

Factsheet: Battery electric mobility in China

Status: October 2020

OVERVIEW

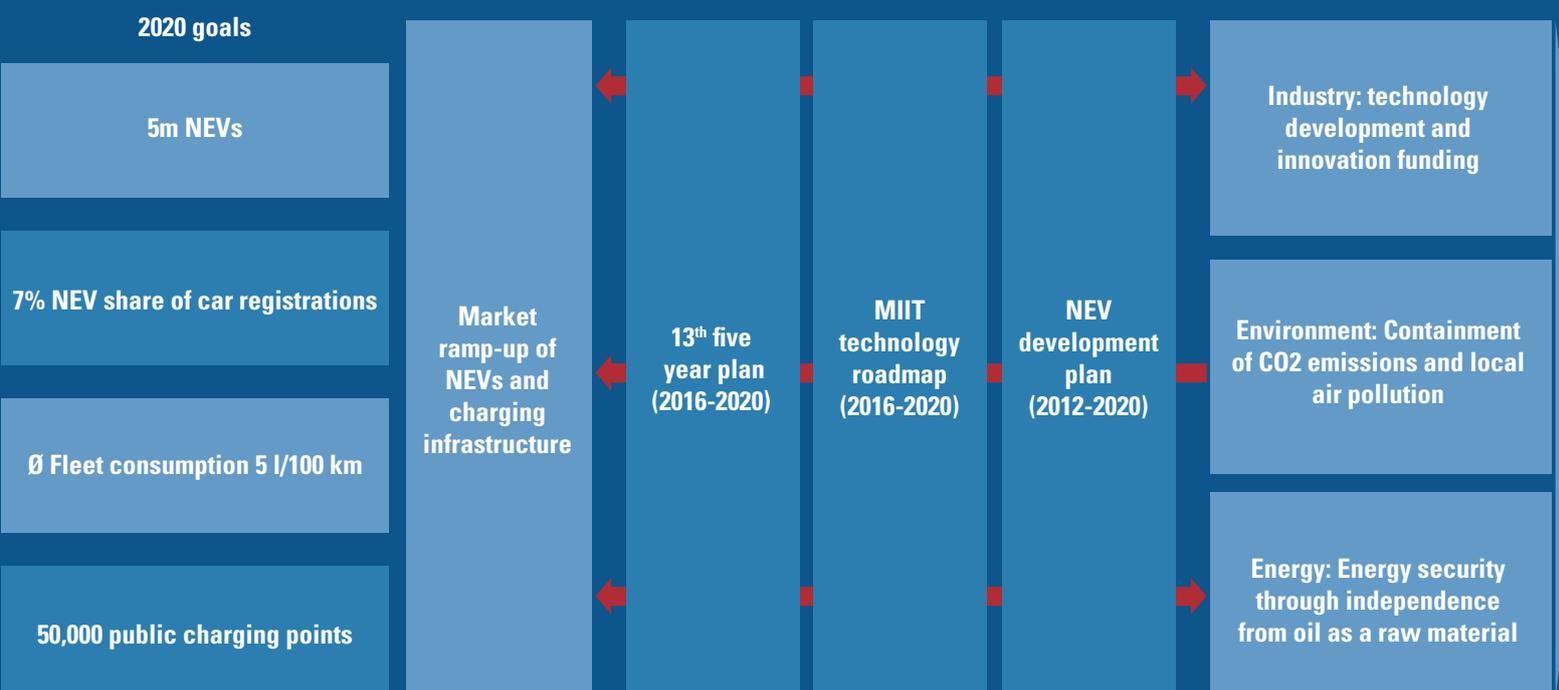
Chinese development strategy for electric mobility

Generating around half of global sales of electric vehicles, China is by far the largest electric mobility market in the world. Alongside worldwide technological leadership, it was the goal of the country's government to put at least 5 million so-called NEVs (New Energy Vehicles) on China's roads by the end of 2020. The Chinese government defines NEVs to include firstly, purely battery-electric vehicles (BEVs – Battery Electric Vehicles) and plug-in hybrids (PHEVs – Plug-in Hybrid Vehicles), and secondly, fuel cell vehicles or particularly efficient vehicles without electric drives. This factsheet concentrates on BEVs and PHEVs as well as the associated charging infrastructure¹ and provides an overview of the measures taken so far in the areas of market activation, funding support and stock of both vehicles and charging columns.

