

# Toyota, Volkswagen, General Motors Risk Loss of Market Share in China as EV Sales Surge

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Greenpeace East Asia

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## Background

China's auto market is undergoing a rapid transition. New energy vehicles comprised approximately one quarter of new car sales<sup>1</sup> in China in 2022, a figure that continues to rise. China is the world's biggest auto market, providing a strong incentive for leading automakers to electrify. At the same time, road transport is responsible for nearly one tenth of China's overall carbon emissions.<sup>2</sup> Automakers must transition to zero-emission vehicles in China both to avoid the most catastrophic impacts of climate change and to protect their businesses.

This study adopts scenario analysis and Monte Carlo simulation methods to predict and analyze the market share, production capacity gap and capacity utilization rate of 11 leading passenger car manufacturers in China. The study also compares the current new energy vehicle production capacity of automakers with their announced 2025 or 2030 new energy vehicle production and sales targets.

In this briefing, the phrase "new energy vehicles" refers to plug-in hybrid electric vehicles, battery electric vehicles, and fuel cell vehicles.

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1. <http://www.evinchina.com/uploadfile/file/20230113/2023011310424805510.pdf>  
2. <https://www.mee.gov.cn/ywgz/ydqhbh/wsqtgz/201907/P020190701765971866571.pdf>

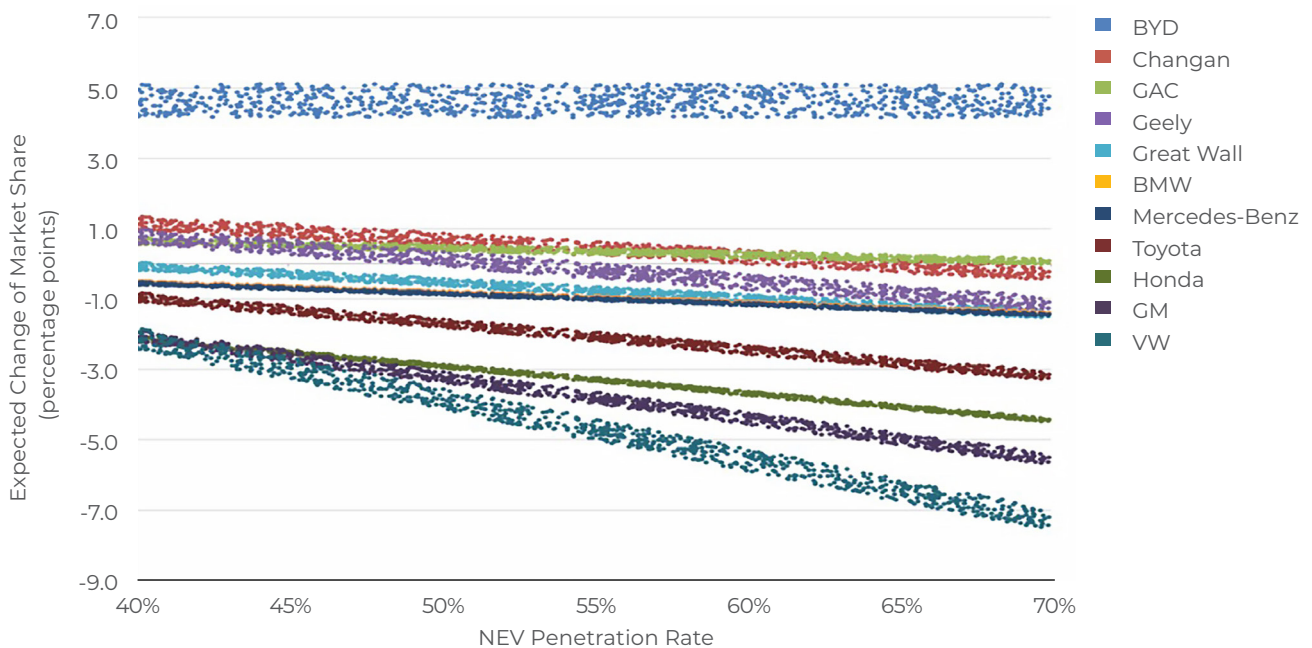
## Key Findings

### 1. Foreign automakers are on track to lose market share in China as new energy vehicle sales surge.

By 2030, Volkswagen is likely to lose between 3 and 7 percentage points (probability 76.6%) of market share in China compared to its average for the period 2019 to 2021. Over the same period, General Motors is likely to lose between 3 and 6 percentage points of market share (probability 73.4%), Honda between 2 and 4 percentage points (probability 80.2%), Toyota between 1 and 3 percentage points (probability 89.0%), and BMW and Mercedes-Benz between 0.5 and 1.5 percentage points (probability 99.4% and 99.9%, respectively).

