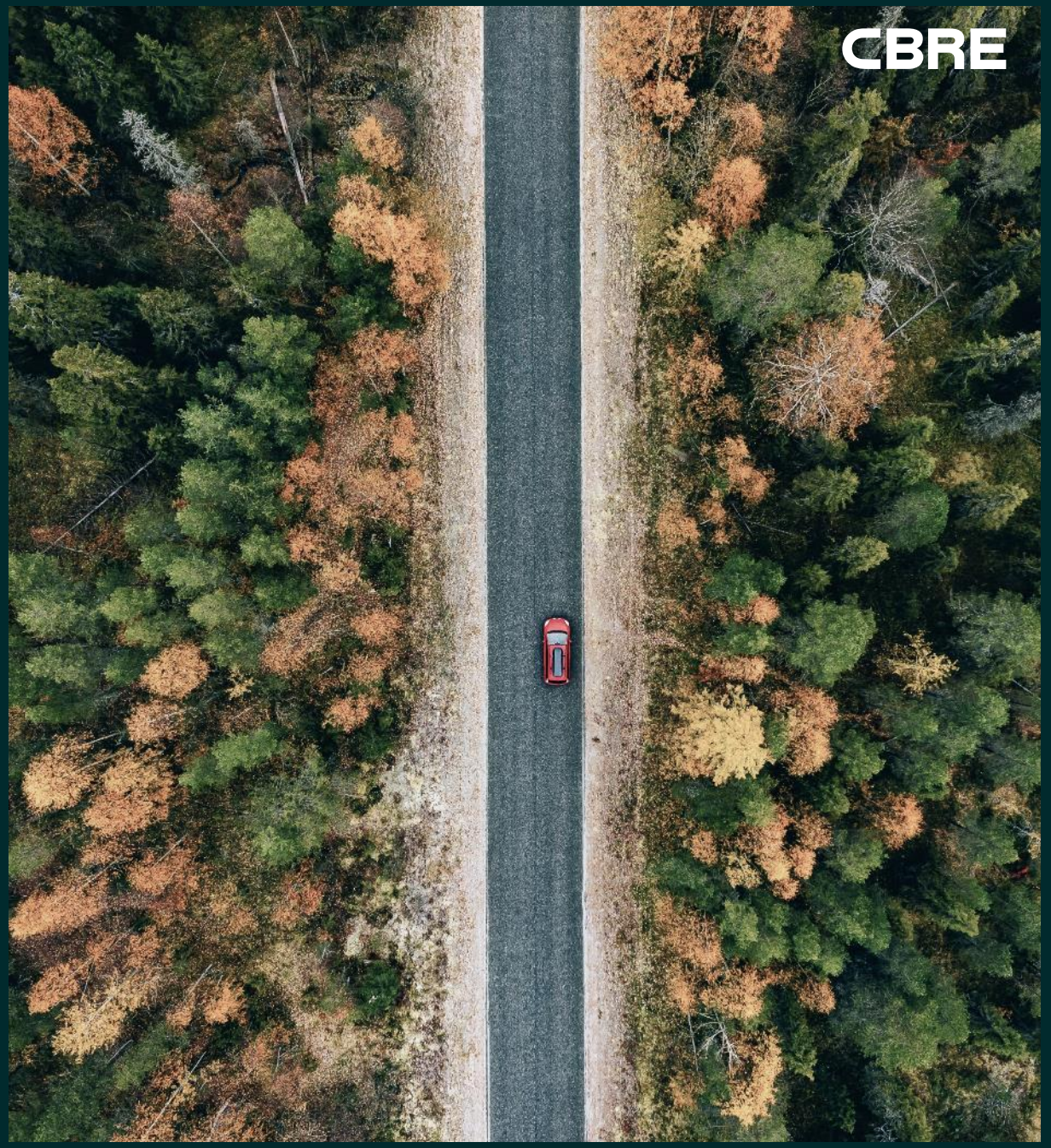
Creating Resilience

Electric Vehicle Manufacturing and Site Selection

REPORT

CBRE CHINA RESEARCH
JUNE 2024



Executive Summary

Driven by China‘s ‘3060’ carbon neutrality goals and supported by a raft of industrial policies, China’s Electric Vehicle (EV) production and sales have ranked first globally for each of the last seven years, helping China achieve the status of the world's largest automobile exporter in 2023. At the same time, long-term R&D and the domestic commercialisation of technology is boosting the country’s advantages in areas of the core supply chain such as battery, electric traction motor, and smart cockpit production.

EVs are now firmly established as a key industry that local governments are competing to attract and support. Although EV production qualifications have been tightened after 2019, automotive and related parts factories have mushroomed across in the country in recent years. In 2023, national automotive manufacturing fixed asset investment increased by 19.4% y-o-y, the highest growth rate in a decade.

CBRE has undertaken a comprehensive analysis of EV manufacturing clusters, supply chain, labour resources, automobile consumption market size, and transportation convenience in major cities, as well as policy support and property conditions. This report provides recommendations for EV automotive and related parts companies considering site selection; suggestions for local authorities on ways to attract investment; and advice for developers on the development and operation of industrial parks.

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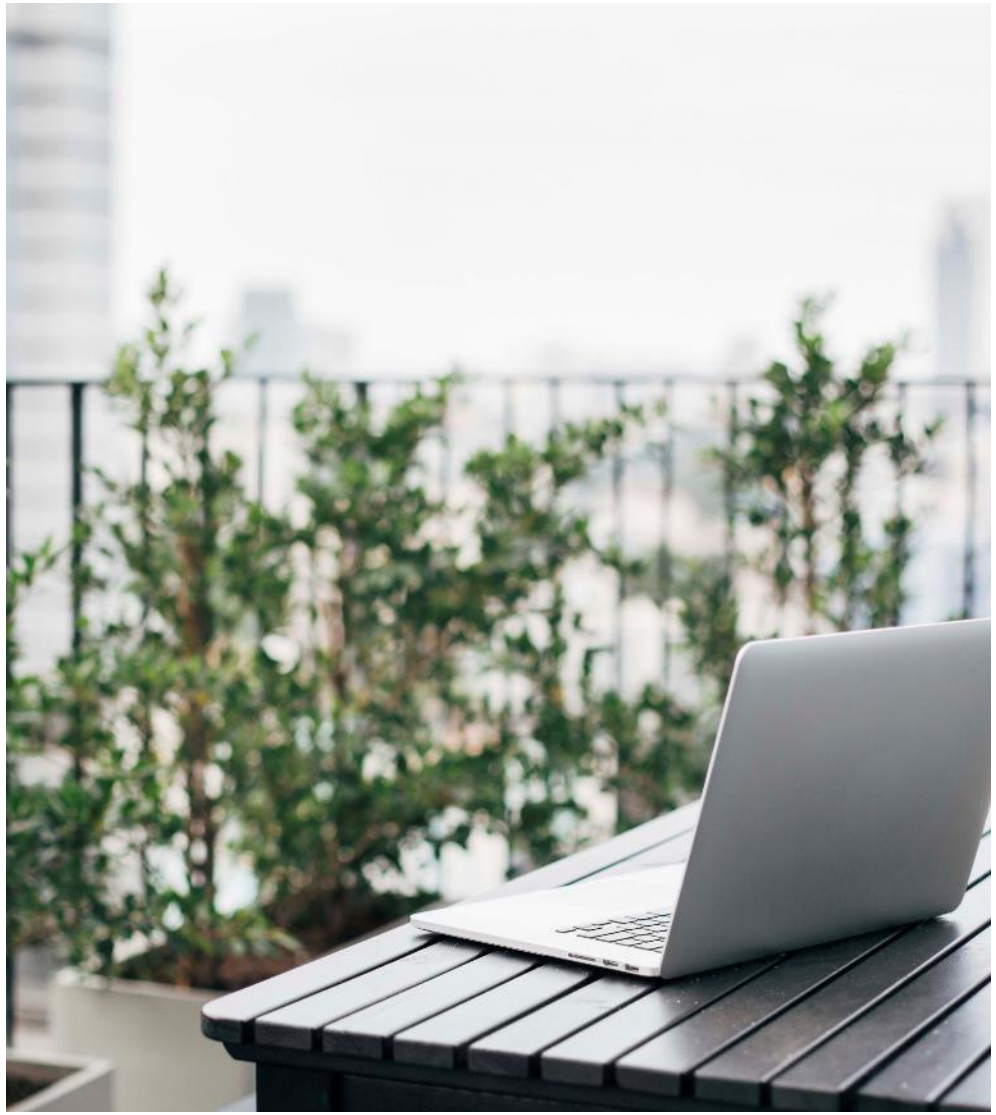


1 The Development of China's EV Industry

China's rapid EV development

Drivers of China's EV market

Policy

- China and Global Carbon Reduction Targets
- Car purchase subsidies and license relaxation
- Industrial support policies

Technology

- Battery Range
- Advanced Assisted Driving
- Battery As A Service (BAAS)

Infrastructure

- Construction of charging piles, battery exchange stations and hydrogen refueling stations

Supply Chain

- China's strong competitive edge in EV production and core automotive parts such as batteries

Note 1: Guided by the Ministry of Industry and Information Technology, the China Society of Automotive Engineers and China Automotive Technology and Research Center Co., Ltd. jointly researched and compiled in 2023

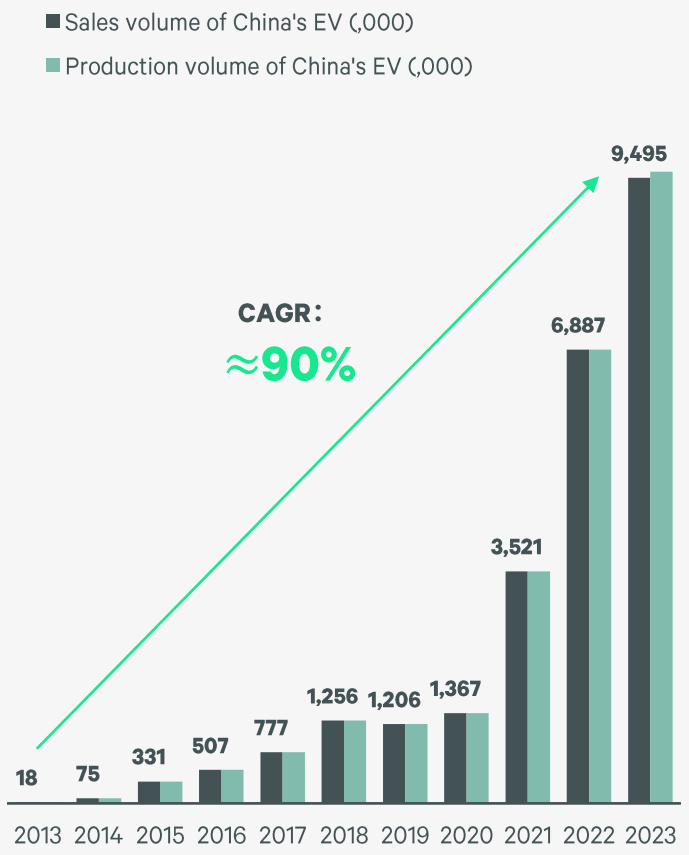
China Association of Automobile Manufacturers (CAAM) data show that China's EV production and sales reached 9.6 million and 9.5 million, respectively, in 2023, representing y-o-y growth of nearly 40%. The production and sales of petrol vehicles grew by just 3.1% y-o-y, which pushed the sales penetration rate (share of EV sales of total auto sales) of EVs to more than 35%.

The past decade has witnessed the rapid development of China's EV industry. Backed by supportive national industrial policies, China's EV industry has made remarkable progress in advancing its core supply chain, especially with regard to auto production, battery technology, and autonomous driving.

China's vehicles per 100 people was 24 in 2023, indicating considerable growth potential compared with the theoretical saturation value of 45 per 100 people as stated by the National Information Centre. With EVs accounting for just 6% of the total number of automobiles in China, CBRE believes that, considering incremental growth in auto sales and the replacement of petrol cars, EV have significant growth potential in China, supported by policies, technologies, infrastructure and supply chain advantages.

S&P Global Automotive forecasts that China's EV production will jump to 21.2 million in 2030. The 'Automotive Industry Green and Low-Carbon Development Roadmap 1.0' [1], jointly published in 2023 by the China Society of Automotive Engineers and China Automotive Technology and Research Center Co. under the supervision of China's Ministry of Industry and Information Technology forecasted the sales penetration rate of EVs in China at 45% and 60% in 2025 and 2030, respectively.

