%	1.7%	1.7%	1.8%	1.8%
BAIC	1.9%	1.5%	1.6%	1.5%	2.1%	1.7%	1.7%	1.5%	1.6%	1.0%	1.6%	1.7%	1.4%	1.7%	1.7%
Great Wall Motors	4.9%	2.1%	1.6%	1.8%	1.1%	1.2%	2.0%	1.5%	1.5%	1.5%	1.4%	1.7%	1.7%	1.7%	1.2%
Hozon Auto	2.5%	3.2%	1.8%	3.5%	2.8%	2.1%	2.2%	1.8%	1.4%	1.4%	2.0%	1.9%	1.6%	1.6%	1.0%

Source: EV-volumes, BofA Global Research

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## Exhibit 38: China Top BEV sales by model (sorted by highest sales in the latest month)

Tesla is the only international OEM that has a models within the top10 best-selling BEVs in China, the rest is dominated by BYD, GAC (Aion) and Wuling

China unit sales	Q3 22	Q4 22	Q1 23	Q2 23	Q3 23	Q4 23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	2022	2023
Tesla Model Y	86,130	96,202	94,647	109,285	116,177	136,285	23,632	51,117	41,428	26,353	49,877	60,055	241,317	456,394
BYD Seagull	0	0	0	32,360	97,853	132,964	28,001	34,841	35,011	37,836	44,603	50,525	0	263,177
BYD Yuan Plus / Atto-3	60,314	74,893	77,083	88,425	76,403	96,579	23,564	24,192	28,647	40,019	25,761	30,799	173,511	338,490
Wuling Bingo	0	0	3,312	41,178	48,048	75,226	14,550	13,892	19,606	23,744	24,024	27,458	0	167,764
Wuling HongGuang Mini	108,410	107,760	69,842	52,195	47,489	68,352	15,485	15,858	16,146	20,337	22,985	25,030	323,637	237,878
BYD Dolphin	68,817	77,343	70,048	87,311	87,028	88,568	31,650	31,096	24,282	28,353	35,246	24,969	175,006	332,955
Aion Y	36,950	38,486	31,055	60,954	71,543	72,165	17,861	26,713	26,969	27,132	22,355	22,678	100,787	235,717
Tesla Model 3	35,582	25,417	42,782	47,391	23,447	33,290	7,791	13,577	2,079	2,273	15,267	15,750	92,030	146,910
Aion S / Aion S Plus	32,069	44,162	48,310	67,289	66,631	38,674	22,437	22,648	21,546	11,730	11,728	15,216	98,928	220,904
BYD Qin Plus	34,328	35,628	23,842	30,954	34,946	36,665	11,455	11,654	11,837	9,383	12,082	15,200	95,900	126,407

Source: EV-volumes, BofA Global Research

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# US BEV sales at a glance

## Exhibit 39: US BEV sales units (sorted by latest month)

The US is the only region where Tesla lost share as the market becomes more competitive. Other losers include Ford and Kia, while MBG and Rivian gain the most