The average market share from 2019 to 2021 in China for Volkswagen, General Motors, Toyota, Honda, BMW and Mercedes-Benz was 17.2%, 11.7%, 7.5%, 7.7%, 3.0% and 3.0%, respectively.

**Figure 1 | Monte Carlo Simulation Results: Change in expected market share of each automaker in 2030 compared to their average market share during 2019-2021**



### 2. BYD is forecast to experience the biggest China market growth of all automakers studied.

Due to the company's early adoption of new energy vehicles. Chinese automaker BYD is forecast to gain market share in China. By 2030, BYD is likely to increase its market share in China by between 4 and 5 percentage points (probability 90.5%) compared with its average market

share from 2019 to 2021. Changan and GAC are also likely to see market share growth by 2030 (probability 80.8% and 99.9%, respectively).

**Table 2 | Probability of Change in Expected Market Share of Each Automaker in 2030 Compared to Their Average Market Share from 2019 to 2021**

Carmaker	Change in Market Share in Percentage Points	Probability
BYD	[4.0, 5.0]	90.5%
Changan	[0, 1.5]	80.7%
GAC	[0, 0.6]	92.1%
Geely	[-1.0, 0]	51.4%
Great Wall	[-1.0, 0]	69.2%
BMW	[-1.5, -0.5]	99.4%
Mercedes-Benz	[-1.5, -0.5]	99.9%
Toyota	[-3.0, -1.0]	89.0%
Honda	[-4.0, -2.0]	80.2%
GM	[-6.0, -3.0]	73.4%
VW	[-7.0, -3.0]	76.6%

**Table 3 | Probability of Growth in Expected Market Share of Each Automaker in 2030 Compared to Their Average Market Share from 2019 to 2021**

Carmaker	Probability of growth in market share
Changan	80.8%
GAC	99.9%
Geely	39.6%
Great Wall	0.4%

### 3. Foreign automakers' market share in China is on track to shrink even under the most conservative forecast.

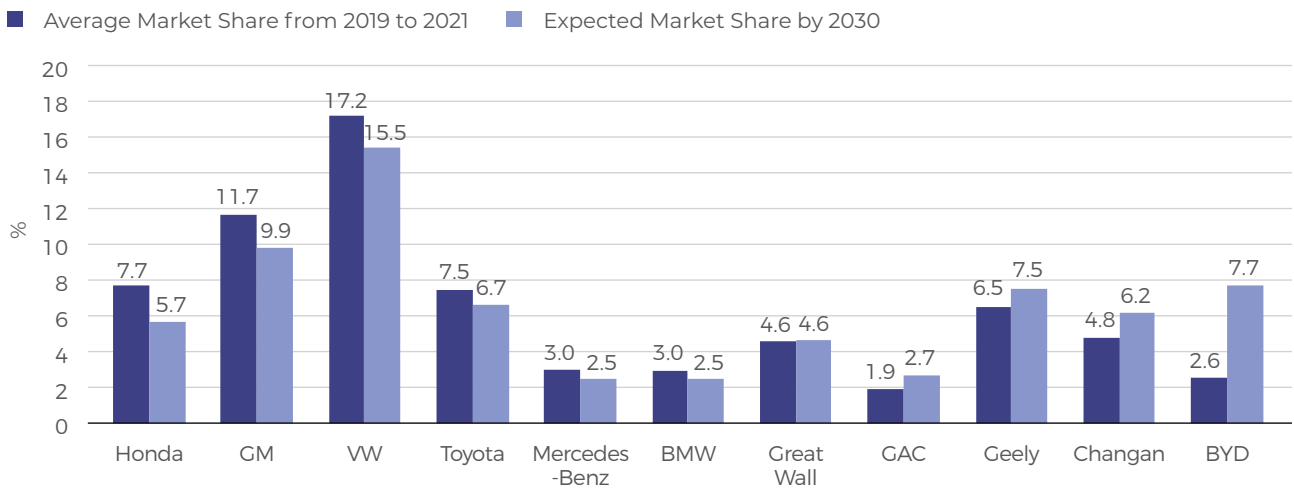
Even under the most conservative scenario for new energy vehicle adoption, foreign automakers will experience a decline in China market share by 2030.<sup>3</sup> If China's new energy vehicle adoption rate reaches just 40% by 2030, Honda would lose 2 percentage points of market share, Volkswagen 1.7