Figure 1: EV production and sales volume in China



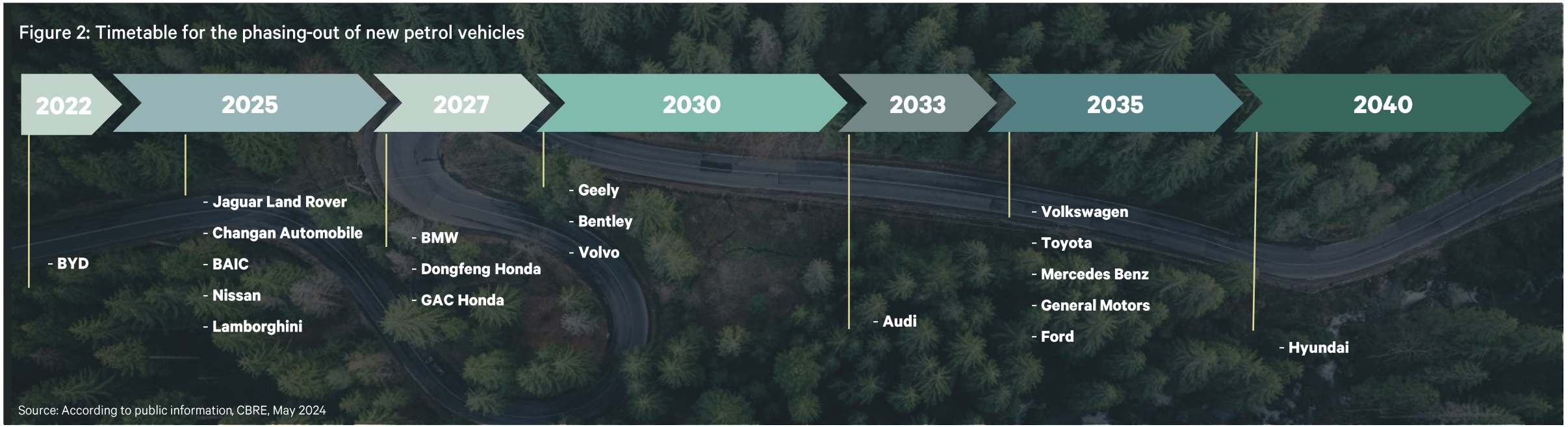
Source: China Association of Automobile Manufacturers (CAAM), CBRE, May 2024

The shift from fossil fuels to electricity

According to the International Energy Agency (IEA), transportation accounted for 25% of global carbon emissions in 2022. With the transportation sector a key focus of global carbon reductions, the development of EVs with low or even zero carbon emissions is increasingly important for the transformation of the automotive industry in major countries. In March 2023, the European Union formally adopted the 'Zero Emission Agreement for New Fuel Sold Cars and Small Vans in Europe in 2035', formally banning the sale of new fuel vehicles after 2035, although new vehicles using carbon-neutral synthetic fuels will still be able to continue to be sold after 2035. Elsewhere, the U.S. and the UK are aiming for EVs to account for 50% of total new automobile sales and zero-emission vehicles to account for 80% of new car sales in 2030, respectively.

Although some automotive companies have recently postponed plans to stop manufacturing fuel vehicles due to the slowdown in EV sales, the retreat of government incentives, and incomplete infrastructure, the shift to electricity in the automotive industry will continue.

Figure 2: Timetable for the phasing-out of new petrol vehicles



Source: According to public information, CBRE, May 2024

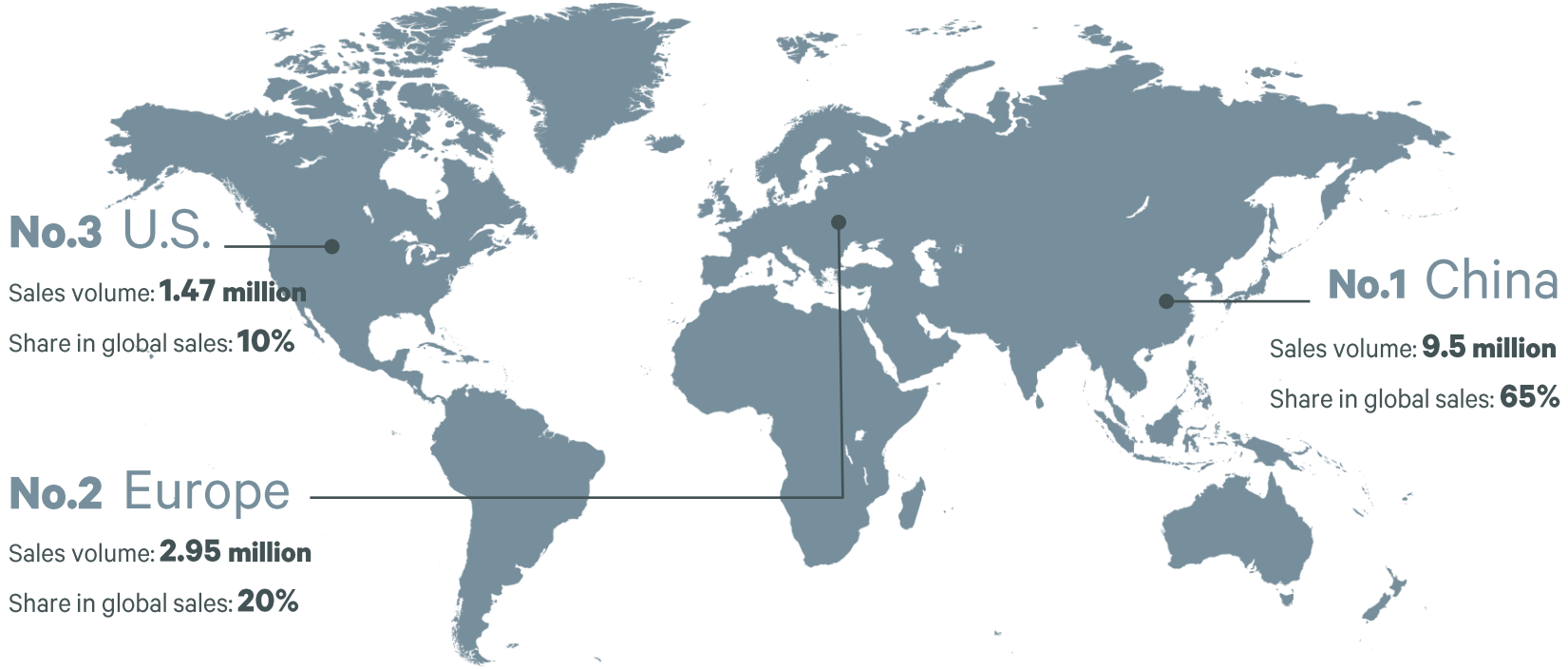
China is a leader in global automotive industry transformation

China is a leader in the transformation of the global automotive industry.

EVTank data show global sales volume of EVs reached 14.65 million in 2023, with China accounting for 65% of this figure.

2023 was a milestone for China's automotive industry, with the country exporting 4.91 million vehicles, surpassing Japan (4.42 million) for the first time to become the world's top automobile exporter. Of this total, 1.2 million were EVs, marking a significant increase of 78% y-o-y and cementing EVs status as a major driver of China's growth in auto exports.

Figure 3: EV sales volume and share of top three regions (2023)



Source: EVTANK, IEA, CBRE, May 2024

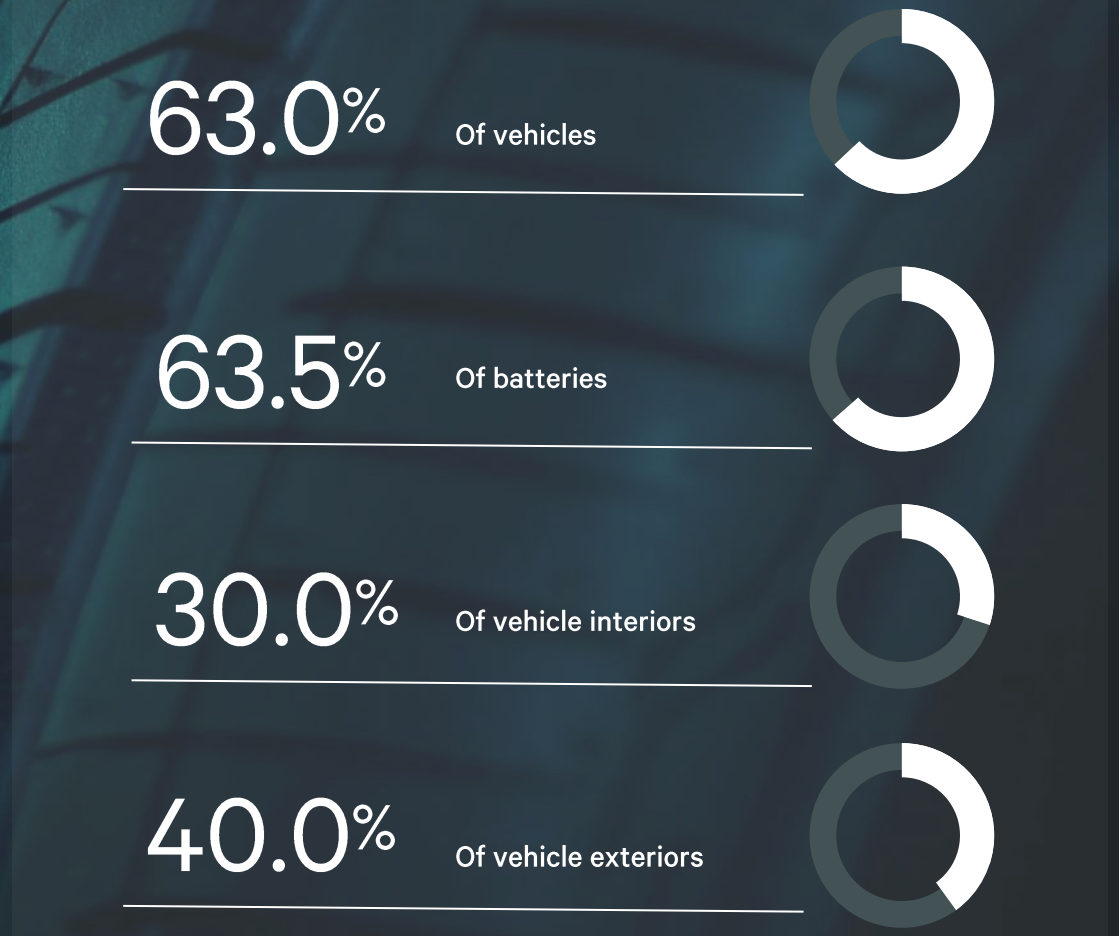
Competitive strength in the supply chain

China’s EV industry ranks first globally in terms of market share in the EV supply chain, with the country’s complete industry chain spurring domestic enterprises to continuously increase investment and attract foreign enterprises to carry out cooperation and collaboration.

The ‘three-electrical systems’, which are electric motors, batteries, and electronic control systems, are the core components of EVs, of which batteries account for about 30%-40% of the cost. According to South Korea's SNE Research, six Chinese companies (CATL, BYD, CALB, Gotion High tech, Sunwoda Electronic and EVE Energy) collectively accounted for 63.5% of the global EV battery market in 2023. China's battery exports have maintained a high growth rate, with the country’s lithium battery exports reaching a record high of nearly USD 65 billion in 2023, an increase of 28% y-o-y.

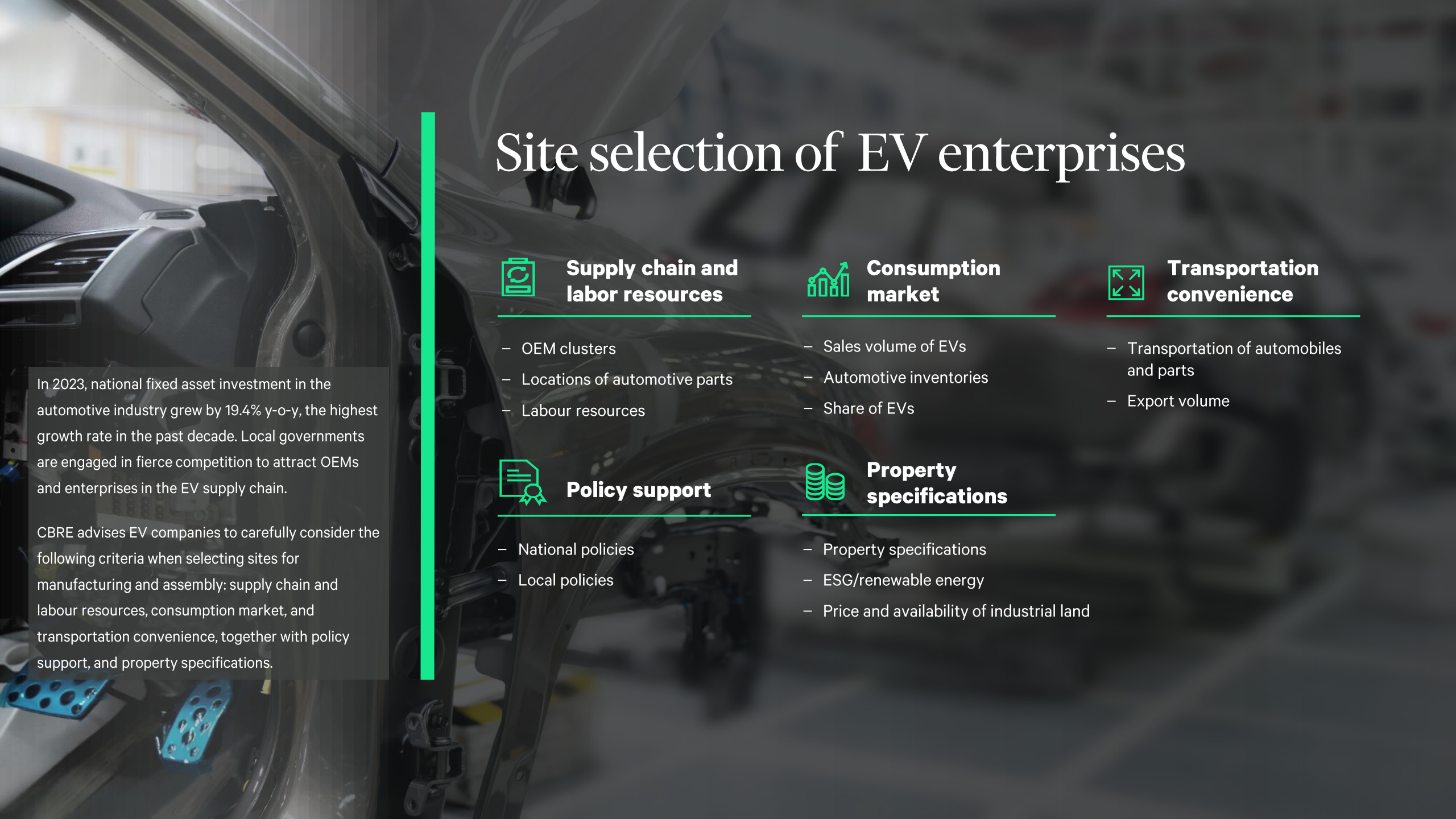
China's significant advantages in the EV supply chain are attracting foreign enterprises to expand their footprint in the country. Over 95% of Tesla’s auto parts for its Shanghai factory were sourced from Chinese enterprises. Volkswagen, Audi, BMW and other international automotive companies have also increased their investment in domestic EVs and stepped-up cooperation with Chinese EV supply chain enterprises in the last two years.

