

A Glance at the Chinese NEV Deployment in 2021



**China Center For Energy and
Transportation
(C-CET)**

China—U.S. – UK ZEV Policy Lab

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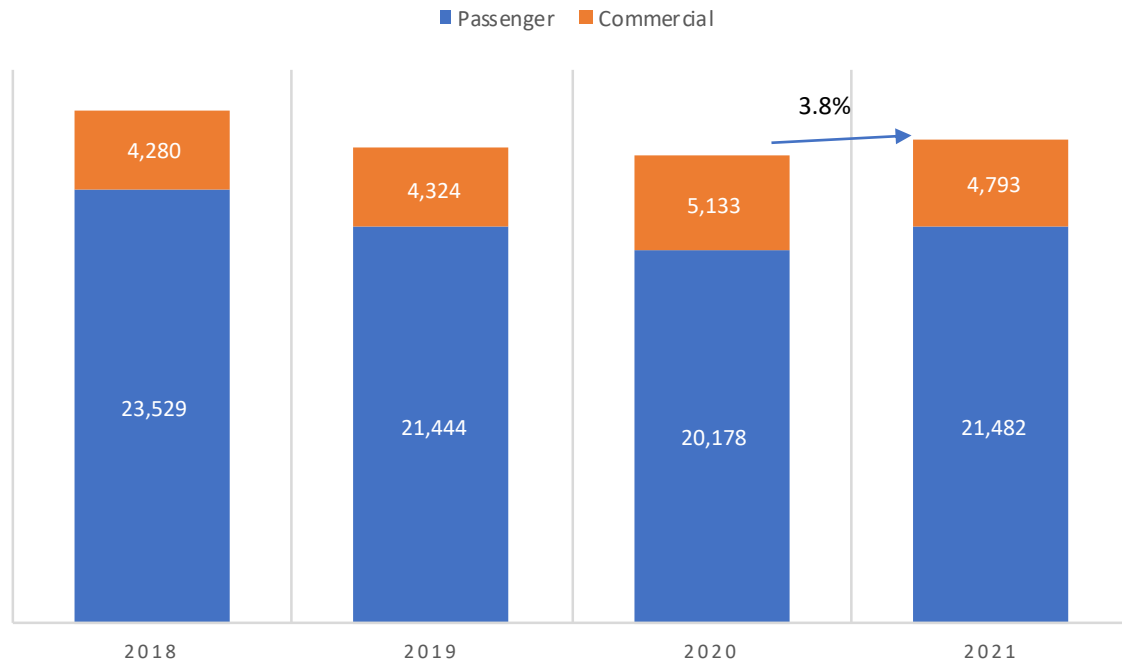
January 18, 2021

(with data from CATARC and CAAM)

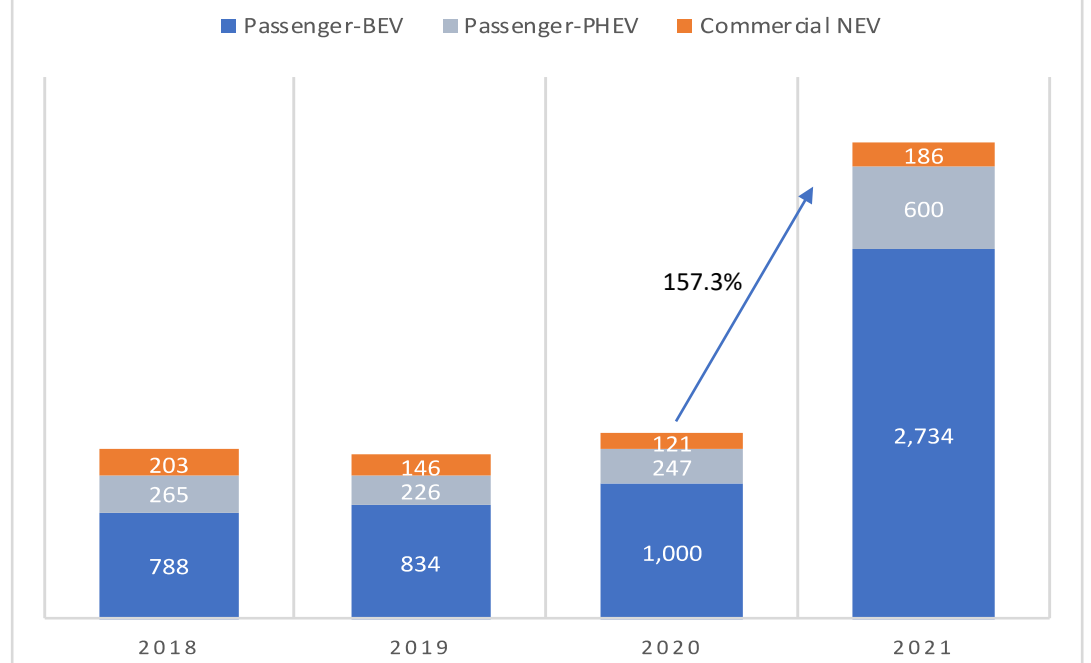
2021 auto market in a glance:

Total vehicle sales turned around at 3.8%, but NEV Sales sky-rocked. This is what we at UC Davis has predicted:
A rapid aging society leads to slower total auto sales with much faster electrification rate

ANNUAL VEHICLE SALES (UNIT: '000)



ANNUAL PEV SALES (UNIT: '000)



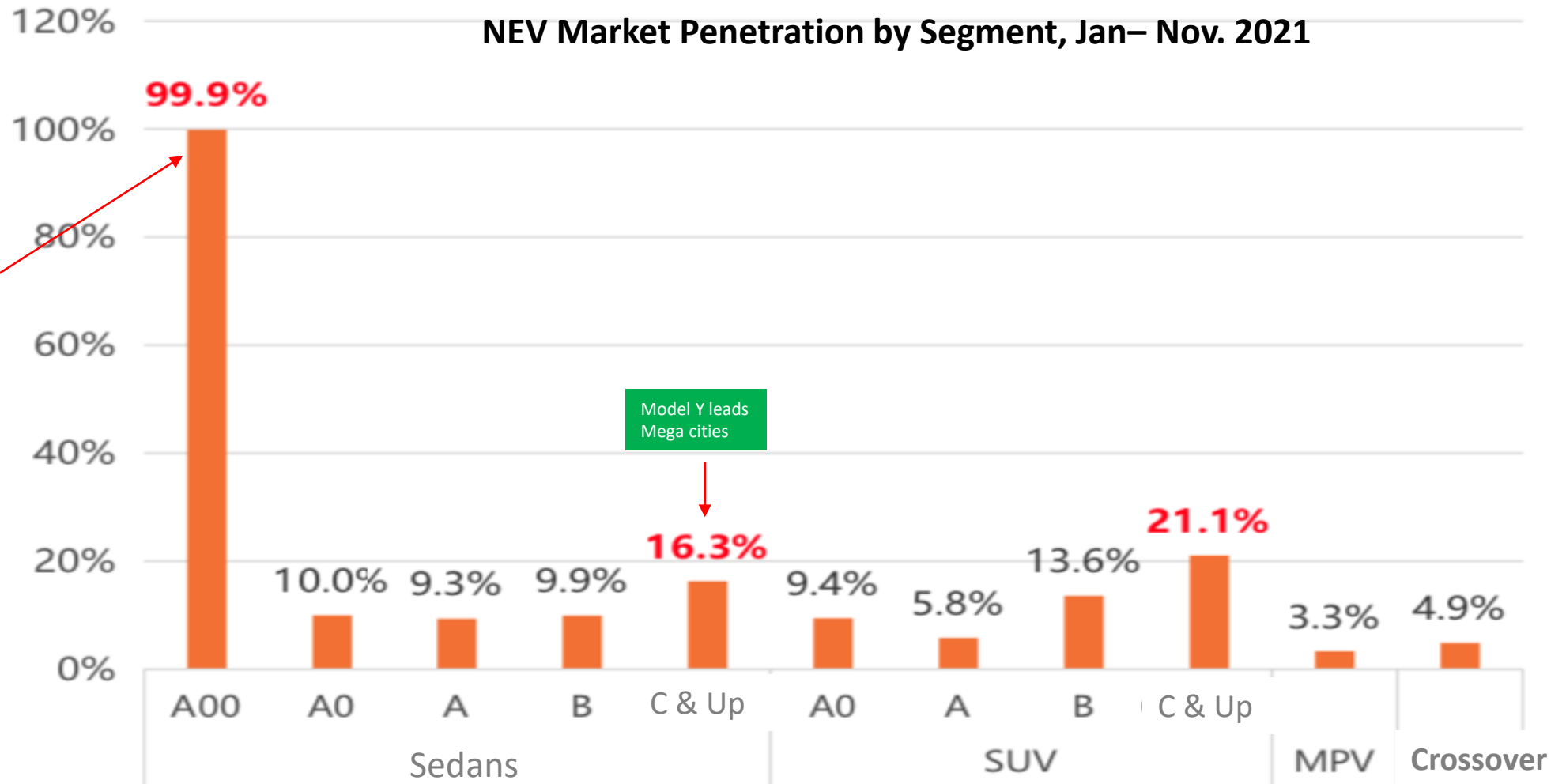
	2018	2019	2020	2021	21/20
Passenger	23,529	21,444	20,178	21,482	6.5%
Commercial	4,280	4,324	5,133	4,793	-6.6%
Total	27,809	25,768	25,311	26,275	3.8%

	2018	2019	2020	2021	21/20
Passenger-BEV	788	834	1,000	2,734	173.4%
Passenger-PHEV	265	226	247	600	142.9%
Commercial NEV	203	146	121	186	53.7%
Total	1,256	1,206	1,368	3,520	157.3%

China's NEV penetration rate reached 15.5% in 2021, **unexpectedly**. In 2022, it is expected to reach 20%, 3 years ahead of the 2025 target