3. Compared to their average market share for the period 2019 to 2021.

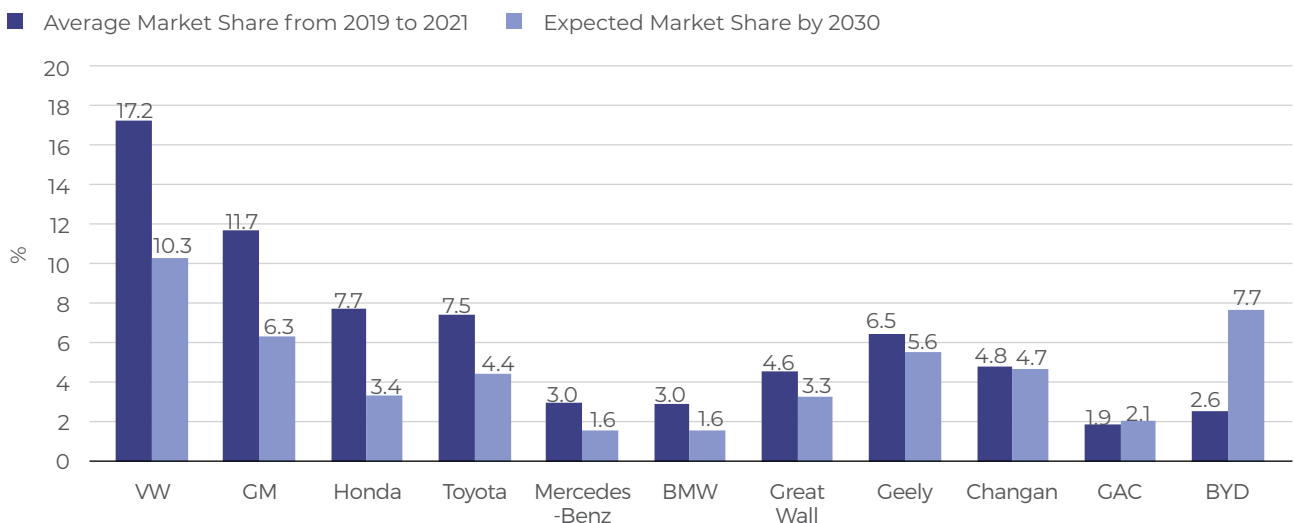
percentage points, General Motors 1.8 percentage points, Toyota 0.8 percentage points, Mercedes-Benz 0.5 percentage points, and BMW 0.5 percentage points. By contrast, the market share of domestic automakers would increase by 2030. BYD would see the largest market share increase, at around 5.1 percentage points, followed by Changan, at approximately 1.4 percentage points.

If China's new energy vehicle adoption rate reaches 70% by 2030, foreign automakers would face even greater losses. Under this scenario, Volkswagen's market share would decrease by 6.9 percentage points, General Motors' market share would decrease by 5.4 percentage points, and Toyota's would decrease by 3.1 percentage points.

**Figure 2 | Change in expected market share of each automaker in 2030 compared to their average market share during 2019-2021 in China under a baseline scenario (40% NEV adoption rate)**



**Figure 3 | Change in expected market share of each automaker in 2030 compared to their average market share during 2019-2021 in China under a 70% NEV adoption rate**