Figure 4: China’s share of the global EV supply chain (2023)



Source: SNE Research, CAAM, CBRE, May 2024

2 Manufacturing clusters and city selection of China's EV industry



Site selection of EV enterprises

In 2023, national fixed asset investment in the automotive industry grew by 19.4% y-o-y, the highest growth rate in the past decade. Local governments are engaged in fierce competition to attract OEMs and enterprises in the EV supply chain.

CBRE advises EV companies to carefully consider the following criteria when selecting sites for manufacturing and assembly: supply chain and labour resources, consumption market, and transportation convenience, together with policy support, and property specifications.

Supply chain and labor resources

- OEM clusters
- Locations of automotive parts
- Labour resources

Consumption market

- Sales volume of EVs
- Automotive inventories
- Share of EVs

Transportation convenience

- Transportation of automobiles and parts
- Export volume

Policy support

- National policies
- Local policies

Property specifications

- Property specifications
- ESG/renewable energy
- Price and availability of industrial land

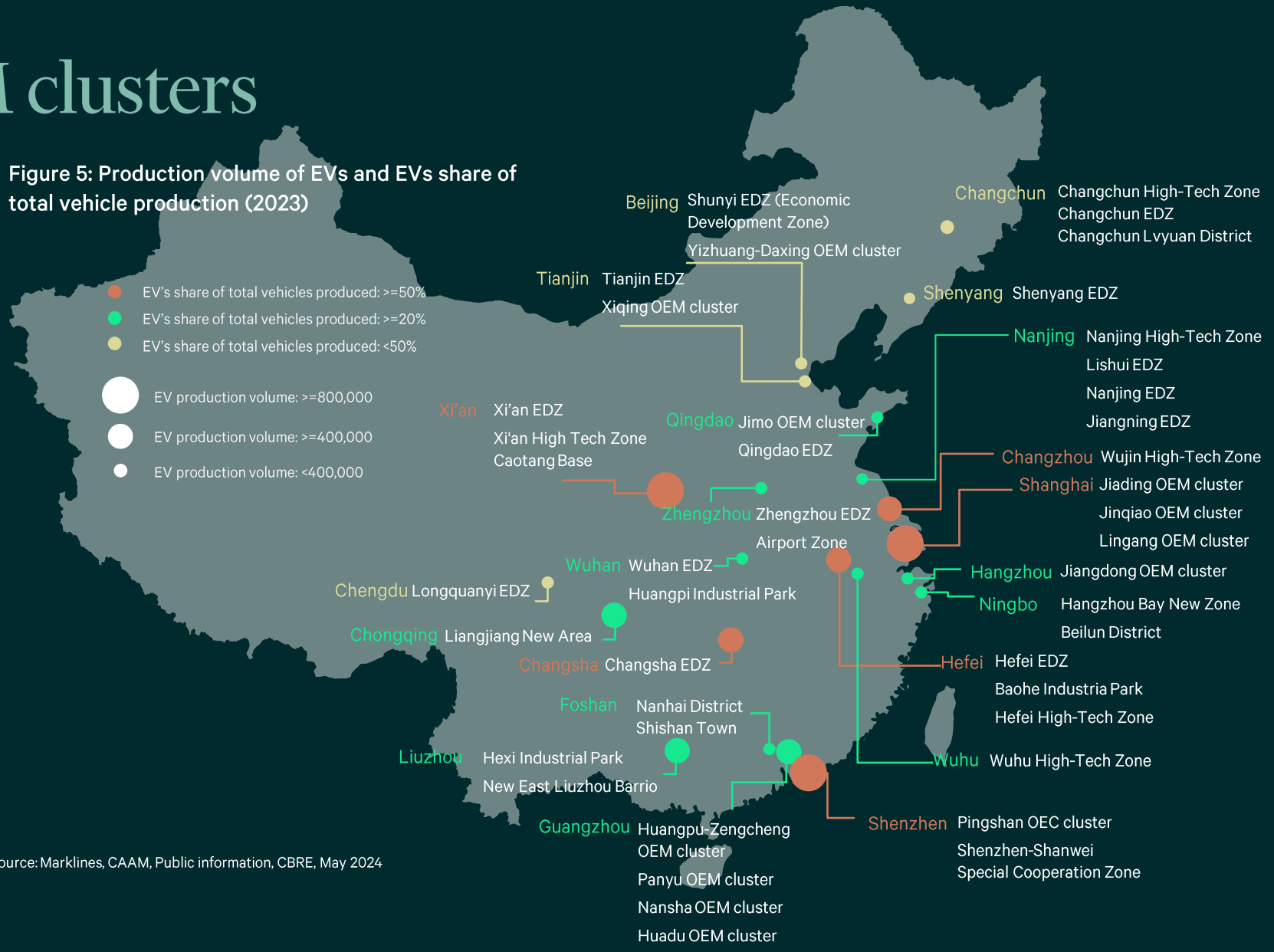
Supply chain | OEM clusters

Newcomers with strong competitiveness – While Xi'an, Shenzhen, Changzhou and Changsha are not traditional hotspots for vehicle manufacturing, they have positioned themselves at the forefront of the EV transformation wave by luring leading EV companies and building a strong presence in the supply chain.

Solid background in auto manufacturing - Cities such as Guangzhou, Shanghai, Changchun, Chongqing, and Liuzhou possess a strong vehicle manufacturing base. After surviving the initial transition from petrol vehicles to EVs, these cities have built comprehensive advantages in EV production through independent innovation or joint ventures and cooperation thanks to their advanced supply chain, labour force, consumer market and branding.

In the process of transformation – North and northeast China have a cold climate which can sap battery range, meaning that adoption of EVs is lower than that in the south. However, local governments in the north have prioritised the development of EVs by attracting more automotive companies to set up and expand production through policy incentives, improving local support, and promoting the consumption of EVs.

Figure 5: Production volume of EVs and EVs share of total vehicle production (2023)



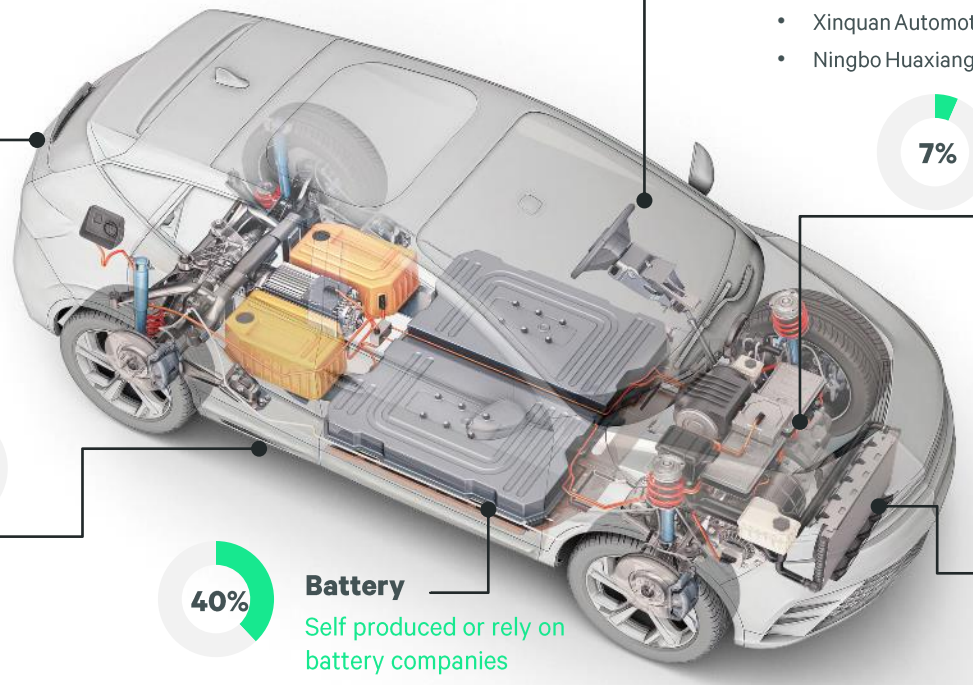
Source: Marklines, CAAM, Public information, CBRE, May 2024

Supply chain | auto components

While the average number of components in a petrol car is 30,000, this figure falls to 10,000 for EVs. The biggest difference between the two types is the power system, with an EV operating using a battery rather than a fuel engine. The application of new technologies such as intelligent chassis and integrated die-casting of car bodies has led to an evolution in the distribution and development of components. However, EVs continue to follow the clustering of traditional OEMs, in which supply chains were built around OEMs (see Figure 7 on page 13 for details).

> Shenyang is the largest production base for the BMW Group worldwide. The company has more than 430 suppliers in China, of which more than 120 are located in Liaoning and nearly 100 are rooted in Shenyang.

Figure 6: Share of EV components and top five suppliers



Interiors & Exteriors — 15%

Simplified interiors and exteriors

- Faurecia
- Antolin
- Yanfeng
- Xinquan Automotive
- Ningbo Huaxiang

Body — 7%

Cost down through integrated die casting

- Xusheng Group
- Wencan Group
- Guangdong Hongtu
- Tuopu Group

Electric motor & Electronic control — 7%

Self produced or cooperation

- BYD
- Tesla
- Nidec
- UAES
- HYCET

Car chassis — 10%

Intelligent chassis advances Intelligence car

- Tuopu Group
- Zhongding Group
- Baolong
- Nexteer
- Bethel

Battery — 40%

Self produced or rely on battery companies

- CATL
- BYD
- CALB
- EVE Energy
- Gotion High tech

Electronics — 18%

The usage greatly expanded

- BOE
- Bosch
- Denso
- Continental
- ZF Friedrichshafen (ZF)

Source: Gasgoo, CAAM, Public information, CBRE, May 2024

Supply chain | auto components

Being the core component of an EV and having the highest value, battery manufacturing is affected by the location of OEM along with environmental assessments and mineral resources distribution.

While East China is home to most EV supply chain companies, west China is developing quicky due to its rich lithium resources. Within this region, Sichuan accounts for over half of the country's lithium resources, attracting many battery companies. In 2022, Sichuan produced about one-sixth of the total number of batteries manufactured countrywide.

Figure 7: Locations of top EV suppliers

CATL C

- Ningde
- Xining
- Lianyang
- Yibin
- Zhaoqing
- Shanghai
- Xiamen
- Yichun
- Guiyang
- Jining
- Luoyang

FDB (BYD) FD

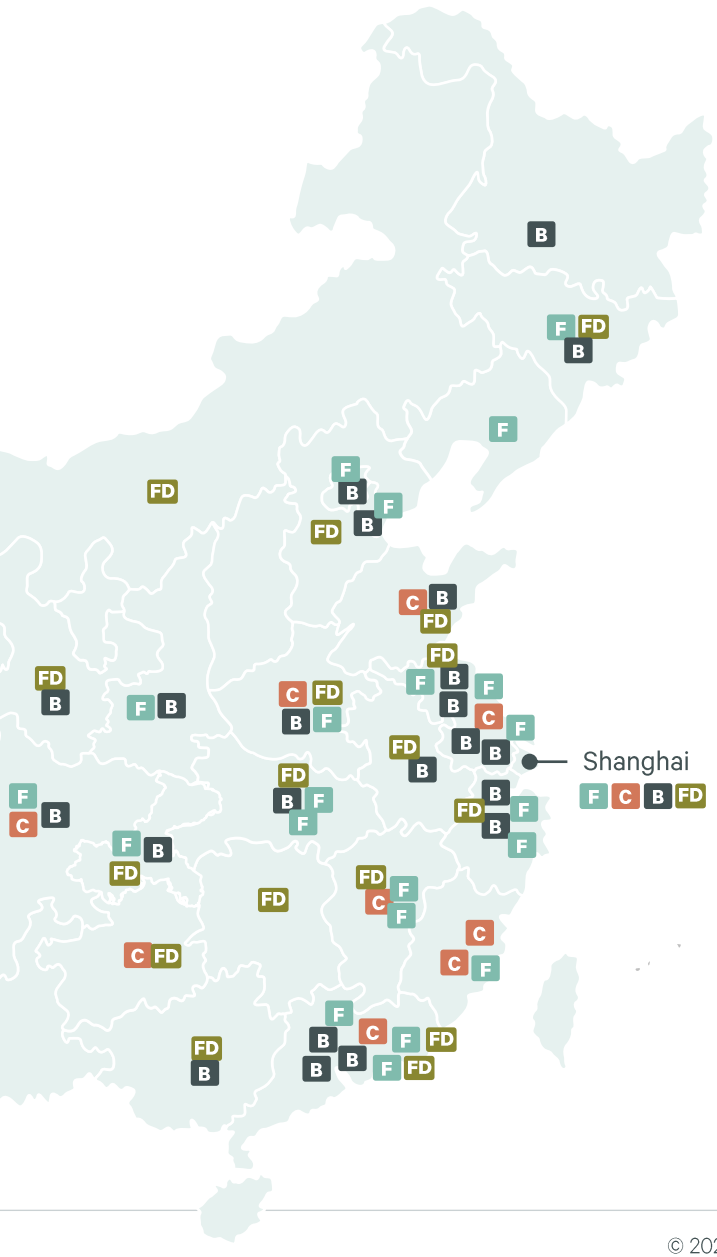
- Guangdong
- Shanghai
- Jilin
- Chongqing
- Zhejiang
- Jiangsu
- Shaanxi
- Jiangxi
- Anhui
- Shandong
- Hebei
- Hubei
- Hunan
- Henan
- Guizhou
- Guangxi
- Qinghai
- Guizhou
- Inner Mongolia