Sales of Chinese NEV Vehicles (unit: 1,000)					
	2018	2019	2020	2021	21/20
Passenger-BEV	788	834	1,000	2,734	173.4%
Passenger-PHEV	265	226	247	600	142.9%
Total Passenger V	23,529	21,444	20,178	21,482	6.5%
Penetration rate	4.5%	4.9%	6.2%	15.5%	151.1%

In passenger vehicles, A00 segment, the microcars, is fully electrified, and larger cars and SUVs, led by Model Y, Tang DM, and Nio EC6, are electrified at a faster pace. The two segments of micro cars and B & above are squeezing the passenger vehicles toward full electrification. China's LDVs will be fully electrified (70-80%) sooner than expected.



wuling hongguang mini
\$4,500-6,000: R=120 km

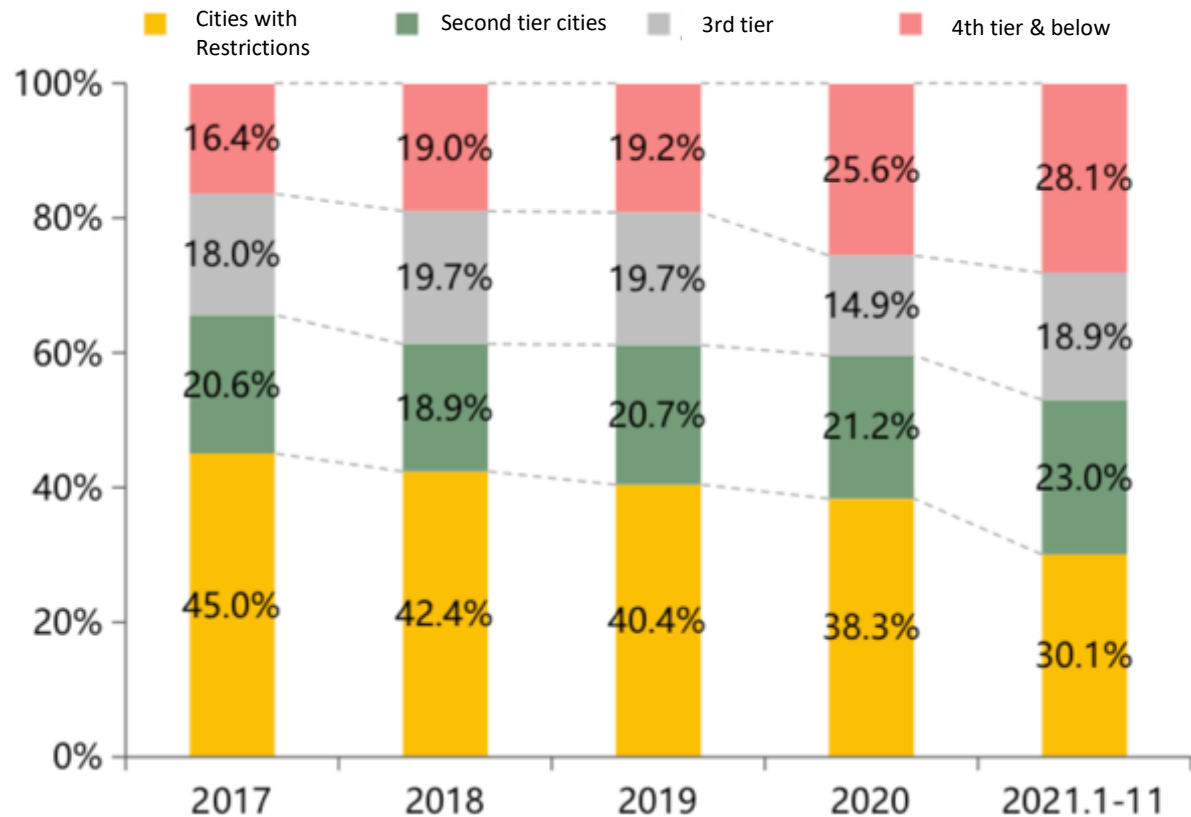


Lead 2nd & 3rd Tier Cities