US BEV unit sales	2021	2022	2023	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23
Tesla Inc.	349,400	511,429	644,548	129,078	151,518	154,143	167,040	156,580	166,785	52,900	51,450	52,230	52,250	52,610	61,925
Ford	27,216	61,575	72,608	18,257	20,339	10,866	14,843	20,962	25,937	6,280	6,940	7,742	6,831	8,958	10,148
VW Group	36,571	44,111	70,290	11,966	15,052	15,873	13,967	20,103	20,347	5,690	6,656	7,757	6,491	6,377	7,479
GM	24,828	39,242	75,883	15,156	16,266	20,670	15,650	20,094	19,469	6,100	7,016	6,978	7,080	5,936	6,453
BMW Group	3,299	18,075	48,671	5,262	8,728	7,172	12,040	13,906	15,553	4,918	5,129	3,859	3,956	5,370	6,227
Hyundai Motor	10,855	29,320	62,186	6,743	6,902	8,623	15,970	21,638	15,955	7,308	7,197	7,133	5,333	4,503	6,119
Rivian Automotive	938	20,342	52,043	6,814	7,834	8,066	13,192	16,230	14,555	5,269	5,469	5,492	4,569	4,755	5,231
Mercedes-Benz Group	443	12,421	43,202	2,715	5,656	7,341	11,927	10,423	13,511	3,335	3,649	3,439	4,241	4,322	4,948
Kia	8,735	28,708	32,154	5,834	4,031	6,080	7,784	10,016	8,274	3,077	4,070	2,869	2,328	2,415	3,531
Geely-Volvo Car Group	8,794	16,472	25,988	4,558	4,532	5,509	7,465	6,847	6,167	2,389	2,114	2,344	2,212	1,965	1,990
Nissan	14,239	12,226	20,616	1,276	3,328	5,214	4,215	6,074	5,113	1,585	1,571	2,918	1,934	1,355	1,824
Toyota Motor Corp.	0	1,220	14,715	2	986	1,883	2,893	4,221	5,718	1,230	1,366	1,625	2,060	1,964	1,694
Lucid Motors	125	4,477	6,149	1,375	1,841	1,462	1,511	1,551	1,625	418	528	605	514	537	574
Market share															
Tesla Inc.	71.8%	63.8%	54.7%	61.7%	61.1%	60.6%	57.6%	50.3%	51.7%	52.3%	49.5%	49.3%	51.7%	51.5%	51.9%
Ford	5.6%	7.7%	6.2%	8.7%	8.2%	4.3%	5.1%	6.7%	8.0%	6.2%	6.7%	7.3%	6.8%	8.8%	8.5%
VW Group	7.5%	5.5%	6.0%	5.7%	6.1%	6.2%	4.8%	6.5%	6.3%	5.6%	6.4%	7.3%	6.4%	6.2%	6.3%
GM	5.1%	4.9%	6.4%	7.2%	6.6%	8.1%	5.4%	6.5%	6.0%	6.0%	6.8%	6.6%	7.0%	5.8%	5.4%
BMW Group	0.7%	2.3%	4.1%	2.5%	3.5%	2.8%	4.2%	4.5%	4.8%	4.9%	4.9%	3.6%	3.9%	5.3%	5.2%
Hyundai Motor	2.2%	3.7%	5.3%	3.2%	2.8%	3.4%	5.5%	7.0%	4.9%	7.2%	6.9%	6.7%	5.3%	4.4%	5.1%
Rivian Automotive	0.2%	2.5%	4.4%	3.3%	3.2%	3.2%	4.6%	5.2%	4.5%	5.2%	5.3%	5.2%	4.5%	4.7%	4.4%
Mercedes-Benz Group	0.1%	1.6%	3.7%	1.3%	2.3%	2.9%	4.1%	3.4%	4.2%	3.3%	3.5%	3.2%	4.2%	4.2%	4.1%
Kia	1.8%	3.6%	2.7%	2.8%	1.6%	2.4%	2.7%	3.2%	2.6%	3.0%	3.9%	2.7%	2.3%	2.4%	3.0%
Geely-Volvo Car Group	1.8%	2.1%	2.2%	2.2%	1.8%	2.2%	2.6%	2.2%	1.9%	2.4%	2.0%	2.2%	2.2%	1.9%	1.7%
Nissan	2.9%	1.5%	1.8%	0.6%	1.3%	2.1%	1.5%	2.0%	1.6%	1.6%	1.5%	2.8%	1.9%	1.3%	1.5%
Toyota Motor Corp.	0.0%	0.2%	1.2%	0.0%	0.4%	0.7%	1.0%	1.4%	1.8%	1.2%	1.3%	1.5%	2.0%	1.9%	1.4%
Lucid Motors	0.0%	0.6%	0.5%	0.7%	0.7%	0.6%	0.5%	0.5%	0.5%	0.4%	0.5%	0.6%	0.5%	0.5%	0.5%

Source: EV-volumes, BofA Global Research

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## Exhibit 40: US Top BEV sales by model (sorted by highest sales in the latest month)

Tesla dominates the market as the Ford Mustang and VW ID.4 follow with much lower volumes

US unit sales	Q3 22	Q4 22	Q1 23	Q2 23	Q3 23	Q4 23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	2022	2023
Tesla Model Y	60,655	73,647	92,663	94,360	96,330	94,500	32,900	32,000	31,430	31,000	30,500	33,000	194,732	377,853
Tesla Model 3	50,543	64,921	54,320	63,190	49,950	57,000	16,900	16,000	17,050	17,500	16,500	23,000	156,504	224,460
Ford Mustang Mach-E	10,414	11,369	5,407	8,633	14,842	11,889	3,937	5,033	5,872	2,732	4,294	4,863	32,724	40,771
VW ID.4	6,657	9,439	9,758	6,690	10,707	10,634	3,151	3,471	4,085	3,464	3,099	4,071	17,756	37,789
Ford F-150 Lightning	6,464	6,857	4,291	4,466	3,503	11,905	1,552	1,018	933	3,712	4,393	3,800	15,363	24,165
Tesla Model X	9,400	6,800	4,260	6,200	6,700	9,500	2,100	2,200	2,400	2,600	3,500	3,400	22,152	26,660
Hyundai Ioniq 5	4,800	4,490	5,736	7,905	11,665	8,612	4,135	3,572	3,958	2,979	2,372	3,261	16,738	33,918
Rivian R1S	1,000	550	2,980	6,300	9,200	8,200	3,100	3,100	3,000	2,600	2,700	2,900	1,900	26,680
Chevrolet Bolt EUV	11,057	11,242	12,808	8,718	8,793	8,731	2,452	2,933	3,408	3,391	2,840	2,500	26,633	39,050
Tesla Model S	8,480	6,150	2,900	3,290	3,600	5,750	1,000	1,250	1,350	1,150	2,100	2,500	23,990	15,540