BOSCH B

- Shanghai
- Beijing
- Shenzhen
- Guangzhou
- Suzhou
- Dongguan
- Hangzhou
- Ningbo
- Wu'xi
- Tianjin
- Nanjing
- Xi'an
- Changchun
- Liuzhou
- Qingdao
- Chengdu
- Chongqing
- Wuhan
- Hefei
- Changzhou
- Changsha
- Zhengzhou
- Harbin

Faurecia F

- Shanghai
- Beijing
- Guangzhou
- Changchun
- Tianjin
- Chongqing
- Chengdu
- Wuhan
- Xiangyang
- Shenyang
- Hangzhou
- suzhou
- Xi'an
- Nanjing
- Wuxi
- Ningbo
- Foshan
- Dongguan
- Zhengzhou
- Xiamen
- Nanchang
- Yichun



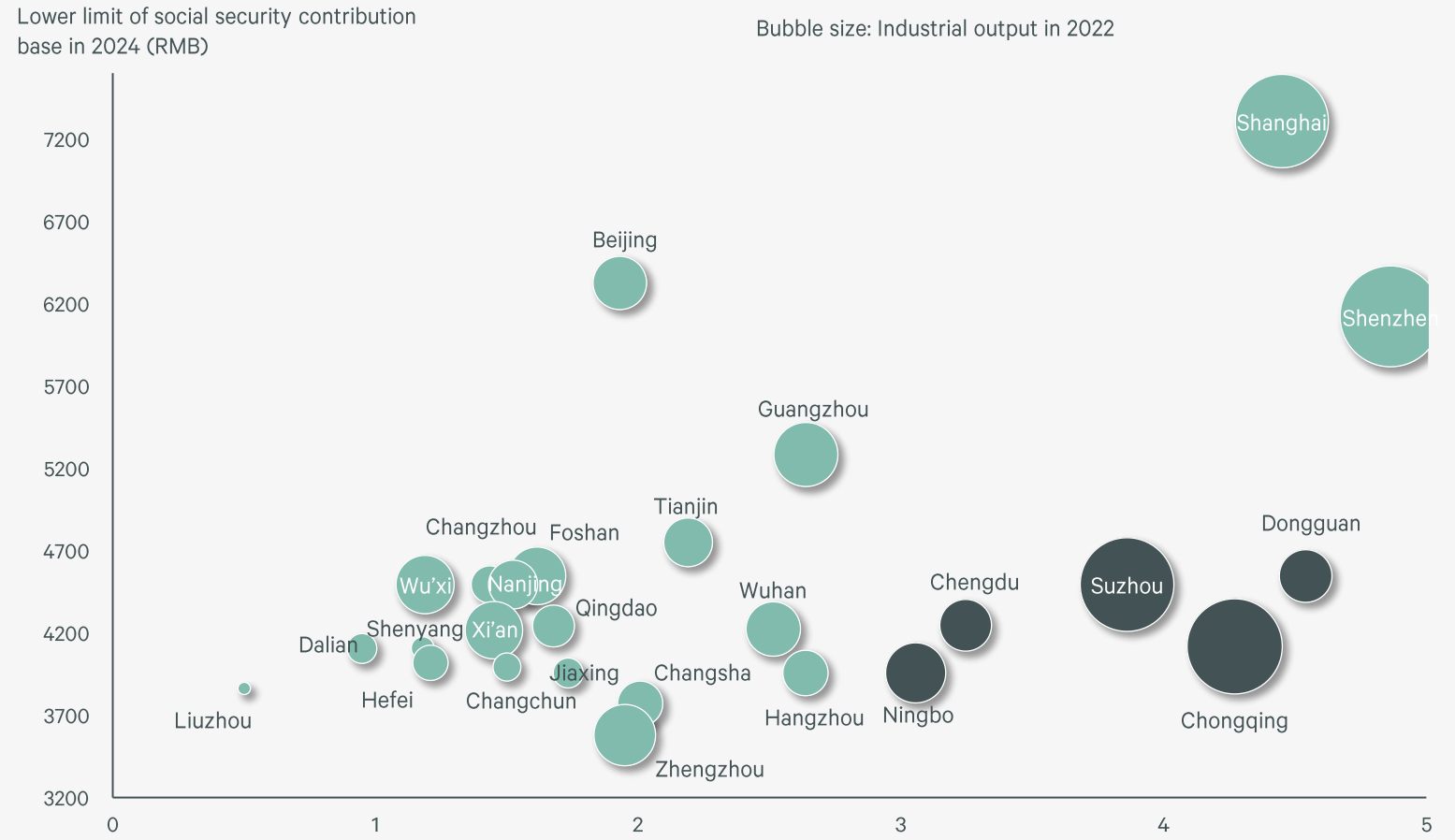
Source: Company websites, CBRE, May 2024

Labour resources

Using the number of people employed in the industrial sector as an observational indicator, the Yangtze River Delta, Pearl River Delta and Chengdu-Chongqing region lead the rest of the country. The five major manufacturing cities of Dongguan, Suzhou, Chongqing, Chengdu and Ningbo each have over 3 million people employed in the industrial sector and possess a strong competitive advantage in labour costs.

Cities such as Wuhan, Changsha and Zhengzhou in the central region, and Tianjin and Qingdao in north China also possess comparative advantages in labour resources and costs.

Figure 8: Labour resources by city



Note 2: Industrial includes: mining, manufacturing, electricity, heat, gas and water production and supply, and construction industries

Source: Statistics bureaus of local governments, public information, CBRE, May 2024

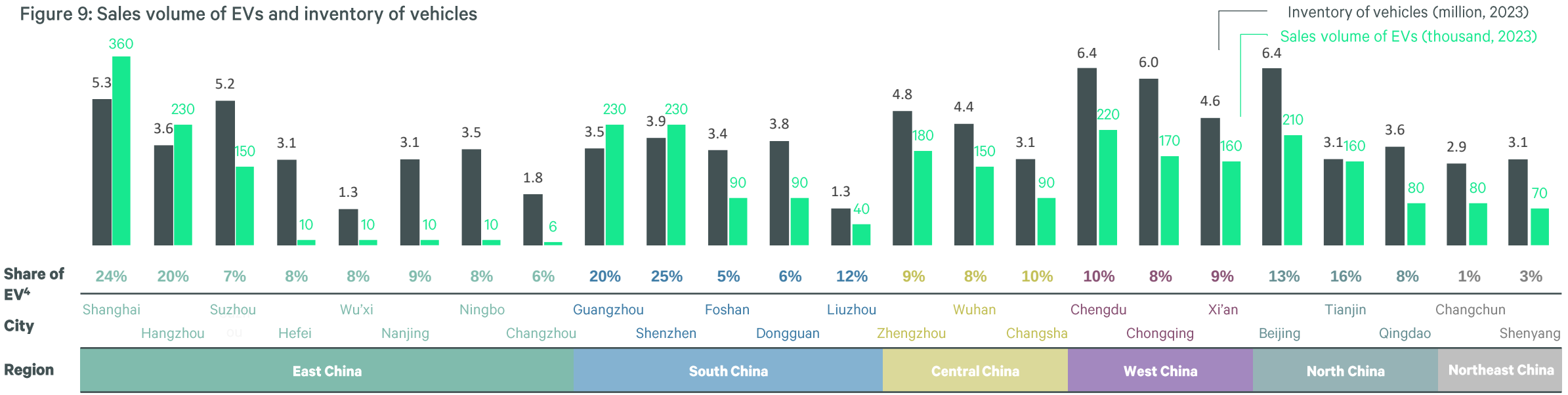
Consumption market

CBRE used EV sales, vehicle inventory and share of the EV inventory to analyse the size and potential of the sales market in each region[3]. Owing to the large number of middle- and high-income households, a well-developed sales and service network for EVs, an advanced network of charging piles and other charging facilities, and favourable climate, East China and South China are the country's biggest EV consumption markets. Shanghai, Hangzhou, Guangzhou, and Shenzhen reported the highest EV sales in 2023. The central and western regions are the second largest EV markets and offer significant growth potential. Beijing and Tianjin play an important role in North China, although overall sales volume in the northeast is still constrained by cold weather.

In April 2024, the Ministry of Commerce, the Ministry of Finance and seven other government departments jointly issued the 'Detailed Rules for the Implementation of Automobile Trade-in Subsidies', giving eligible individual consumers a subsidy of RMB 10,000 per EV, which is expected to further boost nationwide EV sales. Sales subsidies provided by local governments play a key role in promoting the development of the local EV market, while cities with OEMs typically have stronger policy support.

Note 3: When analysing future market potential, CBRE assumes that future EV sales growth will come from the replacement of existing petrol cars, regardless of the potential growth of vehicle sales and the upper limit for growth of EV sales being constrained by road resources and population density.

Figure 9: Sales volume of EVs and inventory of vehicles



Note 4: share of EV = inventory of EVs / inventory of total vehicles

Source: Ministry of Public Security, public information, CBRE, May 2024

Transportation Convenience

The automotive supply chain is extensive and comprises tens of thousands of parts and components, requiring specialised logistics companies for distribution. The location of automotive logistics companies is closely tied to automotive manufacturing clusters and further strengthens supply chain efficiency and transport convenience in these regions. As new EV manufacturers do not have their own logistics and transport network like OEMs, who develop their own logistics networks, the service capability of third-party logistics companies plays a key role in site selection.

CBRE analysed the locations of four large automotive logistics enterprises and found that all of them have set up branches in the Yangtze River Delta, the Pearl River Delta, the Chengdu-Chongqing urban agglomeration, the central transport hub and the automobile town of Wuhan. In addition, there are two to three automotive logistics enterprises in large automotive manufacturing cities, such as Beijing-Tianjin-Hebei, Liuzhou, Changchun, Shenyang, and Zhengzhou.

Figure 10: Locations of major automotive logistics players

Source: Annual book, QCC.com, CBRE, May 2024

Transportation Convenience

China exported 1.2 million EVs in 2023, an increase of 77.6% y-o-y, well above the growth rate for traditional petrol vehicles. EVs accounted for 24.5% of total vehicle exports last year. For OEMs with export businesses, seaports and land ports remain important considerations for site selection. BYD's factory in Shenzhen-Shanwei Special Cooperation Zone is just five minutes' drive to Xiaomo Port, where customs clearance takes only one day. The company's factory in Xi'an can reach Central Asia and Europe through the China-European Union line train.

Most vehicles are exported by sea. Eight of China's top ten ports that exported vehicles in 2023 are seaports, with a combined export volume of 3.16 million units, accounting for 64% of national export volume. Shanghai port is a major leader in vehicle exports, with SAIC, Chery and Tesla ranking the top three exporters in 2023 with 1.21 million, 937,000 and 2.34 million vehicles respectively, most of which were exported from Shanghai seaport.

For inland cities, railway networks are crucial for vehicle exports. Although railway capacity is lower than ocean freight, transporting to Central Asia and Europe via the China-European line train can save nearly two-thirds of the time. The China-Europe Union line trains run from Chongqing, Xi'an, Wuhan and other central and western cities, via Horgos, Alashankou and Erenhot.