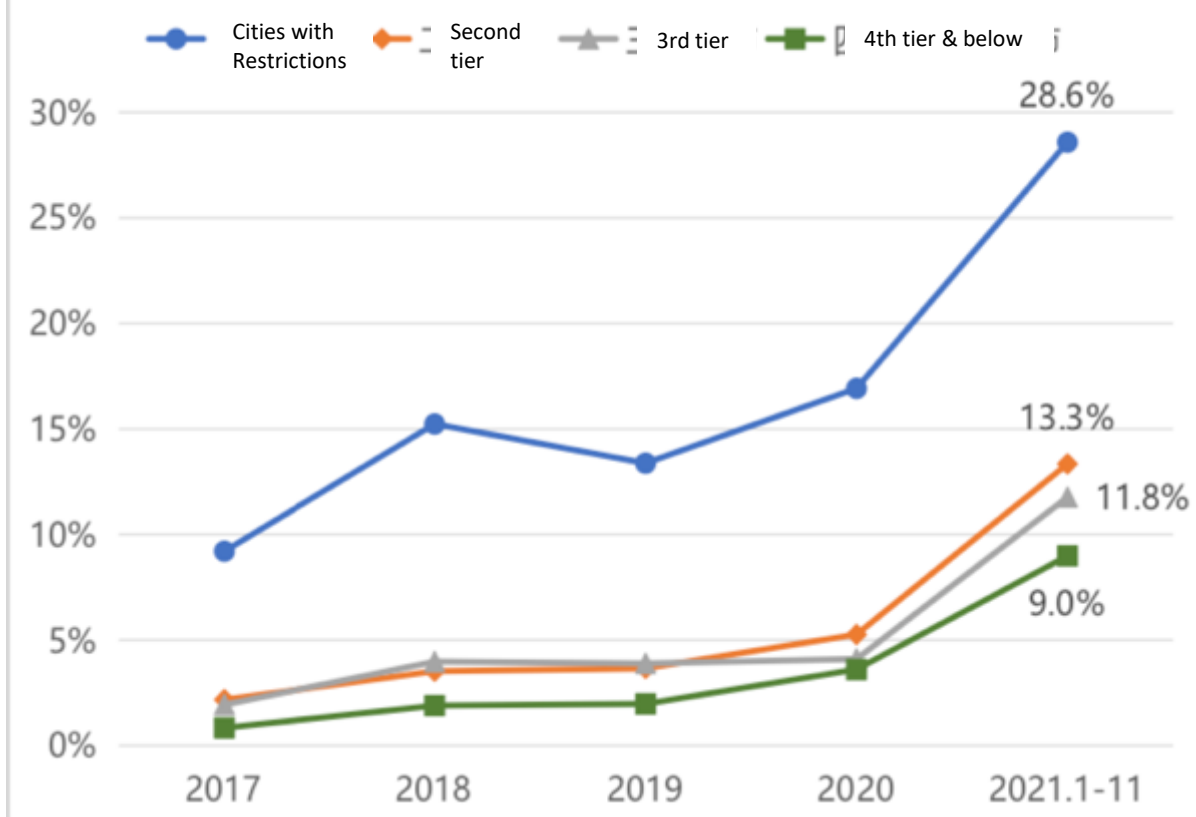
Model Y leads
Mega cities

Megacities with restrictions are no longer the dominant markets, but they still lead in NEV market penetration, and the second and third tier cities have great potentials

The Change of NEV Sales in Different Tiered Cities



NEV Market Share in Different Tiered Cities



NEV Sales Grew Steadily Each Month, yet HD Trucks is the Weakest Link

Battery Swappable HD Trucks broke out, accounting for 30.7% of the NEV HD Trucks

Sales of HD Trucks in 2021 (=>12 Ton)			
Truck Type	Sales	As of Total HD	As of NEV HD
HD Trucks	1,390,000	100.0%	
HD NEV Trucks	10513	0.8%	100.0%
HD Swap Trucks	3228	0.2%	30.7%
HD FC Trucks	779	0.1%	7.4%