Source: EV-volumes, BofA Global Research

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# Premium vs Mass market

## Exhibit 41: Global BEV sales split between premium and mass market

The global BEV premium market is growing twice as fast as the mass market

Global BEV sales	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	4Q22	1Q23	2Q23	3Q23	4Q23	2021	2022	2023
Premium	120,119	134,721	137,427	139,291	156,169	178,134	344,804	264,976	344,409	392,267	473,594	493,505	934,960	1,475,246
y/y growth	86.5%	88.3%	55.7%	53.5%	39.8%	25.1%	86.0%	50.7%	81.1%	74.9%	37.4%	75.8%	89.5%	116.7%
% total EV sales	14.9%	14.5%	14.7%	15.1%	15.5%	15.9%	14.1%	14.1%	14.3%	14.7%	15.5%	10.2%	12.2%	14.7%
Mass	686,763	791,265	797,528	783,784	852,119	943,947	2,096,980	1,612,548	2,059,436	2,275,556	2,579,850	4,333,419	6,750,674	8,527,390
y/y growth	28.4%	33.1%	9.0%	28.5%	24.4%	17.6%	35.1%	20.5%	41.6%	22.3%	23.0%	118.6%	55.8%	62.0%
% total EV sales	85.1%	85.5%	85.3%	84.9%	84.5%	84.1%	85.9%	85.9%	85.7%	85.3%	84.5%	89.8%	87.8%	85.3%
EU BEV sales	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	4Q22	1Q23	2Q23	3Q23	4Q23	2021	2022	2023
Premium	42,393	47,338	54,310	53,877	58,918	65,581	164,045	115,544	136,463	144,041	178,376	252,070	418,473	574,424
y/y growth	95.7%	87.6%	41.2%	36.2%	18.1%	-12.1%	67.2%	34.5%	64.1%	68.8%	8.7%	66.1%	66.0%	95.4%
% total EV sales	25.5%	21.8%	25.7%	29.7%	28.2%	28.2%	26.9%	24.5%	24.7%	24.2%	28.6%	19.6%	24.8%	25.6%
Mass	123,693	169,889	157,009	127,648	149,876	166,774	446,073	356,681	415,808	450,591	444,298	1,031,252	1,266,450	1,667,378
y/y growth	63.0%	113.8%	13.6%	37.6%	9.0%	-22.7%	29.1%	35.7%	57.5%	53.5%	-0.4%	64.3%	22.8%	82.6%
China BEV sales	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	4Q22	1Q23	2Q23	3Q23	4Q23	2021	2022	2023
Premium	48,260	55,860	49,918	53,363	60,074	68,143	112,869	85,968	117,988	154,038	181,580	159,092	295,469	539,574
y/y growth	93.7%	101.5%	90.6%	75.3%	50.1%	60.7%	103.3%	72.7%	118.6%	95.4%	60.9%	127.2%	85.7%	153.3%
% total EV sales	10.2%	10.5%	9.3%	9.5%	9.8%	10.0%	8.0%	8.9%	8.8%	10.0%	9.8%	5.8%	6.3%	9.5%
Mass	423,827	477,516	488,240	507,768	549,838	615,229	1,297,052	882,051	1,221,656	1,389,583	1,672,835	2,607,604	4,367,967	5,166,125
y/y growth	14.3%	15.0%	2.5%	24.1%	26.3%	36.0%	29.2%	2.4%	29.0%	10.1%	29.0%	155.0%	67.5%	48.4%
US BEV sales	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	4Q22	1Q23	2Q23	3Q23	4Q23	2021	2022	2023
Premium	19,283	19,979	19,367	20,019	23,937	26,740	40,035	36,846	53,585	58,629	70,696	56,174	137,305	219,756
y/y growth	77.6%	64.0%	29.2%	72.6%	87.3%	70.8%	95.0%	39.5%	63.2%	54.2%	76.6%	23.3%	144.4%	101.9%
% total EV sales	19.1%	19.2%	18.3%	19.8%	23.4%	22.4%	16.1%	14.5%	18.5%	18.9%	21.9%	11.5%	17.1%	18.7%
Mass	81,871	83,875	86,618	80,971	78,230	92,618	207,867	217,328	236,175	252,364	251,819	430,633	663,880	957,686
y/y growth	51.3%	52.4%	39.9%	25.1%	31.5%	10.7%	69.1%	63.9%	55.0%	47.5%	21.1%	104.5%	54.2%	83.9%

**Source:** BofA Global Research, EV volumes. Note: Premium include Acura, Alfa Romeo, Audi, Bentley, BMW, Cadillac, Denza, Ferrari, Genesis, HiPhi, IM, Jaguar, Land Rover Lexus, Li Xiang, Lincoln, Lotus, Lucid, McLaren, Mercedes-Benz, Mini, NIO, Polestar, Porsche, Range Rover, Rolls-Royce, Tesla (Model X and Model S), Volvo, Voyah, Zeekr

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## Exhibit 42: Premium OEM sales and M/S (sorted by latest month total sales)