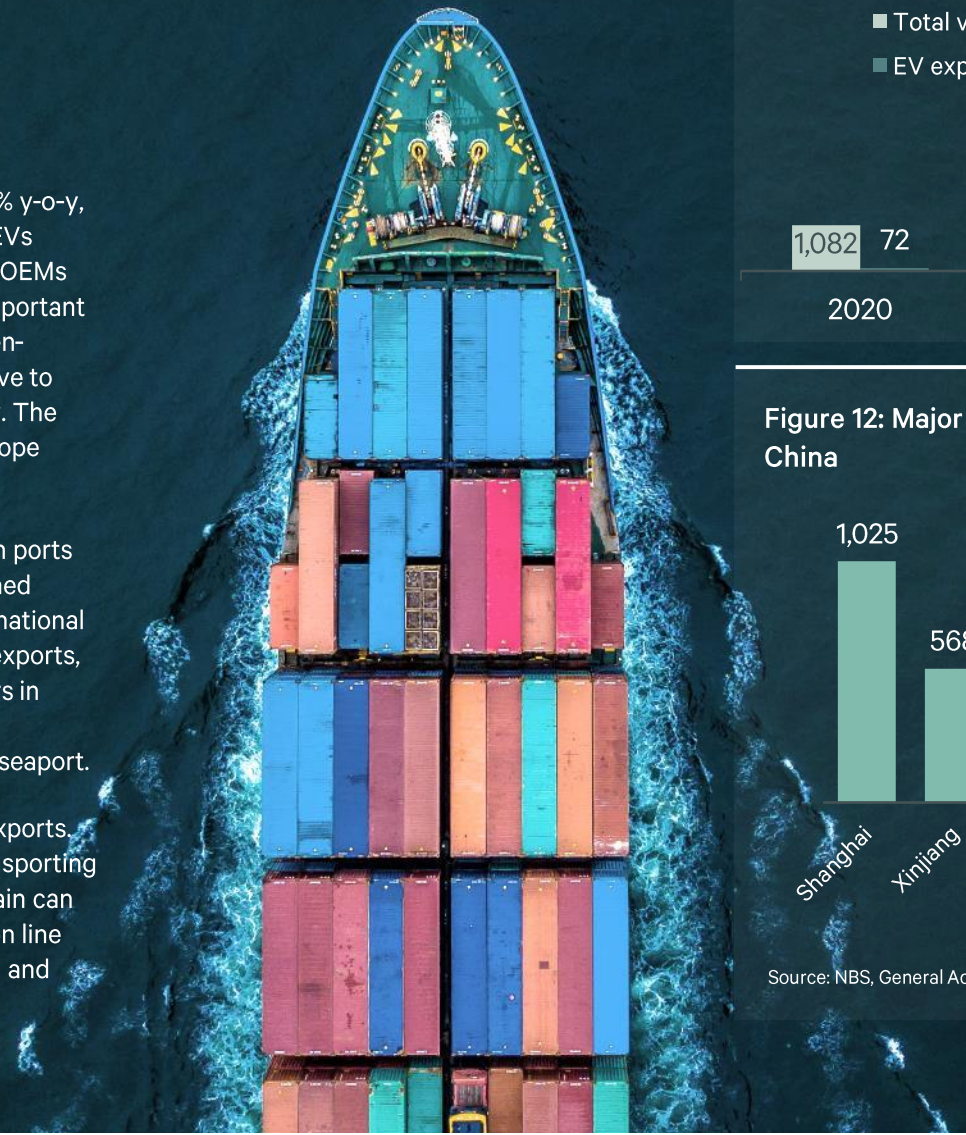


Figure 11: China vehicle export volumes (,000)

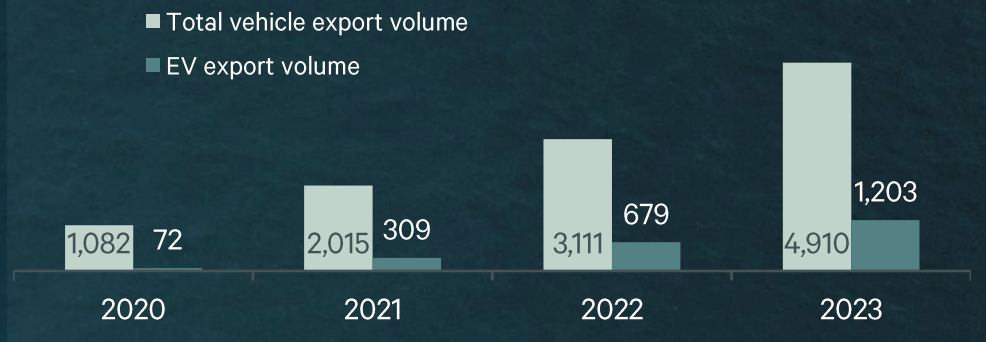
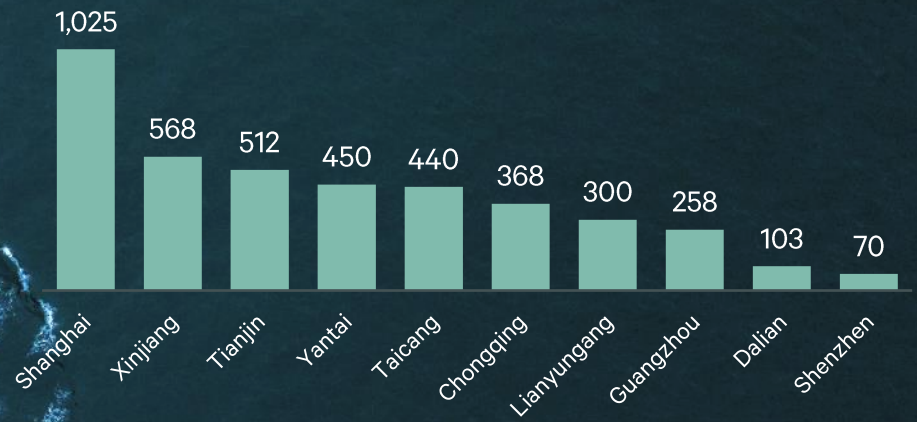


Figure 12: Major ports (seaport and land port) that export vehicles from China



Source: NBS, General Administration of Customs, CAAM, CBRE, May 2024

City selection for EV enterprises

A comprehensive assessment

Source: CBRE, May 2024

City	Total score	Supply Chain	Consumption market	Transportation Convenience
Shanghai	★★★★★	★★★★★	★★★★★	★★★★★
Guangzhou	★★★★½	★★★★★	★★★★☆	★★★★½
Shenzhen	★★★★½	★★★★½	★★★★½	★★★★½
Beijing	★★★★½	★★★★½	★★★★★	★★★★☆
Chongqing	★★★★½	★★★★½	★★★★½	★★★★☆
Wuhan	★★★★☆	★★★★½	★★★★☆	★★★★☆
Xi'an	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Chengdu	★★★★☆	★★★½☆	★★★★★	★★★★☆
Changzhou	★★★½☆	★★★★☆	★★½☆☆	★★★½☆
Hefei	★★★½☆	★★★★☆	★★★½☆	★★★½☆
Liuzhou	★★★½☆	★★★★½	★★½☆☆	★★★☆☆
Changchun	★★★½☆	★★★★½	★★★☆☆	★★★☆☆
Hangzhou	★★★½☆	★★★☆☆	★★★★☆	★★★★☆
Shenyang	★★★½☆	★★★★☆	★★★☆☆	★★★☆☆
Suzhou	★★★½☆	★★★☆☆	★★★★☆	★★★★½
Ningbo	★★★½☆	★★★½☆	★★★½☆	★★★★½
Tianjin	★★★½☆	★★★½☆	★★★½☆	★★★★☆
Qingdao	★★★½☆	★★★½☆	★★★½☆	★★★½☆
Zhengzhou	★★★☆☆	★★★☆☆	★★★★☆	★★★☆☆
Changsha	★★★☆☆	★★★☆☆	★★★½☆	★★★☆☆
Nanjing	★★★☆☆	★★½☆☆	★★★½☆	★★★☆☆
Foshan	★★★☆☆	★★½☆☆	★★★½☆	★★★☆☆
Dongguan	★★★☆☆	★★½☆☆	★★★½☆	★★★☆☆
Wu'xi	★★★☆☆	★★½☆☆	★★½☆☆	★★★☆☆

National Policy

Subsidies for enterprises

- The recognition of high-tech enterprises can enjoy a preferential enterprise income tax rate of 15%;
- 100% R&D expense pre-tax super deduction;
- Exemption of consumption tax on lithium batteries;
- Value-added tax credit refund;
- Automobile export tax refund.

Subsidies for consumers

- Vehicle purchase tax reduction (10% of the vehicle price);
- Subsidy for trading in an old car for a new EV.

Local Policy

- Income tax, VAT concessions and tax rebates;
- Loan subsidies/support;
- Fixed asset investment subsidies;
- R&D and technology subsidies;
- Industrial fund subsidies;
- Cash incentives;
- Construction of amenities such as transportation, hospitals, schools and housing in automotive industrial parks;
- Assisting enterprises in organising staff recruitment, rapid acquisition of relevant qualifications, connecting with financial enterprises and supply chain enterprises and introducing related resources.

Policy support

With EVs now one of China's strategic industries, the sector enjoy a multitude of supportive policies at the national level, such as income tax incentives for high-tech enterprises, 100% R&D expense pre-tax super deduction, VAT tax rebates, and tax refunds for automotive exports.

Local governments, high-tech zones and economic development zones provide qualified key enterprises with full support according to their respective industrial development plans, including tax exemptions and rebates, fixed asset investment subsidies, technology subsidies, bank loans, and fast project approval.

Policy benefits enjoyed by a multinational automaker

Pre-construction

Syndicated loans and cash grants

- - A syndicated loan from four banks was secured in 2019, including an unsecured revolving low-interest loan of RMB 2.25 billion and a secured loan of RMB 9 billion;
- - The government also provided a fixed asset investment subsidy of RMB 600 million

Construction

Rapid construction with special approval

The entire process of building a production plant was completed within one year, including acquiring land, building a factory, obtaining car-making qualifications, and commencing production.

Production

Loans and investment incentives

RMB 4 billion loans for production in 2020;

RMB 123 million fixed asset investment incentive

Vehicles for sale

Beneficiary purchase tax and income tax

- Purchase tax exemption for EVs;
- 15% of preferential income tax;
- Fixed asset investment incentives (2021-2022);
- Subsidy for the promotion and application of EVs

Source: Annual book, According to public information, CBRE, May 2024

At least 10 OEM projects were delivered within two years

Figure 13: New OEM projects 2022-2024

	Announcement time	City	Investment amount (RMB, billion)	Project name	Estimated time of commissioning
BMW	2024	Shenyang	20	BMW Brilliance Dadong Plant (large-scale upgrade and technology innovation)	Undisclosed
Volkswagen	2024	Hefei	EUR 2.5	EV production plant and R&D centre	2026
Audi FAW	2023	Changchun	44.4	EV value chain pant	2025
BYD	2022	Shenzhen-Shanwei Special Cooperation Zone	20	Shenzhen-Shanwei production plant (phase two)	2025
GAC Honda	2022	Guangzhou	3.5	EV production plant	2024
Seres	2022	Chongqing	1.5	Upgrade of EV production plant	2024
NIO	2022	Hefei	Undisclosed	Key components for EV production plant (phase tow)	2024
Xiaomi Auto	2022	Beijing	63	EV production plant	2024
Audi FAW	2022	Changchun	35.8	EV production plant	2024
Dongfeng Honda	2022	Wuhan	10	EV production plant	2024

Source: According to public information, CBRE, May 2024

3 Property Specifications for Site Selection

EV Property specifications

	OEM	EV components	R&D
Storey	Single storey, six workshops, including assembly, stamping, welding, painting, battery assembly and body parts.	Single / double storey	Single storey for testing area; Muti-storey for office area
Height (metres)	>= 7	First floor: >=6; Second floor: 4.5-6	First floor: Testing area: >= 9; Office: >=6; Second floor and above: 4.5-6
Area (sq. m.)	>100,000	5,000-50,000	2,000-30,000
Load bearing (per sq. m.)	>= 5 tonnes	3-5 tonnes	First floor (including testing area): 1-3 tonnes; Second floor and above: 300-500 KG
Power density (W/ sq. m.)	Case by case, requires high instantaneous power supply, the government should provide substation support	>= 100	80-120, additional double power supply need
Location	Mostly located in EDZ and high-tech zones, with a complete supply chain	Close to OEMs	A cluster for high-end and skilled talent, close to public transportation
Lease/self-built	Self-built	Lease / self-built	Lease / self-built
Other requirements	• Cranes and heavy equipment (integrated die-casting and stamping machines, etc.), require high floor loading; • Includes staff dormitory, warehouse and parking area; • Loading bays; • Exhaust gas and wastewater treatment required;	• Heavy equipment (e.g. plastic injection moulding machines); with overhead crane (floor height 12-15m) • Wide column spacing (24m*24m); • Comply with FM insurance requirements; • Larger EV component plants need to be close to OEMs (within 5 km); • Requires exhaust ventilation and exhaust gas treatment	• Some companies require large outdoor space and car parks for field tests; • Some companies need outdoor test drive areas; • Truck loading bays with wide entry doors; • Noise reduction equipment, the noise generated by the testing; equipment needs to be professionally handled; • Backup power to ensure 24-hour operation

Source: CBRE, May 2024

EV Property specifications

	Logistics	Delivery Center
Storey	Single storey is preferred	Single / double storey, single storey is preferred
Height (meter)	First floor: >= 9	4.5-10
Area (sq. m.)	>2,000	2,000-50,000
Load bearing (per sq. m.)	First floor: 3 tonnes	First floor: 1-3 tonnes; Second floor and above: 300-500 KG
Power density (W/ sq. m.)	<= 50	Adaptation to the number of charging piles (fast and slow charging) is required, and the capacitance is usually above 600 kva
Location	• Within 5 km from highway entrance; • Located in or near an automotive industrial park	• Close to downtown or locate in industrial park; • Within 5 km away from vehicles management office (VMO) and highway entrance; • Locate in EV cluster
Lease/self-built	Mostly lease	Lease / self-built, mostly lease
Other requirements	• Components need to be managed according to their functions and specifications; • Warehouse for components is within 5 km from OEM; • Comply with FM insurance requirements; • Adjustable lifting platform	• Renovated from a warehouse or a factory; • Divided into front area (reception centre) and back area (vehicle operation area); • Charging piles are required; need outdoor space for test drive; • 100 parking spaces or more; • if there are no large parking spaces, a warehouse is needed for parking vehicles

Source: CBRE, May 2024

OEM cluster and supply chain

Clustering promotes collaboration between OEMs and supply chain enterprises, and reduces search costs, negotiation costs and logistics costs. This strategy can also quickly create an internal division of labour and improve the efficiency and standardisation of manufacturing, supply chain and logistics services.