Market activation phase for BEVs and PHEVs up to 2020

Deploying massive political and financial commitment, the Chinese government advanced the rollout of NEVs and charging infrastructure in all market segments over the past ten years in order to achieve long-term climate, energy and industrial policy goals in the transport sector. The 13th five-year plan, the Technology Roadmap of MIIT (Ministry of Industry and Information Technology) and the NEV development plan provide the policy framework for the market rollout phase.

Strategies of the Chinese government for the market rollout of electric mobility



¹ Daten zur Wasserstoffmobilität sind in dem Factsheet „Wasserstoff- und Brennstoffzellentechnologie in China“ zusammengefasst.

For the automotive sector, the 2016 Technology roadmap of the MIIT and the Chinese Association of Automotive Manufacturers is decisive. In addition the MIIT developed a two-fold credit point system to manage the electric mobility market, through which fleet consumption specifications (CAFC) as well as sales targets for car manufacturers and distributors (NEV credit point system) are determined. They must fulfil the requirements of both systems in order to be able to produce vehicles in China and sell them there. However the joint venture obligation for foreign OEMs and the white list for traction batteries have now been abolished.

Supply side		Demand side		
Two-fold credit point system		Buyers' premiums (until 2022)		
<p>CAFC (Corporate Average Fuel Consumption) Specification of Ø fuel consumption for fleets from OEMs (Target value 5.5 l/100 km, 'Supercredits' for NEVs; tradeable and annually transferrable)</p>	<p>NEV credit point system Specification for the share of NEVs sold (18% target by 2023), in which NEVs are weighted differently in calculating the quota (tradeable and annually transferrable)</p>	<p>Cars Range-dependent premiums (min. 300 km) of a max. 22,500 RMB* (in 2020, decreasing annually); purchase price max. 300k RMB</p>	<p>Buses Premium dependent on the energy density of the battery, energy consumption and fast-charging capacity (max. 90k RMB)</p>	<p>Trucks Premium dependent on the energy density of the battery and limited by the max. load in tonnes (max. 50k RMB)</p>
<p>Barriers to market entry</p> <ul style="list-style-type: none"> ✓ Technical 'capability' specifications for OEMs (Research department, product data bank, etc.) ✓ Connection to the Real Time Monitoring Database (RTM) 		<p>Other incentives</p> <ul style="list-style-type: none"> ✓ Exemption from sales tax (until 2022) ✓ Exemption from car tax (vehicle and vessel tax) ✓ Development of public charging infrastructure, in particular by state energy suppliers ✓ Additional buyers' premiums as well as traffic restrictions on a local/regional level 		

* 10,000 RMB ≈ 1,250 euros

OEMs are instructed by compulsory national standards to forward data on user behaviour, technical information about batteries, drive trains and control systems to local data centres. This is designed to provide technical security. Local data is collated on the national level in the NEV National Monitoring and Management Platform of the Beijing Institute of Technology.

In addition, buyers' premiums for NEVs are awarded through the programme: Financial Support Policy for New Energy Vehicles 2016-2020. In the latest announcement on subsidy policy from the ministries of finance, science, industry and information as well as the National Reform Commission (MoF, MoST, MIIT, NDRC) it was stated that in 2021, subsidies will decrease by 20%, and by 30% in 2022. The minimum range of cars eligible for funding is 300 km, the average buyer's premium in 2020 is 16,200 RMB (approx. 1,970 euros).