BMW continues to top the premium OEM sales ranking, as Zeekr exceeds sales of sister brand Volvo Cars

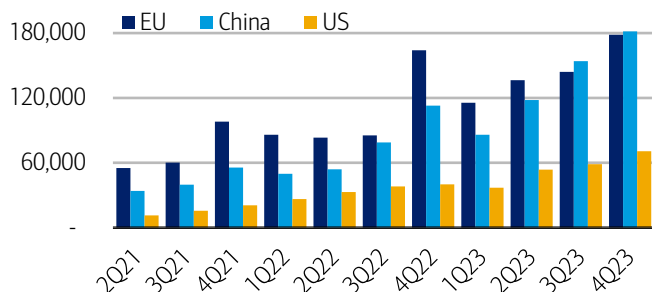
Global Premium EV	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	4Q22	1Q23	2Q23	3Q23	4Q23	2021	2022	2023
BMW	23,762	30,583	28,578	31,475	36,733	45,138	75,363	56,147	79,295	82,923	113,346	71,120	175,157	331,711
Mercedes-Benz	18,920	19,608	24,555	20,923	24,118	24,832	46,243	40,587	56,221	63,083	69,873	64,292	132,455	229,764
Audi	13,565	15,013	17,825	17,253	17,256	19,524	41,117	34,044	41,277	46,403	54,033	81,132	118,570	175,757
NIO	19,430	20,580	15,457	16,077	16,167	18,178	40,515	31,379	25,499	55,467	50,422	93,482	124,704	162,767
Zeekr	11,707	12,445	12,053	13,078	13,124	13,572	32,471	15,428	27,399	36,205	39,774	6,033	71,945	118,806
IM (Zhiji Motor)	1,334	2,191	1,805	4,068	8,792	10,412	1,928	3,765	6,025	5,330	23,272	3	5,293	38,392
Volvo	5,942	7,108	9,430	10,083	10,558	10,337	33,514	29,473	32,213	22,480	30,978	25,725	68,691	115,144
Tesla	4,164	5,163	6,694	4,726	7,049	9,934	17,180	10,705	19,294	16,021	21,709	24,942	66,703	67,729
Mini	3,462	3,960	3,591	4,755	4,493	6,020	13,609	9,056	10,487	11,013	15,268	33,595	43,734	45,824
Polestar	5,752	5,572	4,874	3,768	4,175	4,920	19,416	11,083	14,967	16,198	12,863	28,723	49,282	55,111
Porsche	3,385	2,814	3,038	3,331	4,004	4,814	9,844	9,358	9,135	9,237	12,149	40,610	35,035	39,879
Cadillac	2,048	1,738	1,390	1,308	1,849	2,531	2,390	1,940	1,682	5,176	5,688	-	2,533	14,486
Global Premium M/S	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	4Q22	1Q23	2Q23	3Q23	4Q23	2021	2022	2023
BMW	19.8%	22.7%	20.8%	22.6%	23.5%	25.3%	21.9%	21.2%	23.0%	21.1%	23.9%	14.4%	18.7%	22.5%
Mercedes-Benz	15.8%	14.6%	17.9%	15.0%	15.4%	13.9%	13.4%	15.3%	16.3%	16.1%	14.8%	13.0%	14.2%	15.6%
Audi	11.3%	11.1%	13.0%	12.4%	11.0%	11.0%	11.9%	12.8%	12.0%	11.8%	11.4%	16.4%	12.7%	11.9%
NIO	16.2%	15.3%	11.2%	11.5%	10.4%	10.2%	11.8%	11.8%	7.4%	14.1%	10.6%	18.9%	13.3%	11.0%
Zeekr	9.7%	9.2%	8.8%	9.4%	8.4%	7.6%	9.4%	5.8%	8.0%	9.2%	8.4%	1.2%	7.7%	8.1%
IM (Zhiji Motor)	1.1%	1.6%	1.3%	2.9%	5.6%	5.8%	0.6%	1.4%	1.7%	1.4%	4.9%	0.0%	0.6%	2.6%
Volvo	4.9%	5.3%	6.9%	7.2%	6.8%	5.8%	9.7%	11.1%	9.4%	5.7%	6.5%	5.2%	7.3%	7.8%
Tesla	3.5%	3.8%	4.9%	3.4%	4.5%	5.6%	5.0%	4.0%	5.6%	4.1%	4.6%	5.1%	7.1%	4.6%
Mini	2.9%	2.9%	2.6%	3.4%	2.9%	3.4%	3.9%	3.4%	3.0%	2.8%	3.2%	6.8%	4.7%	3.1%
Polestar	4.8%	4.1%	3.5%	2.7%	2.7%	2.8%	5.6%	4.2%	4.3%	4.1%	2.7%	5.8%	5.3%	3.7%
Porsche	2.8%	2.1%	2.2%	2.4%	2.6%	2.7%	2.9%	3.5%	2.7%	2.4%	2.6%	8.2%	3.7%	2.7%
Cadillac	1.7%	1.3%	1.0%	0.9%	1.2%	1.4%	0.7%	0.7%	0.5%	1.3%	1.2%	0.0%	0.3%	1.0%