Figure 14: OEMs and surrounding supply chain enterprises

Source: According to public information, CBRE, May 2024

Automotive enterprises announce carbon-neutral plans; zero-carbon parks are the future

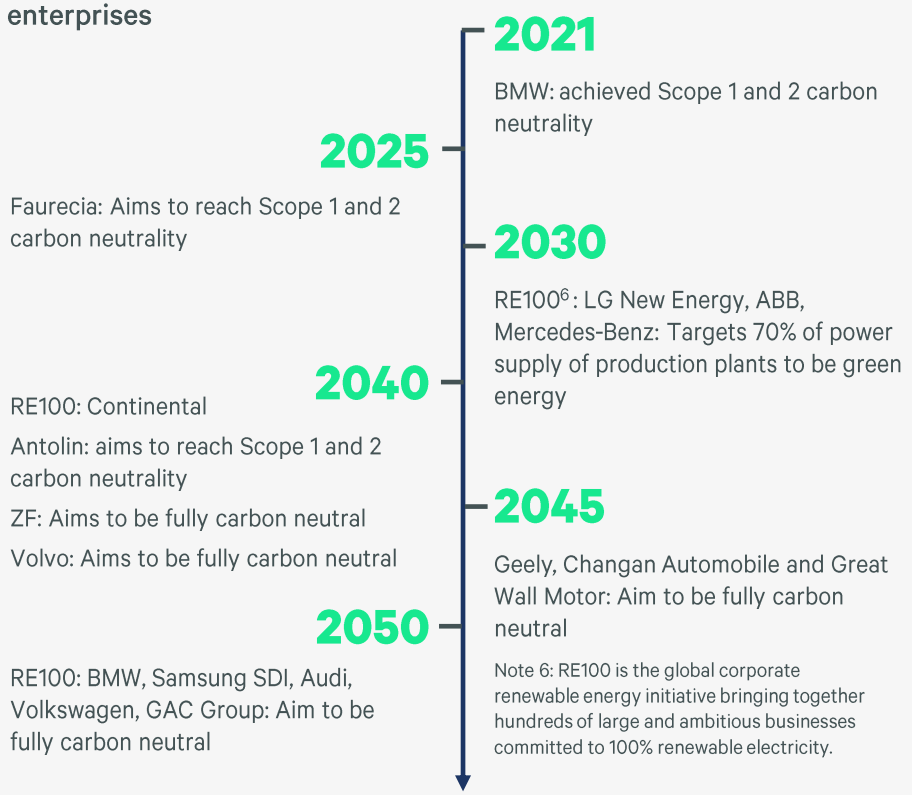
EVs can effectively reduce carbon emissions throughout the life cycle of a vehicle, especially during the usage phase. However, due to the extraction and refining of raw materials such as lithium and cobalt during battery production and an energy-intensive manufacturing process, EVs have higher carbon emissions during the production phase than petrol vehicles. A recent McKinsey study[5] found that the carbon emissions of EVs during the production phase can be up to twice that of petrol vehicles.

With EV sales continuing to grow, the manufacturing phase is a focus for automotive companies seeking to reduce carbon emissions. Investment in and use of clean energy such as photovoltaics at production plants, and energy-saving modifications to production equipment and processes are important initiatives for car companies to achieve Scope 1 and Scope 2 carbon neutrality. In addition, automakers can promote Scope 3 carbon reduction in the supply chain by selecting green suppliers and logistics systems, using renewable and environmentally friendly materials, and enhancing the recycling and reuse of waste materials. For EV OEMs, curtailing carbon emissions from battery production, transport, and recycling processes will be key to reducing emissions.

Domestic and foreign automotive enterprises have announced plans to reach carbon reduction targets, committing to achieve at least Scope 1 and Scope 2 carbon neutrality between 2020 and 2050. Some leading companies have built or are in the process of building green or zero-carbon production plants. These include Geely, which has nine plants rated as national 'green factories', with an installed photovoltaic capacity of 307 megawatts (MW). Around 36% of the company's production plants use renewable electricity, while annual energy consumption per vehicle and carbon emissions of production plants were reduced by 12.1% and 24.8% respectively compared with 2020.

Note 5: Product sustainability: Back to the drawing board, McKinsey, 2022

Figure 15: Carbon-neutral plans of domestic and foreign automotive enterprises



Source: RE100, According to public information, CBRE, May 2024

EV enterprise site selection case study

China base for interior production

A foreign-funded automotive component company's China base for interior production

City Selection

Shanghai is its largest production base for domestic EV interior parts. The company expects to invest RMB 800 million, with the factory's annual output planned to reach RMB 1.1 billion after formal commissioning.

Location and Supply Chain

- Located in the Lin-gang auto cluster, within 5 km of Tesla's Shanghai Gigafactory
- Minhang Development Zone Lingang Park takes the EV supply chain as its key fostering industry and has already attracted a number of domestic and international leading enterprises, including Faurecia, Lear Auto, Ningbo Huaxiang and Yanfeng Automobile.

Property Specification

Area: 20,000 sq. m.

Specifications:

- Storey: Single storey
- Height: 12 meters high
- Load bearing: 5 tonne

Other requirements:

- Overhead crane needed
- Meets FM insurance requirements
- High standard of sprinklers required
- Rooftop PV may be required in the future

EV delivery center site selection case study

Delivery centre

A domestic EV company's delivery centres in multiple cities

City Selection

13 cities across the country

Location and Supply Chain

- Suburban areas of a city
- Convenient transportation

Property Specification

Type of property: industrial property

Specifications:

- Storey: Single/multi storey, normally only use first floor
- Height: 4.5-7
- Load bearing: 1 tonne

Area: 2,000-10,000 sq. m.

Other requirements:

- 100 parking spaces or more
- Extra power supply

4 Conclusions and Recommendations

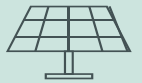
Recommendations for EV site selection

City Selection

- While China leads global EV consumption, EVs account for just 6% of its vehicle inventory, offering significant growth potential.
- When performing site selection, automotive enterprises are advised to carefully investigate the EV supply chain, labour resources, transportation convenience and sales market of candidate cities, either on their own or by commissioning a professional advisor.
- Automotive companies must understand the policies of local governments and industrial parks for EV enterprises, and compare the financial, tax and investment incentives available.

Real Estate Strategy

- When leasing a property, automotive companies should ensure that the property's load bearing, floor height, power supply and other indicators can meet the needs of the enterprise's production, R&D and testing, warehousing and logistics.
- Supply chain clustering is important for the real estate location of automobile enterprises, and enterprises with imports and export should consider the proximity of ports or land ports.
- For large-scale production bases or R&D and testing centres deploying core manufacturing and technology capabilities, enterprises should focus on customised leasing and self-build.



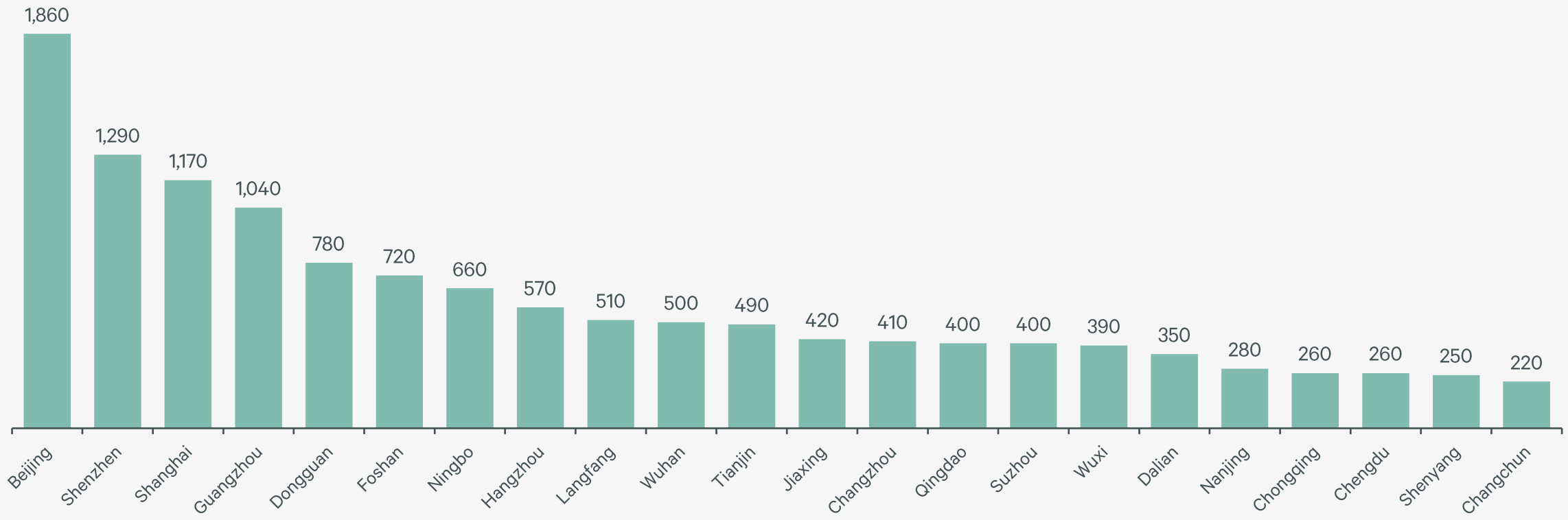
ESG

- Automotive companies must negotiate with and obtain necessary support from local governments, power grid and property owners on matters such as investment and installation of distributed photovoltaics, charging piles and other equipment, and the consumption, purchase, and supply of clean power.
- A full understanding of national and local government subsidies on green buildings, clean energy and technical energy-saving renovation, and active cooperation with various financial institutions on green financing, is key.

5 Appendix

Appendix: industrial land price (firsthand)

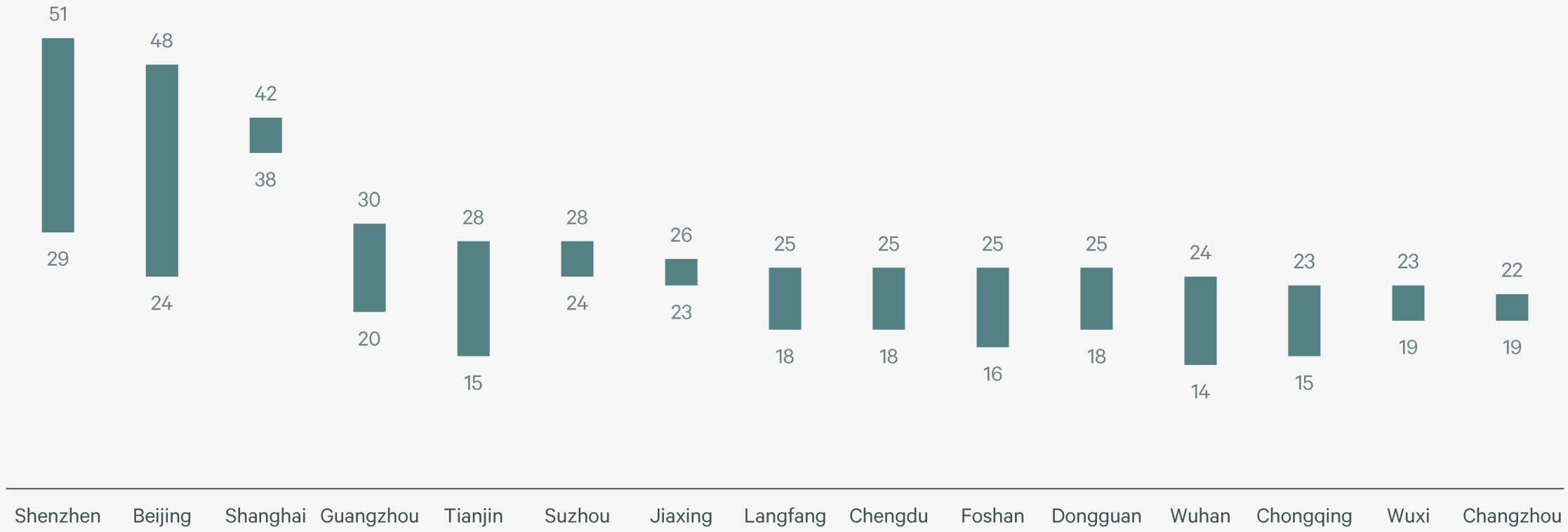
Figure 16: industrial land prices in major cities in 2023 (Thousand RMB per mu)



Source: CIH (China Index Holdings), CBRE, May 2024

Appendix: workshop rents

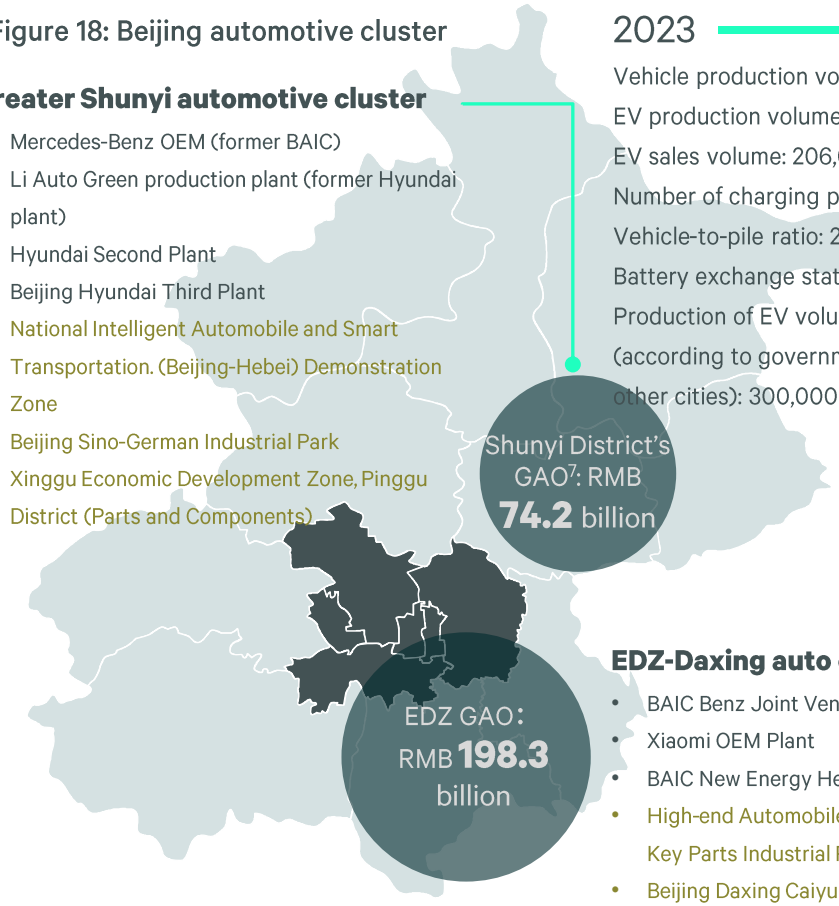
Figure 17: Workshop rents in major cities in 2023 (RMB per month)