Reduction in funding for electric cars from 2020

Purely electric passenger vehicles

According to range R (standard driving cycle)	300 km ≤ R ≤ 400 km	R ≥ 400 km
2020	16,200 RMB	22,500 RMB
2021 (-20%)	12,960 RMB	18,000 RMB
2022 (-30%)	9,072 RMB	12,600 RMB

PHEV passenger cars (R ≥ 50 km)

2020	8,500 RMB
2021 (-20%)	6,800 RMB
2022 (-30%)	4,760 RMB

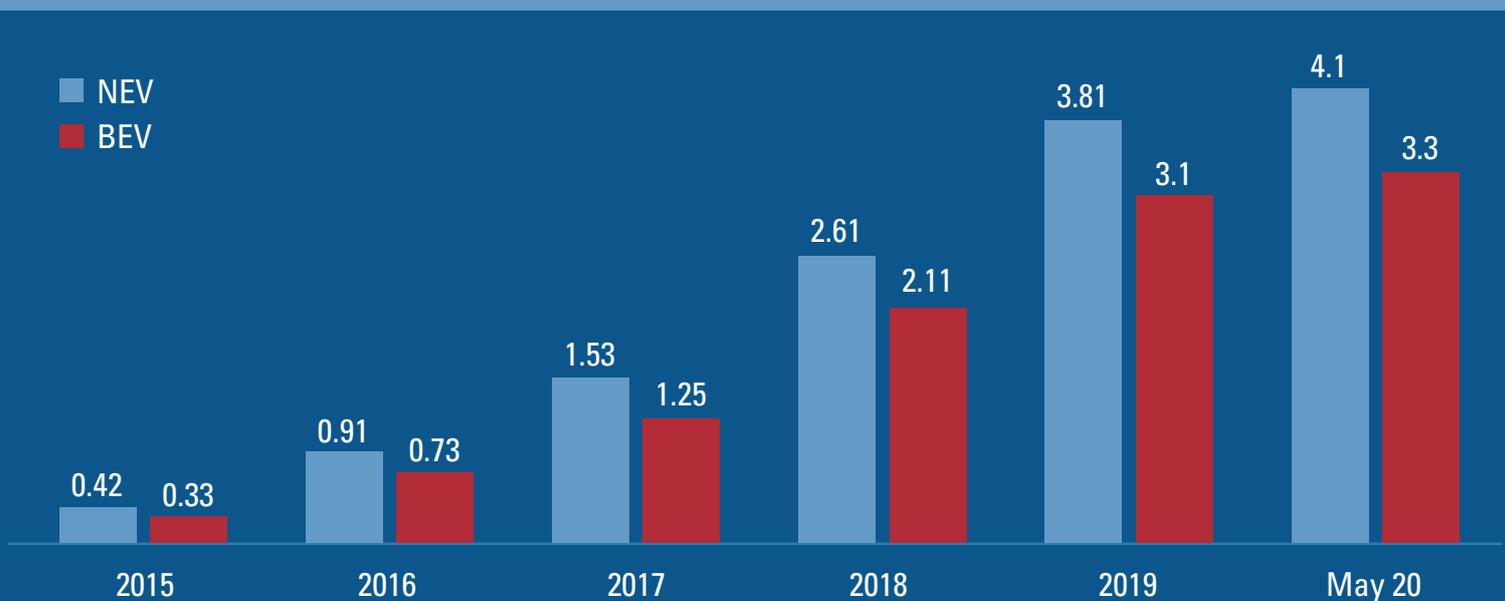
Source: own representation based on MoF, MIIT, MoST, NDRC, 2020

Only private individuals receive the full funding rate. Commercial vehicles like taxis, municipal fleets, vans, postal and courier services, airport vehicles, local public transport or coaches receive 70% of the rate.

In the year 2016 alone, almost 9.6 billion RMB (1.23 billion euros) was paid out to companies through this program-

me. The entire sum of central and local buyers' premiums is estimated to total around 300 billion RMB (approx. 38 billion euros) by the end of 2020. During the market activation phase, the inventory of NEVs in China has risen accordingly to more than four million. 3.3 million vehicles are driven purely electrically, including around 500,000 buses.