Source: Collected from various news media and CATARC

NEV Sales by Month and by Segment

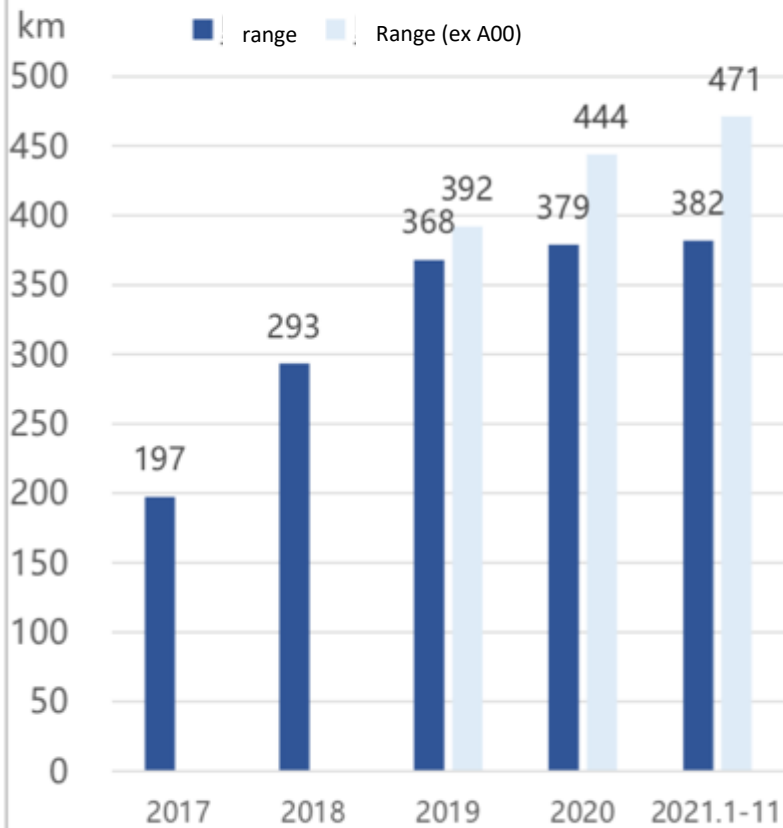
2021 by Month	New Energy Vehicles			By Vehicle Type			By Drivetrain			Battery Swap Vehicles		
	Production '000	Sales '000	NEV Market Share	LDV Sales, '000	Bus Sales '000	Truck Sales '000	BEVs '000	PHEV '000	FCEV (single unit)	Swap Passenger Vehicles	Swap Commercial (HD Trucks)	Total Swap Vehicles
1	193.64	179.18	7.2%	171.78	3.86	3.53	150.60	28.51	63	7347	35	7382
2	123.52	109.63	7.5%	106.06	2.27	1.31	92.34	17.27	28	5757	28	5785
3	216.04	225.80	8.9%	211.96	7.34	6.50	189.64	36.11	59	7013	73	7086
4	216.18	206.21	9.2%	192.73	4.70	8.77	171.27	34.89	38	7524	13	7537
5	217.15	217.39	10.2%	204.14	5.52	7.73	178.59	38.79	9	6962	136	7098
6	248.13	255.75	12.7%	241.41	6.47	7.87	211.48	44.00	272	8616	125	8741
7	283.61	270.58	14.5%	255.90	5.93	8.74	220.05	50.34	196	9280	171	9451
8	308.61	320.97	17.8%	306.60	5.98	8.39	265.17	55.77	38	7914	378	8292
9	353.23	357.47	17.3%	341.22	6.93	9.32	296.49	60.81	173	11715	525	12240
10	397.28	383.42	16.4%	365.69	7.85	9.87	315.75	67.62	47	5296	496	5792
11	457.21	449.86	17.8%	427.17	9.99	12.70	361.19	88.52	147	12346	564	12910
12	518.0	531.0	19.1%	498.0	33.0		448.0	82.0	486	Only Jan-Nov	684	Only Jan-Nov
Year total	3,545.0	3,521.0	13.4%	3,334.0	186.0		2,916.0	603.0	1,596	89,770	3,228	92,998

Source: Chinese Association of Automotive Manufacturer (CAA); Battery Swap Vehicle Data from Insurance Companies