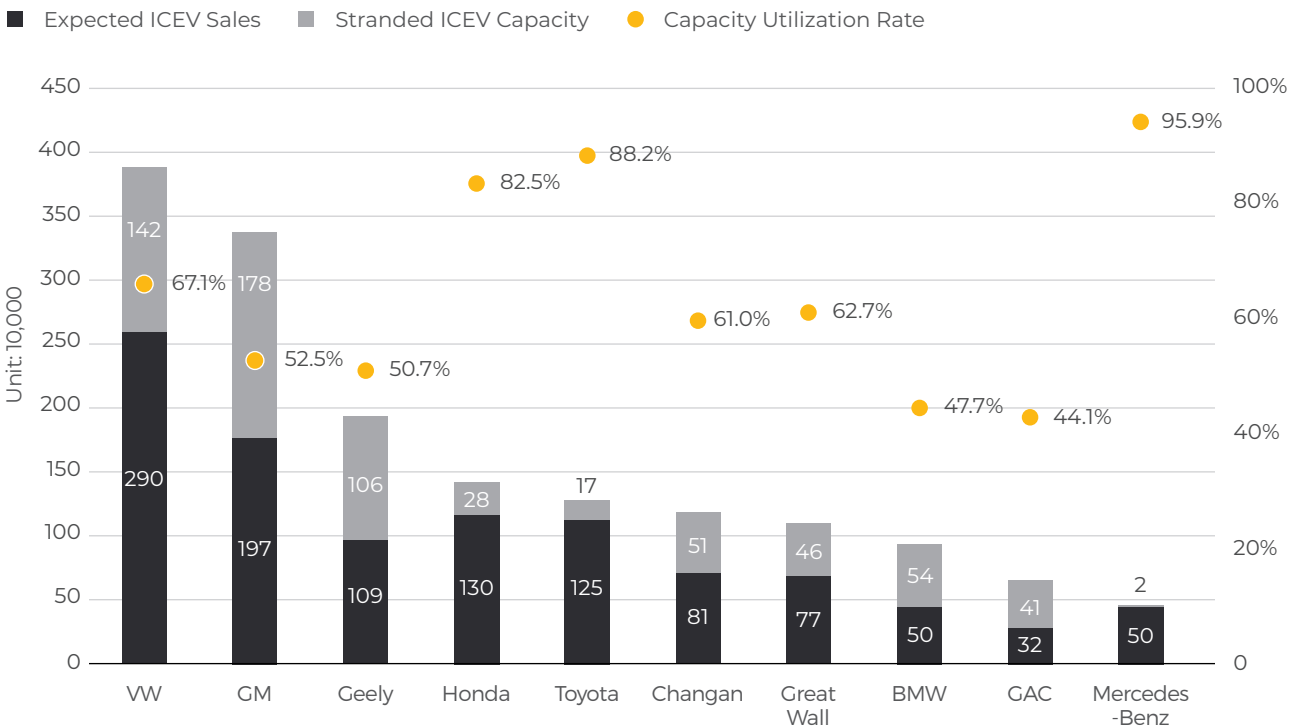


**4. As China’s auto market electrifies, automakers will face high levels of unused production capacity for combustion engine vehicles.**

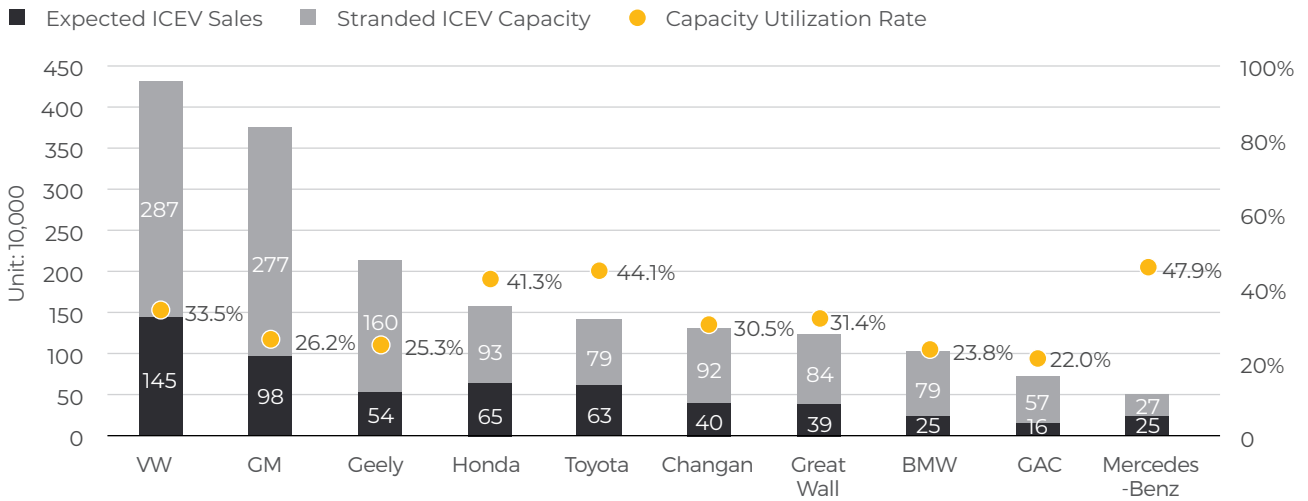
China’s market for combustion engine vehicles is on track to shrink significantly by 2030. Automakers that have been slow to adopt new energy vehicles will face unused production capacity. Under the most conservative scenario for new energy vehicle adoption, the 10 automakers that have not fully transitioned to new energy vehicles will likely see an average combustion engine vehicle production capacity utilization rate of just 68.9%. In other words, on average one third of their capacity for producing gas and petrol vehicles would sit unused.