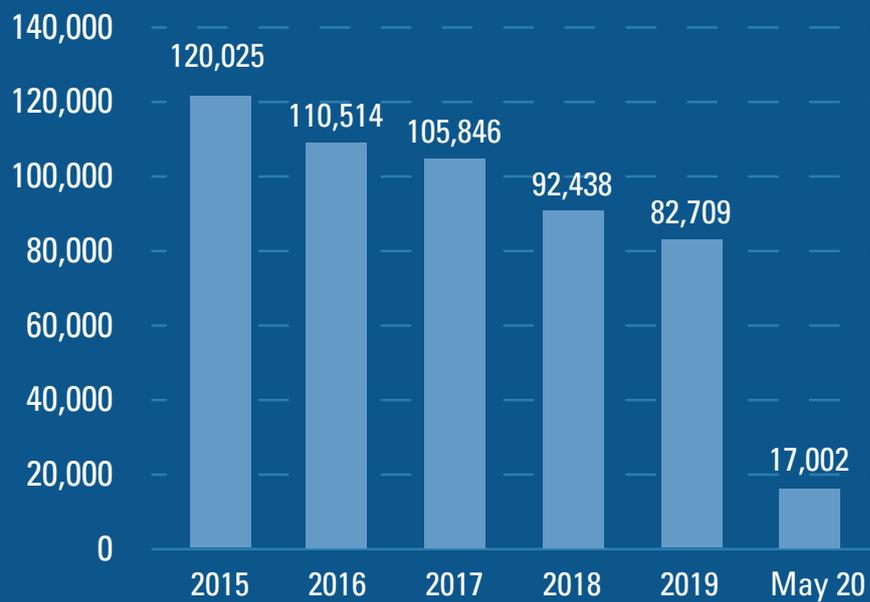
NEV stock in China, 2015 until May 2020 (in millions)



Source: Tech Sina, 2020

The market is currently very fragmented. The year's turnover of around one million vehicles in 2019 is spread across 400 different vehicle models. Buses account for only a small portion of this with over 82,000 vehicles.

NEV bus sales figures in China from 2015 to May 2020



Source: SGEC Monitoring report, B/I/2020

Ranking the NEVs most sold in China – Comparing 2019 to 2020



iTesla leads with a total of 400,000 vehicles sold to date. In the first quarter of 2020, Tesla sold 21,059 vehicles, followed by the Chinese manufacturers BYD (13,486) and GAC (10,624) as well as BMW (8,113).

#	Model	Country	2019 Jan. - Apr.
1	BYD Yuan EV	CH	30,874
2	BAIC EU-Series	CH	24,081
3	BYD e5	CH	19,129
4	BYD Tang PHEV	CH	18,720
5	Geely Emgrand EV	CH	15,902
6	Chery eQ	CH	13,499
7	SAIC Roewe Ei5 EV	CH	12,590
8	SAIC Baojun E100	CH	11,772
9	Great Wall Ora R1 EV	CH	10,993
10	JAC iEV E-Series	CH	9,615
11	VW Passat GTE	GER	8,846
12	JMC E200	CH	7,794
13	BYD Qin PHEV	CH	7,684
14	Great Wall Ora iQ5 EV	CH	7,617
15	Tesla Model 3	USA	6,738
16	SAIC Roewe Ei6 PHEV	CH	6,409
17	Changan Eado EV	CH	6,054
18	Geely Emgrand GSE EV	CH	5,537
19	Nio ES8	CH	5,321
20	Weltmeister EX5 EV	CH	5,303
		Σ	234,478

#	Model	Country	2020 Jan. - Apr.
1	Tesla Model 3	USA	21,059
2	BYD Qin Pro EV	CH	13,486
3	GAC Aion S	CH	10,624
4	BMW 530Le	GER	8,113
5	BAIC EU-Series	CH	7,877
6	Nio ES6	CH	6,550
7	Li Xiang One EREV	CH	5,518
8	SAIC Baojun E-Series	CH	5,351
9	BYD Yuan/S2 EV	CH	5,307
10	SAIC Roewe Ei5 EV	CH	4,599
11	Chery eQ	CH	4,539
12	Great Wall Ora R1 EV	CH	4,445
13	SAIC MG eZS EV	CH	4,318
14	Weltmeister EX5 EV	CH	4,155
15	VW Passat GTE	GER	4,098
16	BYD e2	CH	3,870
17	Xpeng G3	CH	2,914
18	BYD Tang PHEV	CH	2,835
19	SAIC Roewe Ei6 PHEV	CH	2,694
20	FAW Bestun B30 EV	CH	2,532
		Σ	124,938

(Source: China Passenger Car Association, 2020)

Because of the corona pandemic, it is no longer expected that the fleet target of 5 million NEVs will be achieved. In the first quarter of 2020, registrations sank by 43% compared to the previous year. At the moment, the situation for Chinese startups in particular is critical because of falling subsidies and sales numbers. This situation will probably impact the review of strategies to support electric mobility in China.