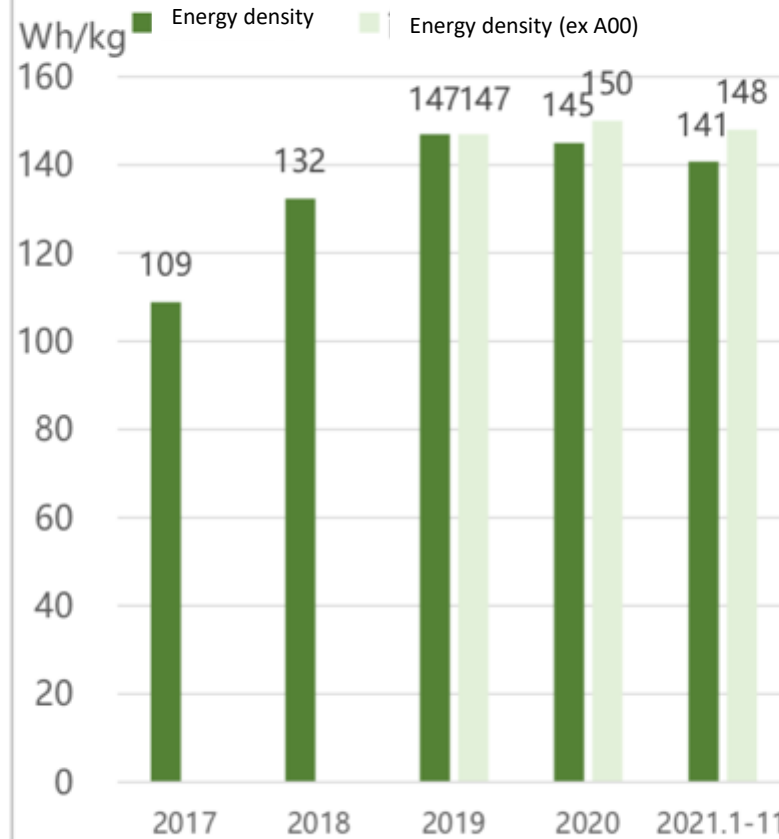
BEV technology improves steadily

BEV ranges are meeting, not exceeding, consumer demands

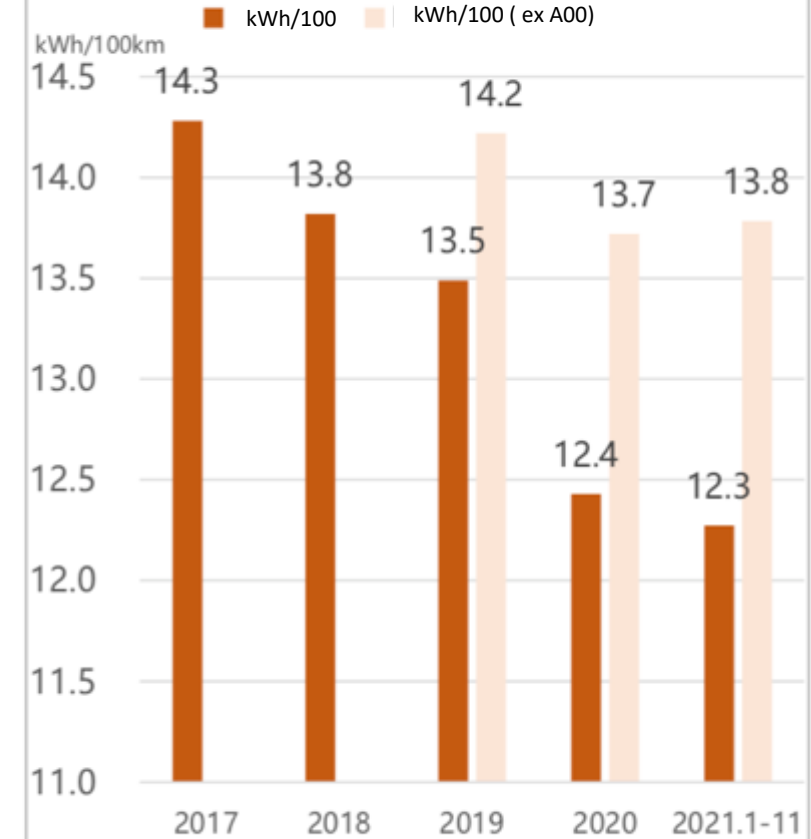
Chinese BEVs Range Trend



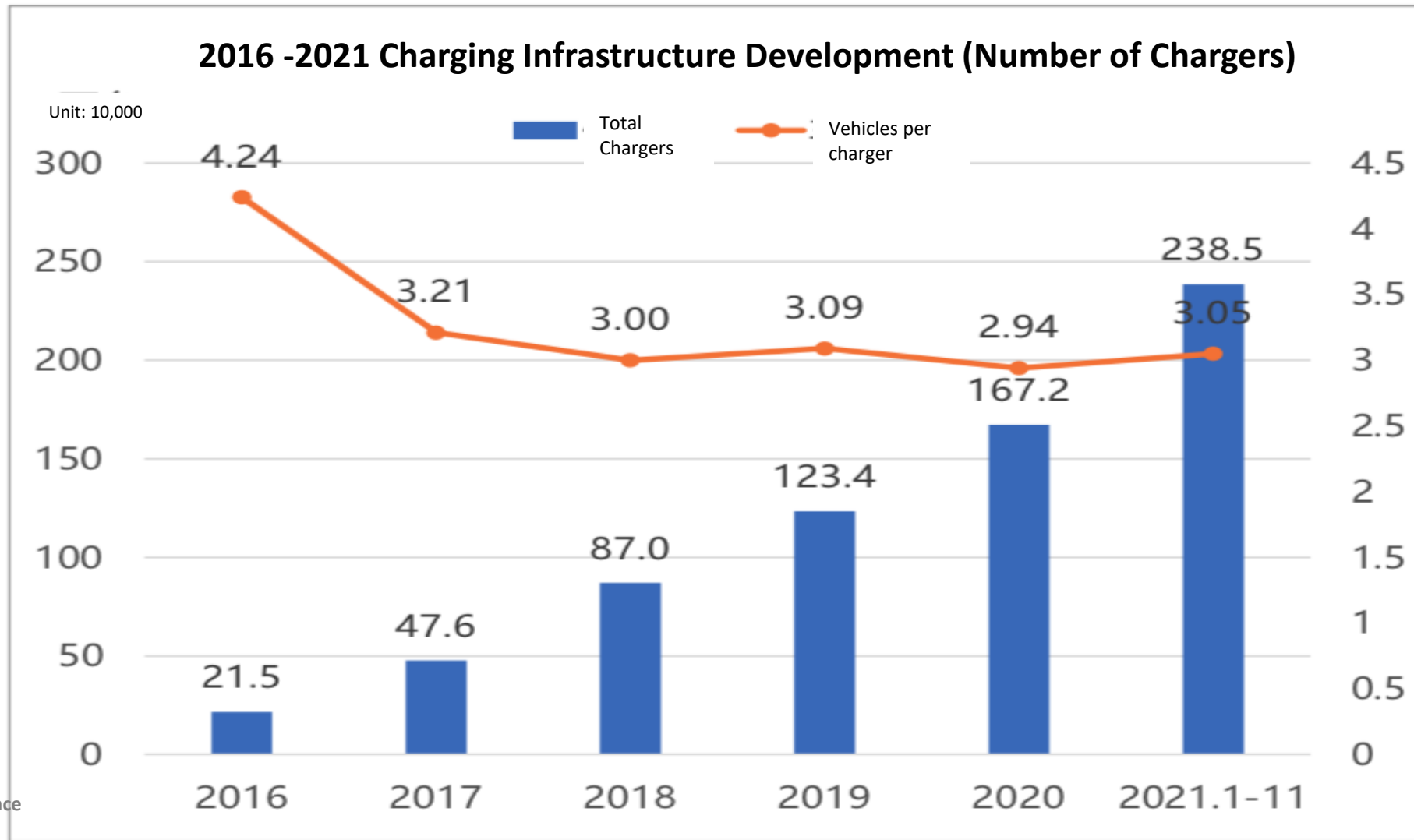
Chinese BEV Battery Energy Density



Chinese BEV Drive Cycle Energy Use



Charging Infrastructure has Developed along with the NEV Deployment, but lags behind in 3rd Tier and smaller cities

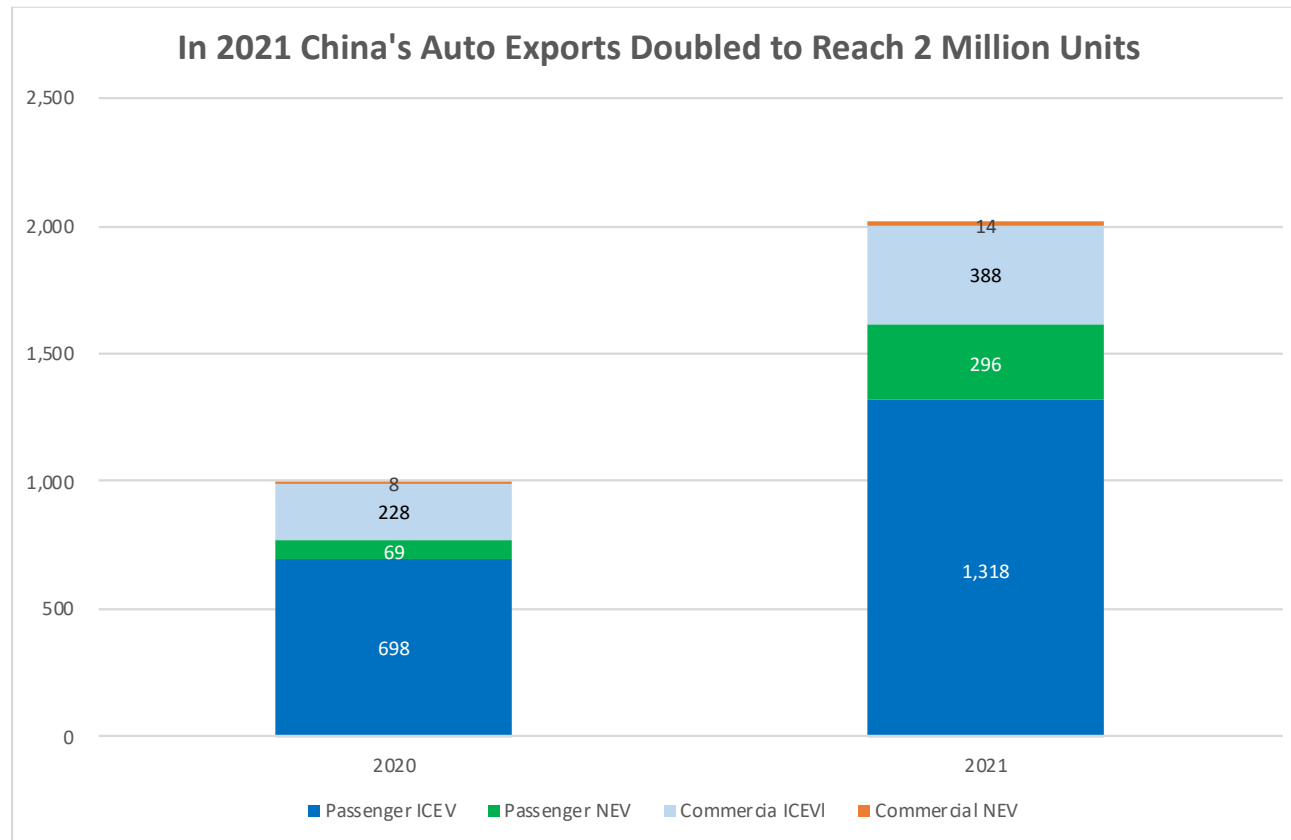


Chinese NEV market alone is now the 4th largest market in the world, behind Japan; indicating that the NEV market has reached the **scale** for commercialization

Characteristic	New car registrations in million units
China	19.79
United States*	14.46
Europe**	11.96
Japan	3.81
India	2.42
Brazil*	1.95
Russia*	1.6

← China new passenger NEV sales reached 3.334 million units. 2022 sales is expected to reach 4.5-5 million

The **frog** has leaped! China's auto exports doubled in 2021; highlighted by NEV exports



	2020	2020	21/20
Total Passenger	767	1,614	110.5%
Passenger NEV	69	296	329.5%
Total Commercial	236	402	70.7%
Commercial NEV	8	14	78.8%
Total Export	1,002	2,015	101.1%
Total NEV	77	310	304.6%