Under the most conservative forecast, General Motors would see the most stranded production capacity for combustion engine vehicles of all 10 automakers, with 1.78 million units, followed by Volkswagen with 1.42 million units. If China’s new energy vehicle adoption rate reaches 70%, carmakers will face an even higher rate of unused production capacity for combustion engine vehicles, and both General Motors and Volkswagen would have more than 2 million units of stranded capacity. High levels of stranded production capacity pose a significant business risk to automakers

**Figure 4 | Estimation of stranded combustion engine vehicle production capacity and utilization rate in 2030 in China under baseline scenario (NEV adoption rate at 40%)**



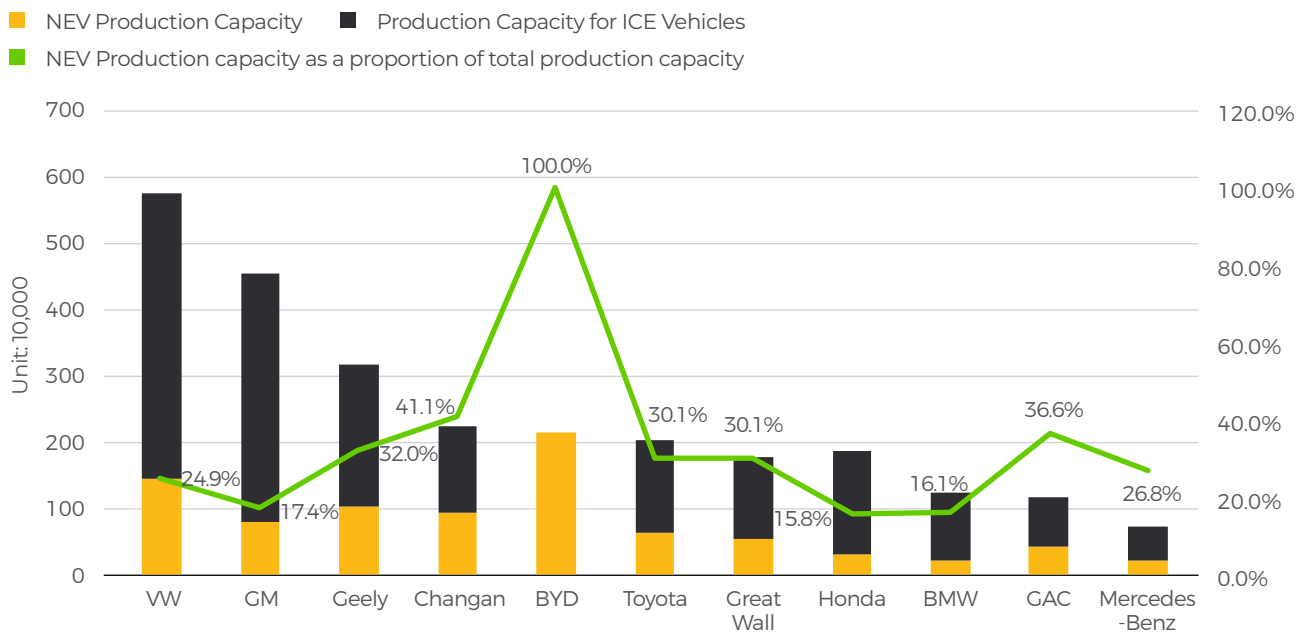
**Figure 5 | Estimation of stranded combustion engine vehicle production capacity and utilization rate in 2030 in China under a 70% new energy vehicle adoption rate**