Source: CBRE, May 2024

Beijing automotive cluster

Figure 18: Beijing automotive cluster



Greater Shunyi automotive cluster

- Mercedes-Benz OEM (former BAIC)
- Li Auto Green production plant (former Hyundai plant)
- Hyundai Second Plant
- Beijing Hyundai Third Plant
- National Intelligent Automobile and Smart Transportation. (Beijing-Hebei) Demonstration Zone
- Beijing Sino-German Industrial Park
- Xinggu Economic Development Zone, Pinggu District (Parts and Components)

EDZ-Daxing auto cluster

- BAIC Benz Joint Venture Plant
- Xiaomi OEM Plant
- BAIC New Energy Headquarters and Factory
- High-end Automobile and New Energy Vehicle Key Parts Industrial Park
- Beijing Daxing Caiyu Auto Parts Industrial Complex
- National Intelligent Vehicle Innovation Park

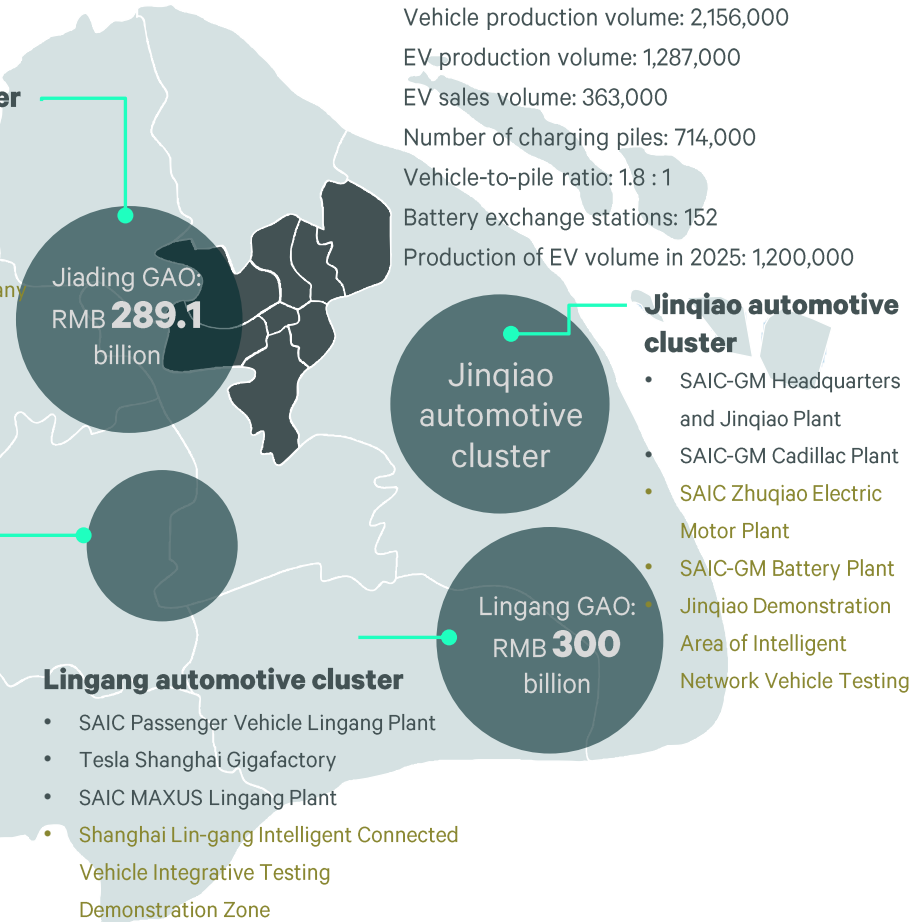
2023

Vehicle production volume: 1,003,000
EV production volume: 50,000
EV sales volume: 206,000
Number of charging piles: 300,000
Vehicle-to-pile ratio: 2.7 : 1
Battery exchange stations: 296
Production of EV volume in 2025 (according to government plan, same for other cities): 300,000

Note 7: GAO means Gross Automobile output
Source: Marklines, Statistical Book of local governments, CBRE, May 2024

Shanghai automotive cluster

Figure 19: Shanghai automotive cluster



Jiading automotive cluster

- SAIC-Volkswagen headquarters and plants
- SAIC-Volkswagen new energy plant
- SAIC new energy battery company
- SAIC fuel battery company
- R&D Centres of several OEMs (Volkswagen, Volvo, Toyota, Li Auto, Jidu Auto and IM Motors)

Minhang-Songjiang automotive cluster

- Sunwin Bus plant
- Wanxiang Auto
- Sunlong Bus

Lingang automotive cluster

- SAIC Passenger Vehicle Lingang Plant
- Tesla Shanghai Gigafactory
- SAIC MAXUS Lingang Plant
- Shanghai Lin-gang Intelligent Connected Vehicle Integrative Testing Demonstration Zone

Jinqiao automotive cluster

- SAIC-GM Headquarters and Jinqiao Plant
- SAIC-GM Cadillac Plant
- SAIC Zhuqiao Electric Motor Plant
- SAIC-GM Battery Plant
- Jinqiao Demonstration Area of Intelligent Network Vehicle Testing

2023

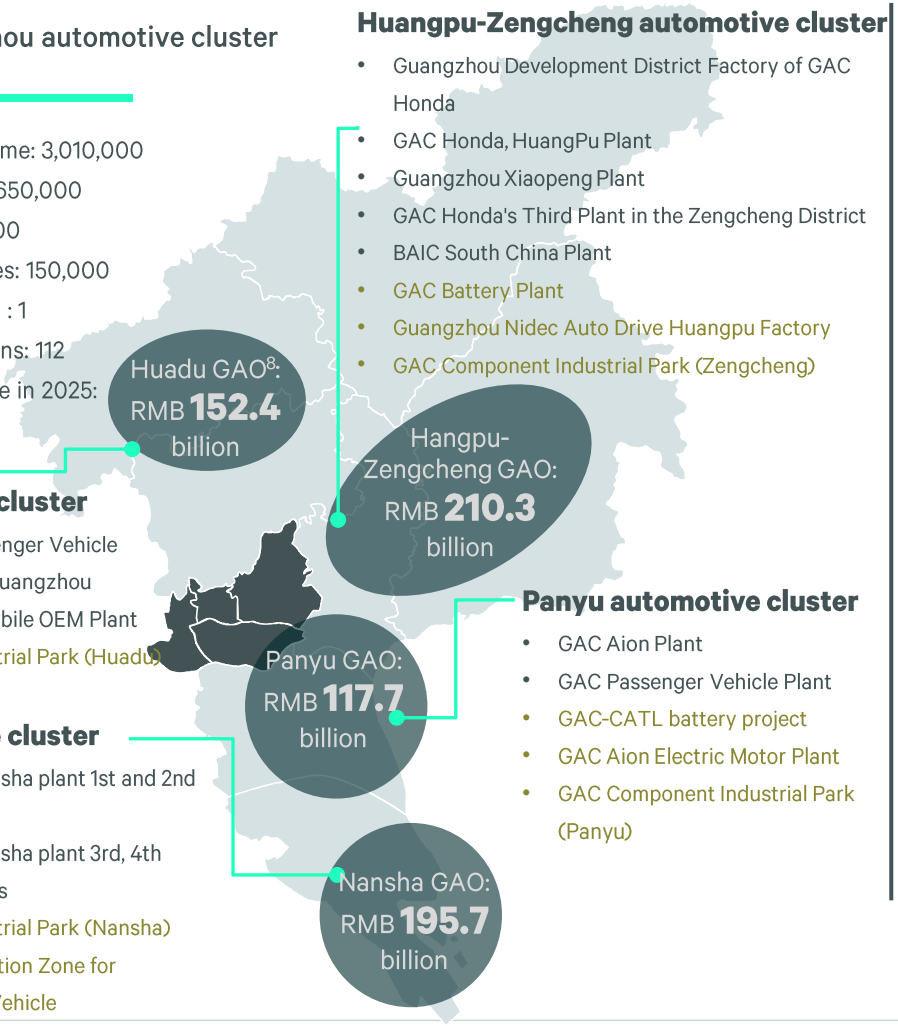
Vehicle production volume: 2,156,000
EV production volume: 1,287,000
EV sales volume: 363,000
Number of charging piles: 714,000
Vehicle-to-pile ratio: 1.8 : 1
Battery exchange stations: 152
Production of EV volume in 2025: 1,200,000

Guangzhou automotive cluster Shenzhen automotive cluster

Figure 20: Guangzhou automotive cluster

2023

Vehicle production volume: 3,010,000
EV production volume: 650,000
EV sales volume: 230,000
Number of charging piles: 150,000
Vehicle-to-pile ratio: 4.5 : 1
Battery exchange stations: 112
Production of EV volume in 2025: 2,000,000



Huadu automotive cluster

- Dongfeng Nissan Passenger Vehicle PlantChengdu Dayun Guangzhou PlantFengshen Automobile OEM Plant
- GAC Component Industrial Park (Huadu)

Nansha automotive cluster

- GAC Toyota Motor Nansha plant 1st and 2nd production lines
- GAC Toyota Motor Nansha plant 3rd, 4th and 5th production lines
- GAC Component Industrial Park (Nansha)
- State-Level Demonstration Zone for Intelligent Connected Vehicle

Huangpu-Zengcheng automotive cluster

- Guangzhou Development District Factory of GAC Honda
- GAC Honda, HuangPu Plant
- Guangzhou Xiaopeng Plant
- GAC Honda's Third Plant in the Zengcheng District
- BAIC South China Plant
- GAC Battery Plant
- Guangzhou Nidec Auto Drive Huangpu Factory
- GAC Component Industrial Park (Zengcheng)

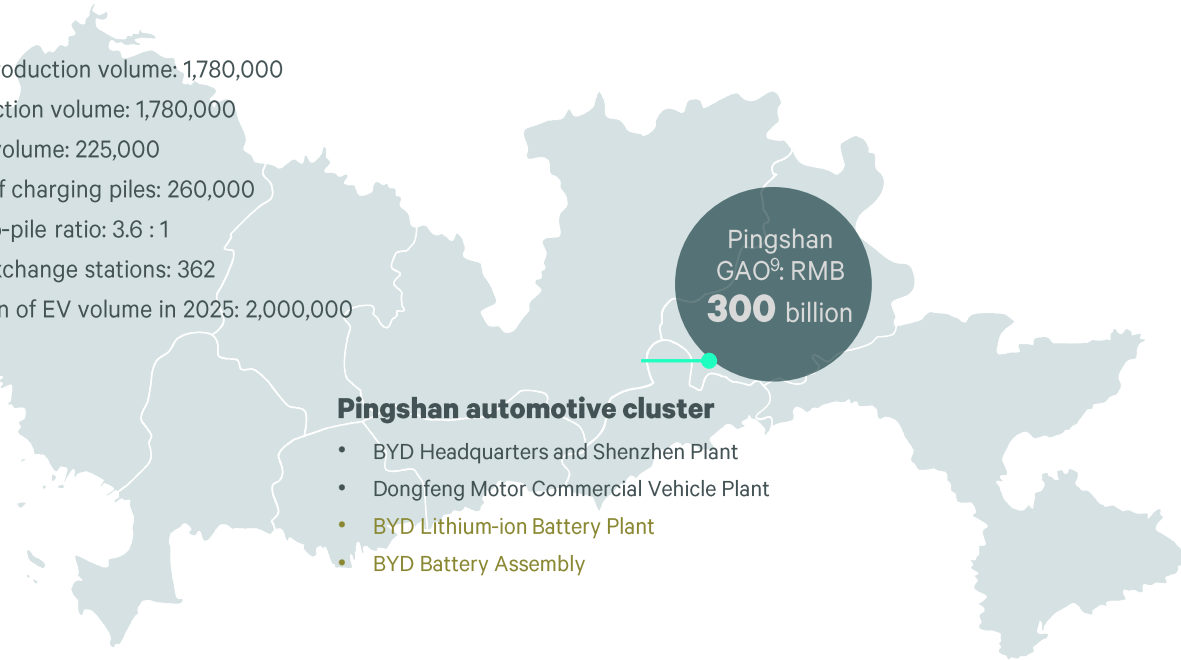
Panyu automotive cluster

- GAC Aion Plant
- GAC Passenger Vehicle Plant
- GAC-CATL battery project
- GAC Aion Electric Motor Plant
- GAC Component Industrial Park (Panyu)