China's battery companies lead the world

Asian Batteries Power Global EV Fleet

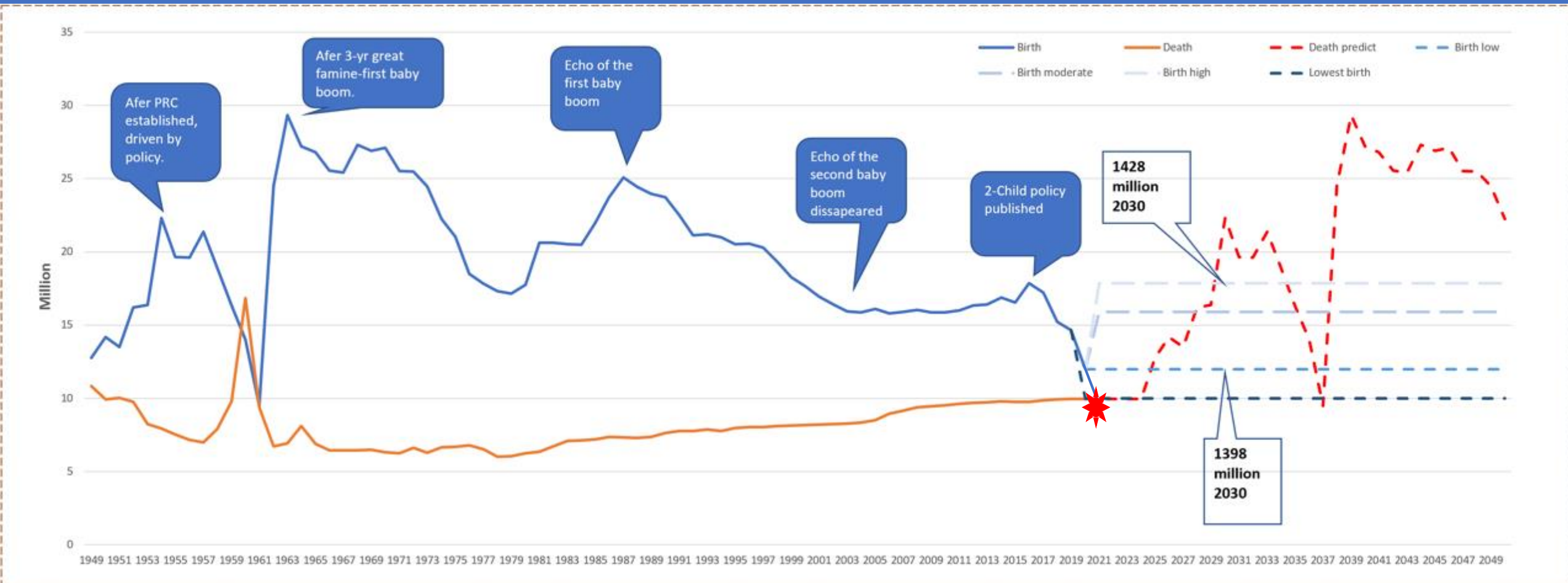
Worldwide market share of the biggest electric vehicle battery makers in 2021 (based on GWh)

■ China ■ South Korea ■ Japan



Sources: SNE Research via Visual Capitalist

Alarm: According to the Government, the number of births fell to 10.6 million in 2021, compared with 12 million the year before, and the number of the death in 2021 was 10.1 Million. The population barely increased by 48,000 people. 2022 could be the year when the Chinese population **peaked**



Source: World Bank, China Ministry of Security, China census data released in May 2021.

We project that a rapid-aging China will experience slower GDP and vehicle ownership growth. Historically, only three countries, all OECDs, have experienced population decline without wars or natural disasters.

Average GDP Growth Rate After A Country's 65&+ Reaches Certain Percentage							
Country	10 YRs after 10%	10 Yrs after 13%	Years after 17%	9 Years after 23%	GDP Deceleration Rate		
					After 13%	After 17%	After 23%
China	6.28%						
Japan	3.30%	0.90%	0.60%	0.48%			
EU		2.48%	1.72%				
Spain	1.83%	2.57%	1.33%				
France	5.43%	3.08%	1.44%				
Italy	4.96%	2.45%	1.20%				
Germany		2.80%	1.09%				
Average ex CN	3.88%	2.38%	1.23%	0.48%	-38.66%	-48.26%	-61.38%
Note . China reached 10% in 2014, so only 5 years in record; after passing 17% some countries have less than 10 Yrs in record							
Source: World Bank							

Year When Population Peaked; GDP Growth			
Country	% of 65&+	Year	Avrg GDP Growth
China	17.7 - 21.0	2021-2023	Peak YR to 2019
Japan	21.8	2008	0.48%
Spain	17.6	2012	1.33%
Italy	21.6	2014	0.83%
Average			0.88%
Source: World Bank			

**Thank you. Please feel free to
contact us for information**

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