**5. Chinese automakers have a higher proportion of existing and planned new energy vehicle production capacity than their foreign-invested competitors.**

New energy vehicle production capacity comprises at least 30% of the total production capacity for all Chinese automakers studied, compared to 30% or lower for the foreign automakers included in the study.

**Figure 6 | Production Capacity of NEVs and ICE Vehicles among Major Automakers in China**



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Recommendations:

- 1. All automakers must phase out combustion engine vehicles before 2030.** The phase-out of combustion engine vehicles is not only the most impactful action for automakers to fulfil their carbon reduction responsibilities but is also critical to their long-term business interests. The results of this study show that most major automakers in China face business risks due to their slow transition to new energy vehicles. The phase-out of combustion engine vehicles is imminent, and the earlier automakers adapt, the more impactful their carbon reduction efforts will be.
- 2. Automakers should transform existing combustion engine vehicle production capacity into electric vehicle production lines.** This study found that automakers face high levels of stranded production capacity for combustion engine vehicles. In most cases, the transformation of existing combustion engine vehicle assembly lines is preferable to the construction of new production lines as it lessens the environmental impact of new construction projects.

## Methodology

### Scope

The study includes 11 leading passenger car manufacturers that operate in China: Volkswagen (China), BMW (China), Mercedes-Benz (China), General Motors (China), Toyota (China), Honda (China), Geely Auto, Great Wall Motor, Changan Automobile (excluding joint-ventures), GAC Group (excluding joint-ventures), and BYD.

This study focuses on passenger cars. Unless otherwise stated, the terms “car” and “vehicle” as used in this study refer to passenger vehicles. In addition, the discussion of new energy vehicle penetration, market share, new energy vehicle capacity, capacity gap, stranded capacity and capacity utilisation used in this study covers passenger vehicles only. The study defines passenger vehicles as sedans, sport utility vehicles (SUVs), hatchback cars, and multi-purpose vehicles (MPVs).

### Key Assumptions

This study is based on the following assumptions:

1. The market share of traditional internal combustion engine vehicles for automotive manufacturers in 2030 is consistent with the average market share they held in the passenger car market from 2019 to 2021.

2. The planned production capacity structure of automotive manufacturers remains unchanged.
3. In 2030, all new energy vehicles produced by each automaker will be sold.
4. Most passenger cars produced by automotive manufacturers in China are sold in the Chinese market.

## Scenario Setting

	2030 Market Size	2030 NEV Adoption Rate
Baseline	28 million	40% (of which BEVs account for 80%)
Moderate	28 million	50%~60% (of which BEVs account for 80%)
Optimistic	28 million	70% (of which BEVs account for 80%)

## Monte Carlo Methods

Monte Carlo simulation is a mathematical method based on probability and statistical theory, commonly used to estimate the possible outcomes of an uncertain event. In this report, the total sales of passenger cars in China in 2030 (total sales) and the penetration rate of new energy vehicles (NEV penetration rate) are two random variables that follow a uniform distribution. The parameters for the Monte Carlo simulation experiment are set as follows: the total sales variable follows a uniform distribution within the range [2800,3200] (unit: ten thousand); the NEV penetration rate variable follows a uniform distribution within the range [40,70] (unit: %).

## Data Sources

Production capacity data for each automotive manufacturer was collected from the environmental impact assessment reports or completion acceptance reports of construction projects of various automobile manufacturers, automobile enterprise annual reports, energy-saving and new energy vehicle yearbooks, and the Marklines database. For specific types of production capacity statistics, if there are parts that cannot be judged based on environmental impact assessment reports, corresponding conversions are made based on automobile enterprise annual reports, Marklines data, and local governments' automobile industry development plans. The passenger car sales data for automotive manufacturers from 2019 to 2021 comes from the Marklines database.