**Source:** BofA Global Research, EV volumes

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**Exhibit 43: Premium EV sales by region**

China premium market surpassed EU in Q4

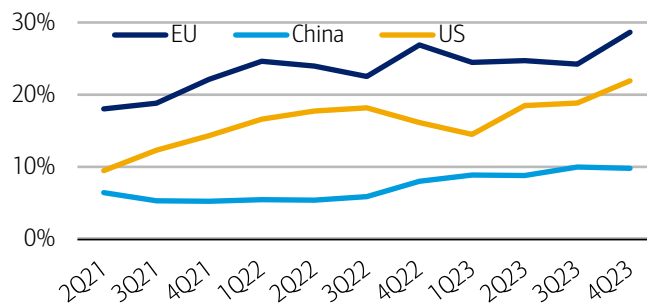


Source: BofA Global Research, EV volumes

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**Exhibit 44: Premium EV sales as a % of region total EV sales**

Premium EV market is much more developed in the EU than China &amp; US

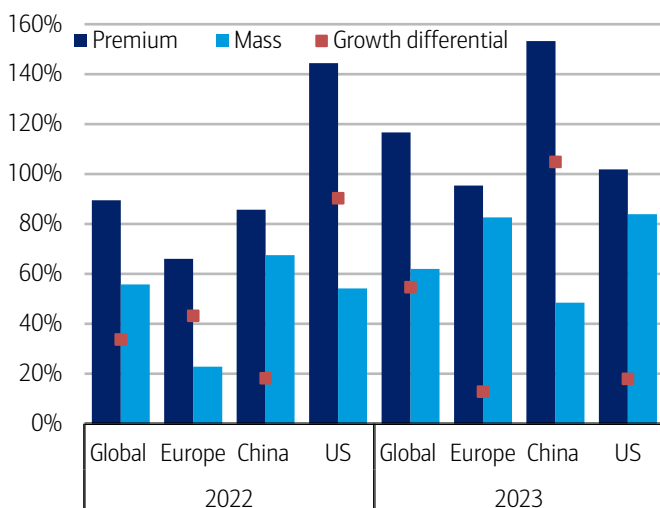


Source: BofA Global Research, EV volumes

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**Exhibit 45: Premium EV y/y sales growth by region**

The premium market is growing faster than mass in 2023

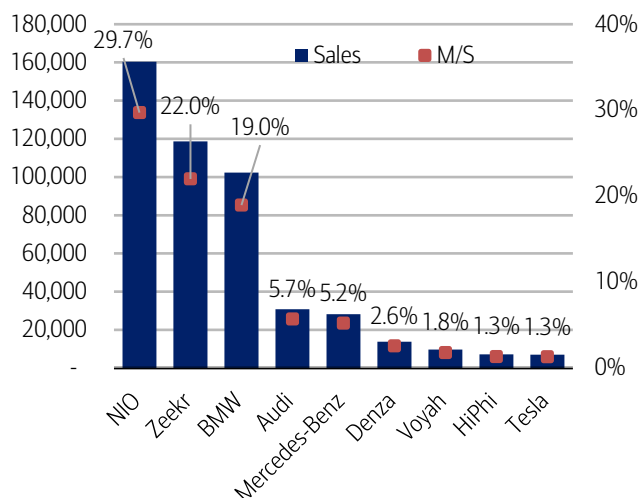


Source: BofA Global Research, EV volumes

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**Exhibit 46: China premium EV market by OEM**

New Chinese entrants are disrupting legacy OEMs premium share

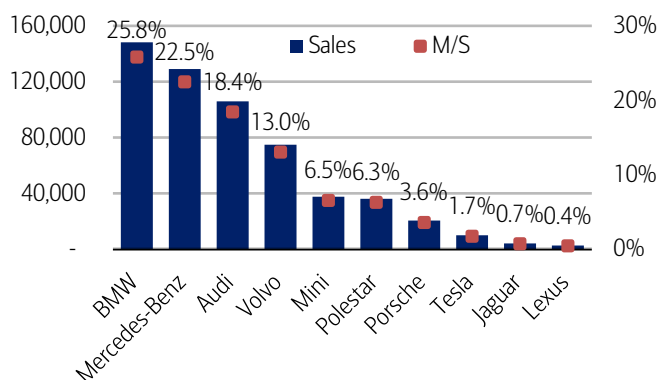


Source: BofA Global Research, EV volumes

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**Exhibit 47: European premium EV market by OEM (YTD23)**