Figure 21: Shenzhen automotive cluster

2023

Vehicle production volume: 1,780,000
EV production volume: 1,780,000
EV sales volume: 225,000
Number of charging piles: 260,000
Vehicle-to-pile ratio: 3.6 : 1
Battery exchange stations: 362
Production of EV volume in 2025: 2,000,000



Pingshan automotive cluster

- BYD Headquarters and Shenzhen Plant
- Dongfeng Motor Commercial Vehicle Plant
- BYD Lithium-ion Battery Plant
- BYD Battery Assembly

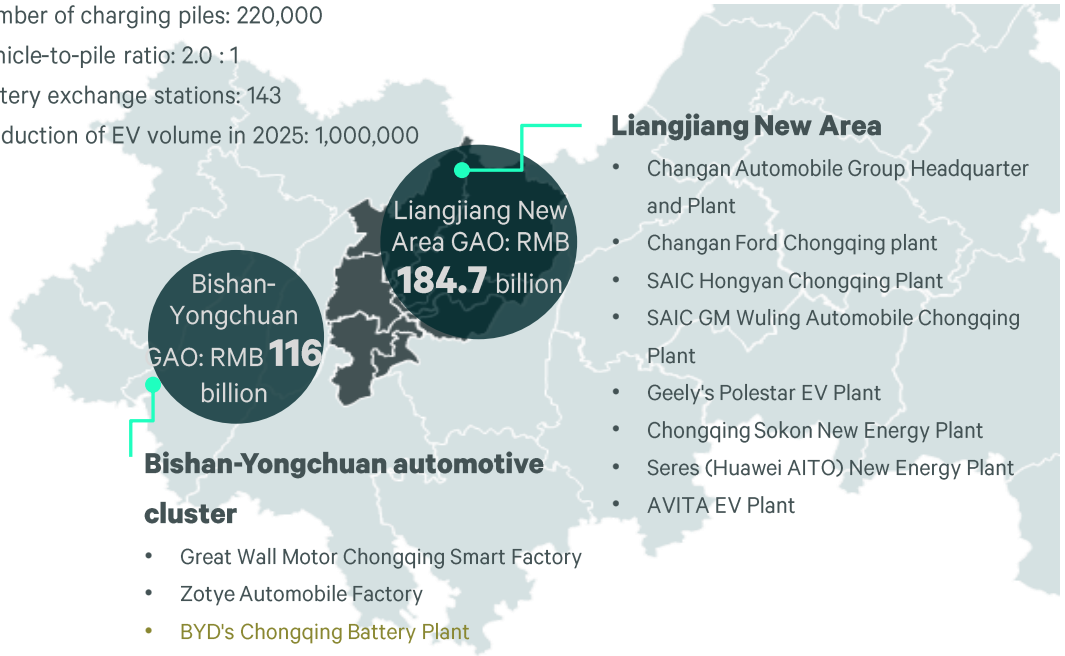
Note 8: Guangzhou GAO data is as of 2022
Note 9: Pingshan GAO is output of New energy and intelligent connected vehicle industry
Source: Marklines, Statistical Book of local governments, CBRE, May 2024

Chongqing automotive cluster

Figure 22: Chongqing automotive cluster

2023

Vehicle production volume: 2,318,000
EV production volume: 500,000
EV sales volume: 167,000
Number of charging piles: 220,000
Vehicle-to-pile ratio: 2.0 : 1
Battery exchange stations: 143
Production of EV volume in 2025: 1,000,000



Liangjiang New Area

- Changan Automobile Group Headquarter and Plant
- Changan Ford Chongqing plant
- SAIC Hongyan Chongqing Plant
- SAIC GM Wuling Automobile Chongqing Plant
- Geely's Polestar EV Plant
- Chongqing Sokon New Energy Plant
- Seres (Huawei AITO) New Energy Plant
- AVITA EV Plant

Bishan-Yongchuan automotive cluster

- Great Wall Motor Chongqing Smart Factory
- Zotye Automobile Factory
- BYD's Chongqing Battery Plant

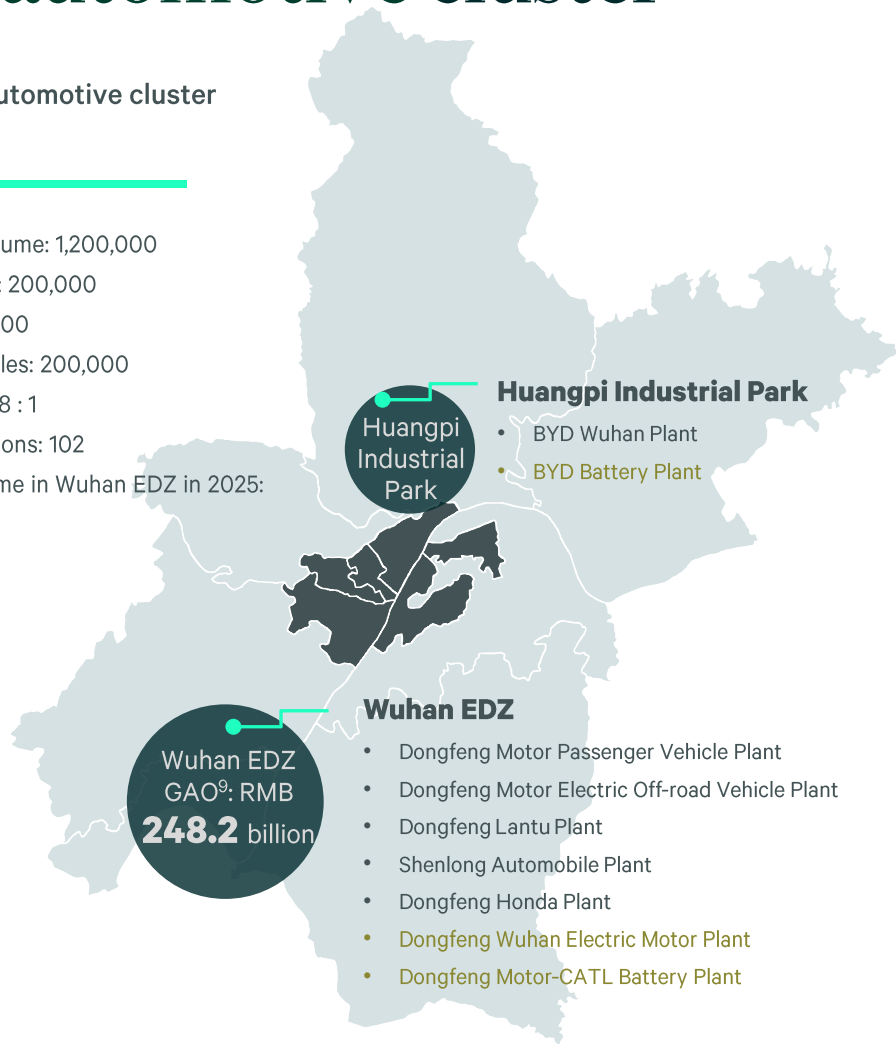
Note 10: as of 2022
Source: Marklines, Statistical Book of local governments, CBRE, May 2024

Wuhan automotive cluster

Figure 23: Wuhan automotive cluster

2023

Vehicle production volume: 1,200,000
EV production volume: 200,000
EV sales volume: 147,000
Number of charging piles: 200,000
Vehicle-to-pile ratio: 1.8 : 1
Battery exchange stations: 102
Production of EV volume in Wuhan EDZ in 2025: 600,000



Huangpi Industrial Park

- BYD Wuhan Plant
- BYD Battery Plant

Wuhan EDZ

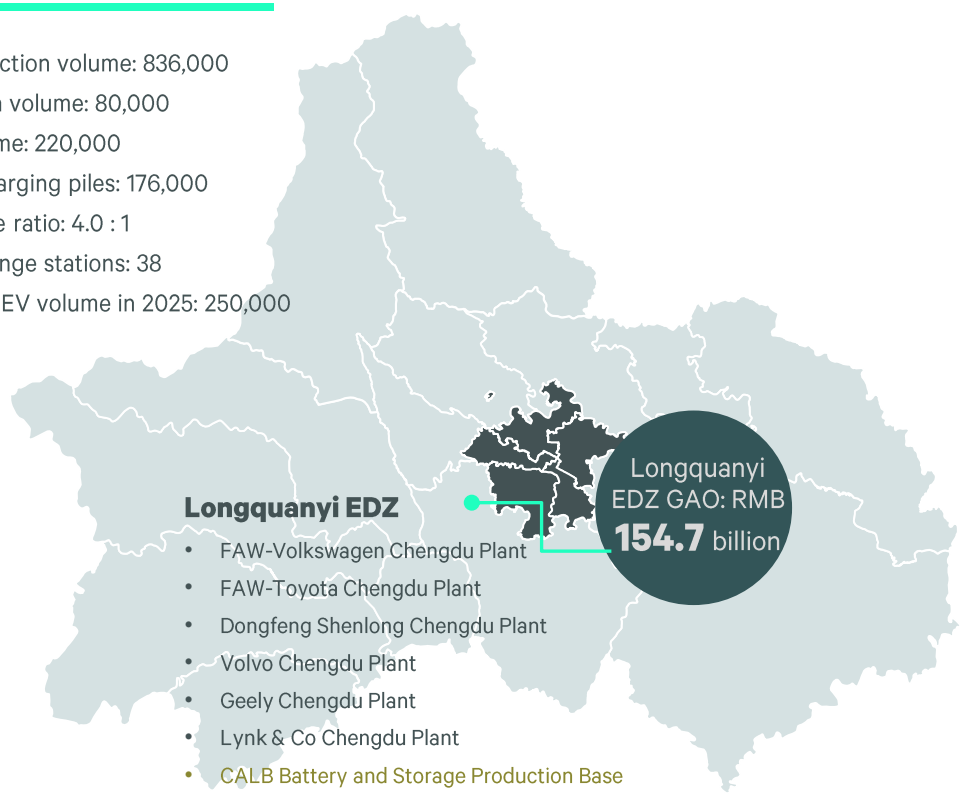
- Dongfeng Motor Passenger Vehicle Plant
- Dongfeng Motor Electric Off-road Vehicle Plant
- Dongfeng Lantu Plant
- Shenlong Automobile Plant
- Dongfeng Honda Plant
- Dongfeng Wuhan Electric Motor Plant
- Dongfeng Motor-CATL Battery Plant

Chengdu automotive cluster

Figure 23: Chengdu automotive cluster

2023

Vehicle production volume: 836,000
EV production volume: 80,000
EV sales volume: 220,000
Number of charging piles: 176,000
Vehicle-to-pile ratio: 4.0 : 1
Battery exchange stations: 38
Production of EV volume in 2025: 250,000

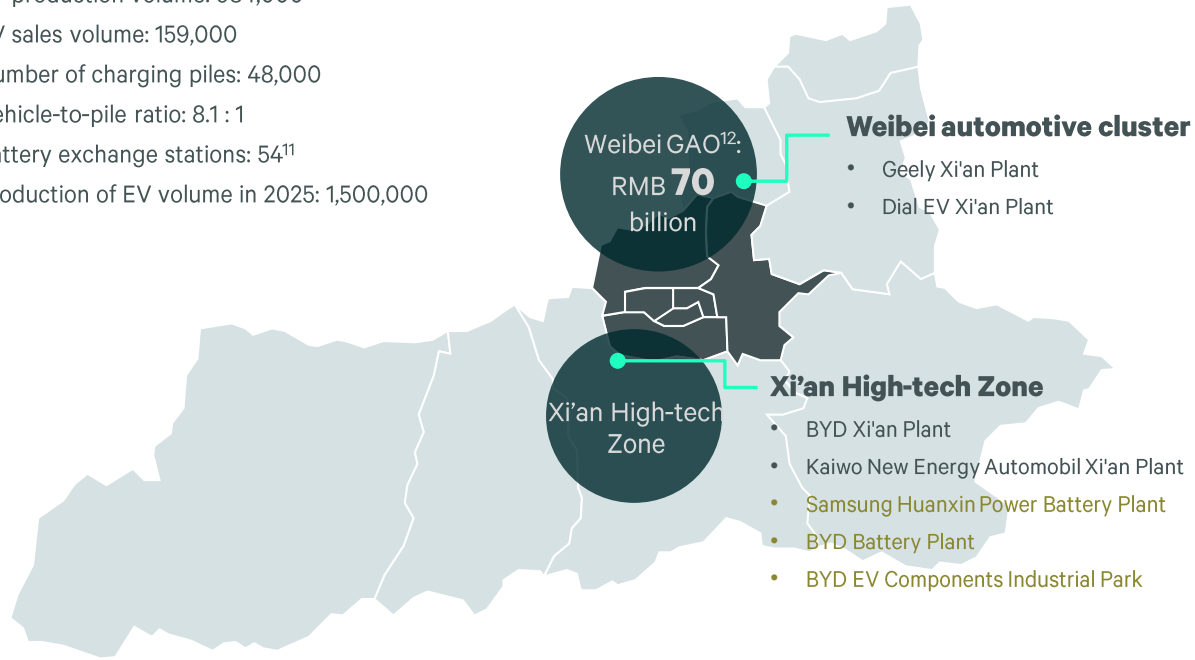


Xi'an automotive cluster

Figure 24: Xi'an automotive cluster

2023

Vehicle production volume: 1,312,000
EV production volume: 984,000
EV sales volume: 159,000
Number of charging piles: 48,000
Vehicle-to-pile ratio: 8.1 : 1
Battery exchange stations: 54[11]
Production of EV volume in 2025: 1,500,000



Note 11: according to Baidu Map
Note 12: as of 2022
Source: Marklines, Statistical Book of local governments, CBRE, May 2024

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