Legacy OEM premium share in Europe remains high

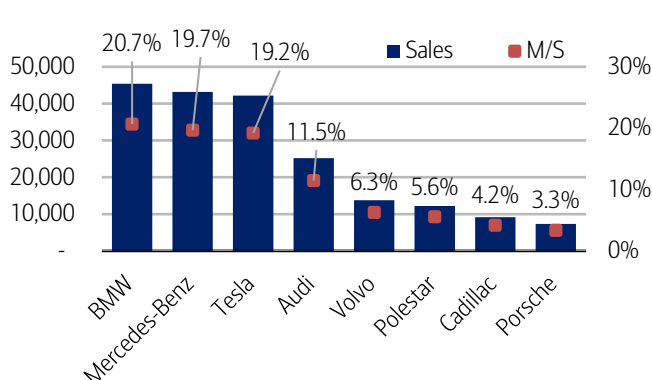


Source: BofA Global Research, EV volumes

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**Exhibit 48: US premium EV market by OEM**

Legacy OEM dominate the market but Polestar and Tesla are winning share



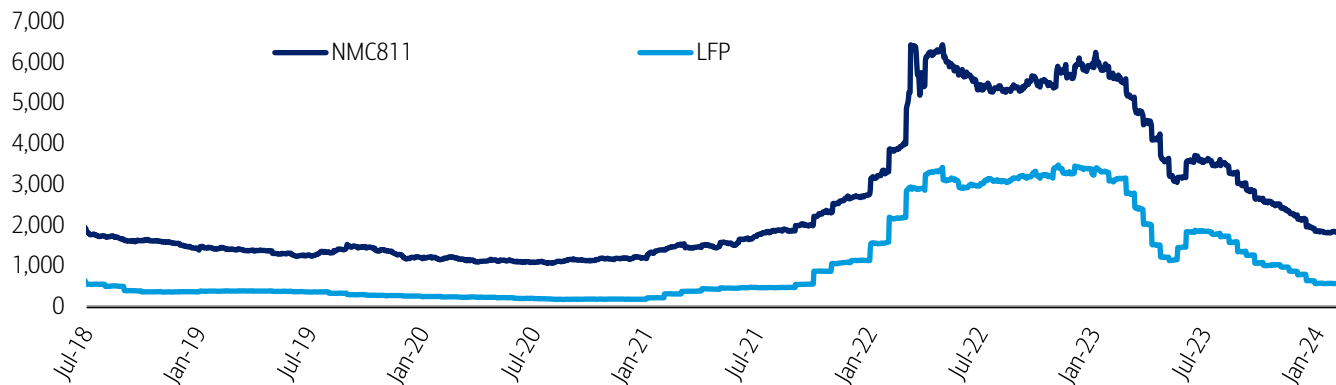
Source: BofA Global Research, EV volumes

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# Raw material price tracker for batteries

## Exhibit 49: NMC811 vs Lithium Iron Phosphate (LFP) battery price

Nickel and Lithium come down sharply in 2023, and we have recently seen prices fall further after a spike in Q2

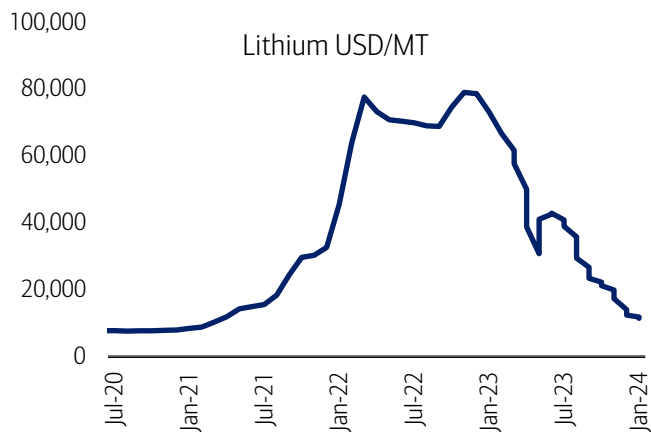


Source: Bloomberg, BofA Global Research

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## Exhibit 50: Lithium price Index

Lithium price spiked in May/June but downwards trend resumed

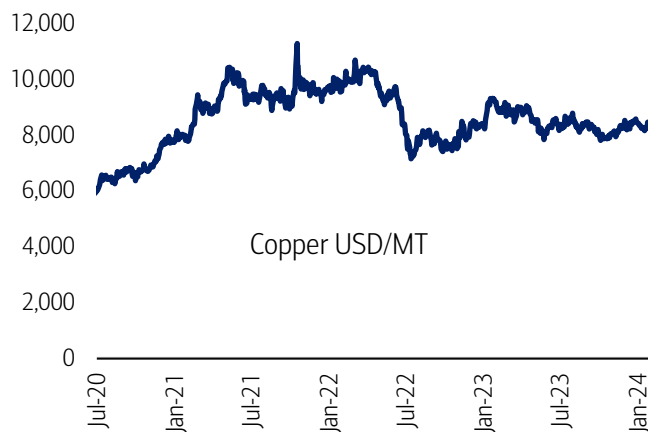


Source: Bloomberg, BofA Global Research

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## Exhibit 51: Copper price

Copper price has been range bound in last couple of months

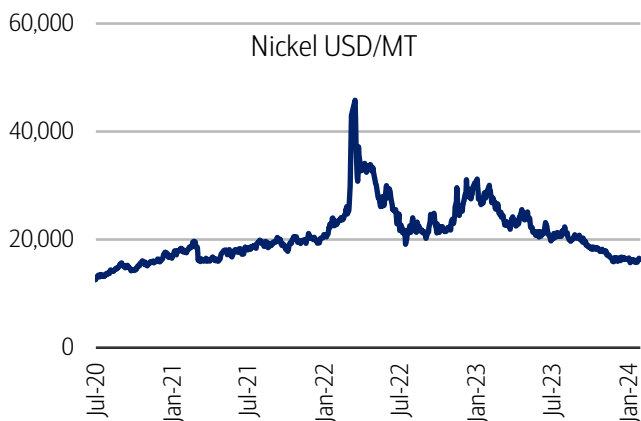


Source: Bloomberg, BofA Global Research

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## Exhibit 52: Nickel price

Nickel prices continue their downwards trend well below 20k per MT again

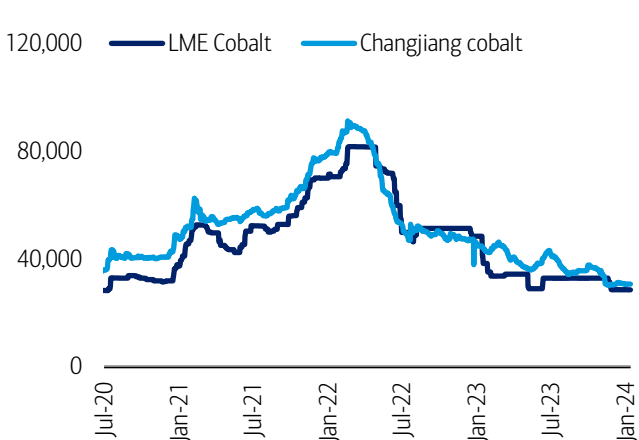


Source: Bloomberg, BofA Global Research

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## Exhibit 53: Changing cobalt and LME cobalt prices (USD/MT)

Changjiang cobalt and LME cobalt prices continue to decline



Source: Bloomberg, BofA Global Research

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# Global EV production by OEM

## Exhibit 54: Global EV production by OEM

S&P now expects Geely to be the largest BEV producer in 2024, ahead of VW as Chinese OEMs aggressively expand production

Region	2021	2022	2023	2024e	2025e	2026e	2027e	2028e	2029e	2030e
Number of vehicles (units); Traditional OEMs										
Volkswagen	460,691	617,892	807,642	1,016,570	1,533,442	2,094,415	2,879,161	3,343,915	3,968,940	4,523,148
Stellantis	235,542	287,425	348,315	700,929	1,109,489	1,373,250	1,765,397	2,281,579	2,729,039	3,258,288
Hyundai	249,338	370,849	522,889	724,557	1,232,950	1,677,014	2,041,123	2,328,822	2,591,895	2,761,414
Toyota	13,220	44,696	131,156	178,213	353,244	729,590	1,095,245	1,502,728	2,042,472	2,392,256
Mercedes-Benz	116,615	206,702	360,002	430,937	554,559	888,870	1,239,953	1,539,785	1,759,668	2,014,345
Geely	129,414	437,094	594,947	1,036,903	1,242,321	1,474,875	1,665,550	1,837,075	1,947,144	2,086,213
General Motors	47,174	84,637	205,252	338,476	474,668	820,356	1,097,097	1,263,274	1,380,658	1,619,403
BMW	111,796	251,703	411,990	615,742	702,135	810,874	968,988	1,225,230	1,468,897	1,716,229
Ford	68,020	126,418	168,570	270,485	521,447	683,419	884,335	1,254,858	1,485,292	1,710,782
Nissan	77,916	164,529	171,711	184,652	251,149	432,015	639,621	814,351	962,575	1,111,200
Honda	13,252	26,060	26,476	108,515	191,730	342,004	591,820	732,386	882,536	1,018,085
Renault	147,661	181,328	159,111	226,407	381,321	470,545	560,704	661,647	758,148	834,771
Great Wall	135,206	108,019	113,499	164,360	207,645	237,924	232,102	272,830	301,514	326,630
Changan	111,243	226,050	233,452	312,188	407,441	484,434	582,185	610,746	669,944	682,966
SAIC	107,654	244,833	363,260	400,818	493,489	593,909	646,254	684,770	772,075	796,480
Tata	18,904	48,331	91,537	147,101	215,787	374,399	473,903	603,613	698,882	750,812
SAIC-General Motors-Wuling	462,563	637,416	369,903	387,611	461,765	511,454	545,900	521,573	562,213	623,460
BAIC	41,396	85,005	135,928	138,437	161,836	166,896	195,365	219,988	228,706	251,609
Dongfeng	92,813	224,788	114,458	219,995	260,821	293,707	346,719	399,802	431,854	487,350
Suzuki	0	0	0	20,748	101,237	155,344	220,883	255,723	312,190	369,277
Chery	101,581	233,747	137,348	249,760	302,770	360,498	376,236	395,894	409,263	485,155
GAC	131,217	294,513	516,978	658,046	705,523	684,670	710,928	715,415	789,986	760,715
Mazda	8,517	6,431	6,052	6,157	8,148	10,629	42,948	70,250	87,413	124,875
FAW	42,253	59,001	101,681	118,868	175,516	209,189	238,296	261,775	273,525	293,212
Subaru	0	6,576	18,528	25,904	35,289	74,644	128,008	208,930	259,747	277,540
Ferrari	0	0	0	0	89	955	1,941	2,312	5,742	6,483
Aston Martin	0	0	0	0	0	854	1,086	1,619	3,299	6,176
BEV penetration ratio as % of total production										
Volkswagen	5.7%	7.3%	9.0%	11.8%	17.8%	24.4%	32.9%	38.1%	44.3%	51.1%
Stellantis	3.9%	4.7%	5.4%	11.2%	17.0%	20.3%	26.0%	34.5%	41.6%	49.2%
Hyundai	3.8%	5.3%	7.1%	10.1%	17.1%	23.3%	28.8%	33.4%	37.0%	38.8%
Toyota	0.1%	0.4%	1.2%	1.6%	3.3%	6.7%	10.2%	13.7%	18.3%	21.8%
Mercedes-Benz	5.0%	8.2%	14.0%	16.4%	21.2%	32.6%	43.0%	51.8%	58.8%	69.1%
Geely	6.3%	19.4%	22.4%	35.2%	40.6%	45.9%	50.5%	55.0%	58.5%	63.0%
General Motors	1.1%	1.7%	4.1%	6.8%	9.8%	17.5%	25.2%	29.3%	31.8%	37.5%
BMW	4.6%	10.6%	15.5%	24.0%	26.0%	30.6%	36.9%	45.5%	54.6%	62.3%
Ford	1.9%	3.1%	4.0%	6.6%	12.9%	17.9%	23.2%	33.7%	41.3%	49.9%
Nissan	2.4%	5.4%	5.0%	6.0%	8.8%	15.0%	20.8%	25.8%	31.6%	37.8%
Honda	0.3%	0.7%	0.6%	2.6%	4.7%	8.7%	14.8%	18.0%	21.5%	24.6%
Renault	9.9%	12.8%	10.6%	15.3%	22.8%	27.5%	32.3%	38.0%	42.9%	47.2%
Great Wall	10.3%	9.3%	8.5%	12.5%	15.7%	18.5%	18.6%	21.1%	23.1%	24.9%
Changan	7.4%	13.4%	11.7%	15.3%	19.9%	24.2%	30.6%	32.3%	35.1%	36.0%
SAIC	9.6%	21.3%	27.9%	31.4%	36.9%	40.9%	45.5%	49.7%	54.0%	53.7%
Tata	2.1%	4.4%	7.7%	12.4%	19.3%	31.3%	38.8%	48.8%	53.4%	55.0%
SAIC-General Motors-Wuling	27.3%	39.4%	28.9%	33.4%	40.5%	43.7%	47.1%	45.7%	48.7%	51.6%
BAIC	7.1%	17.2%	18.7%	20.8%	23.9%	24.7%	27.9%	32.3%	34.1%	38.0%
Dongfeng	12.0%	30.4%	18.7%	31.0%	35.4%	37.6%	42.8%	46.0%	47.8%	51.8%
Suzuki	0.0%	0.0%	0.0%	0.6%	3.0%	4.6%	6.5%	7.3%	9.0%	10.1%
Chery	10.2%	20.1%	8.2%	14.8%	17.4%	20.2%	21.5%	22.8%	23.6%	26.9%
GAC	28.9%	44.1%	56.4%	64.4%	64.9%	63.9%	64.1%	64.3%	66.7%	66.7%
Mazda	0.7%	0.5%	0.4%	0.5%	0.7%	1.0%	4.3%	7.3%	9.8%	14.7%
FAW	9.3%	14.2%	19.8%	25.6%	37.1%	40.9%	45.4%	48.2%	49.8%	52.0%
Subaru	0.0%	0.8%	1.9%	2.4%	3.5%	7.8%	14.1%	23.1%	29.7%	34.9%
Ferrari	0.0%	0.0%	0.0%	0.0%	0.6%	5.8%	11.6%	15.3%	36.0%	43.7%
Aston Martin	0.0%	0.0%	0.0%	0.0%	0.0%	15.2%	20.0%	28.8%	54.9%	89.6%

Source: BofA Global Research, S&P

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# Disclosures

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Investment rating	Total return expectation (within 12-month period of date of initial rating)	Ratings dispersion guidelines for coverage cluster <sup>R1</sup>
Buy	≥ 10%	≤ 70%
Neutral	≥ 0%	≤ 30%
Underperform	N/A	≥ 20%

<sup>R1</sup> Ratings dispersions may vary from time to time where BofA Global Research believes it better reflects the investment prospects of stocks in a Coverage Cluster.

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