Market stabilization phase from 2021

For the market stabilization phase from 2021, the Chinese government was originally planning to let the buyers' premiums for BEVs and PHEVs run out. A consolidation of BEV sellers was expected, through which quality and economic efficiency would be achieved. Because of the corona pandemic and dropping sales figures, specific measures were reconsidered and the buyers' premiums have been extended initially until 2022. To what extent the latest strategy proposals will be adapted for the market stabilization phase remains to be seen.

The MIIT had already published the medium-term development plan (draft version) for the NEV industry 2020-2035 in the autumn of 2019, in which the targets of the preceding roadmap were once again tightened and specified:

Growth until 2030

38m

vehicles produced
per year

40 %

NEV share in new
registrations

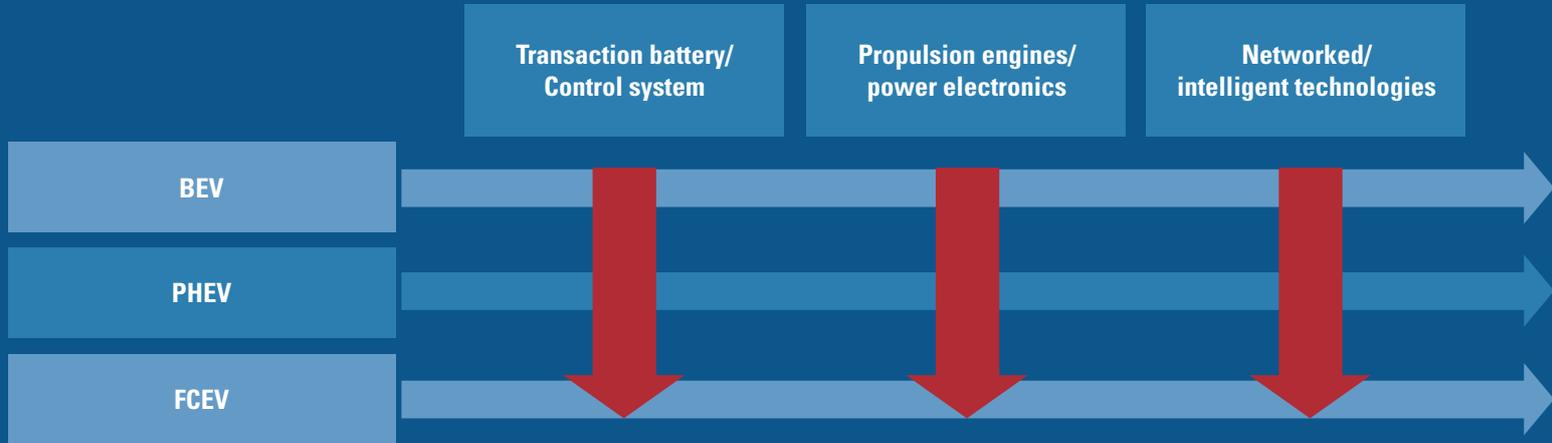
Overall, in the transition from market activation to market stabilization, the guidelines for range, quality and safety were tightened and new targets for both production and the share of NEVs in vehicle fleets were defined. Since 2018, all vehicle batteries have been registered in a central national databank and there is a take-back obligation for old batteries.

Quantitative goals of the MIIT technology roadmap (2019)

	2020	2025	2030
Annual vehicle production	30 million	35 million	38 million
Average fleet consumption	5.0 l/100 km	4.0 l/ 100 km	3.2 l/ 100km
Reduction of the average consumption of commercial vehicles	10%	15%	20%
NEV share of new registrations	7%	20%	40%
Degree of automation	Partially automated systems: 50% market share	Highly automated vehicles: 15% market share	Fully autonomous vehicles: 10% market share
Reduction of energy consumption in relation to GDP	20%	35%	50%

Source: MIIT, 2019

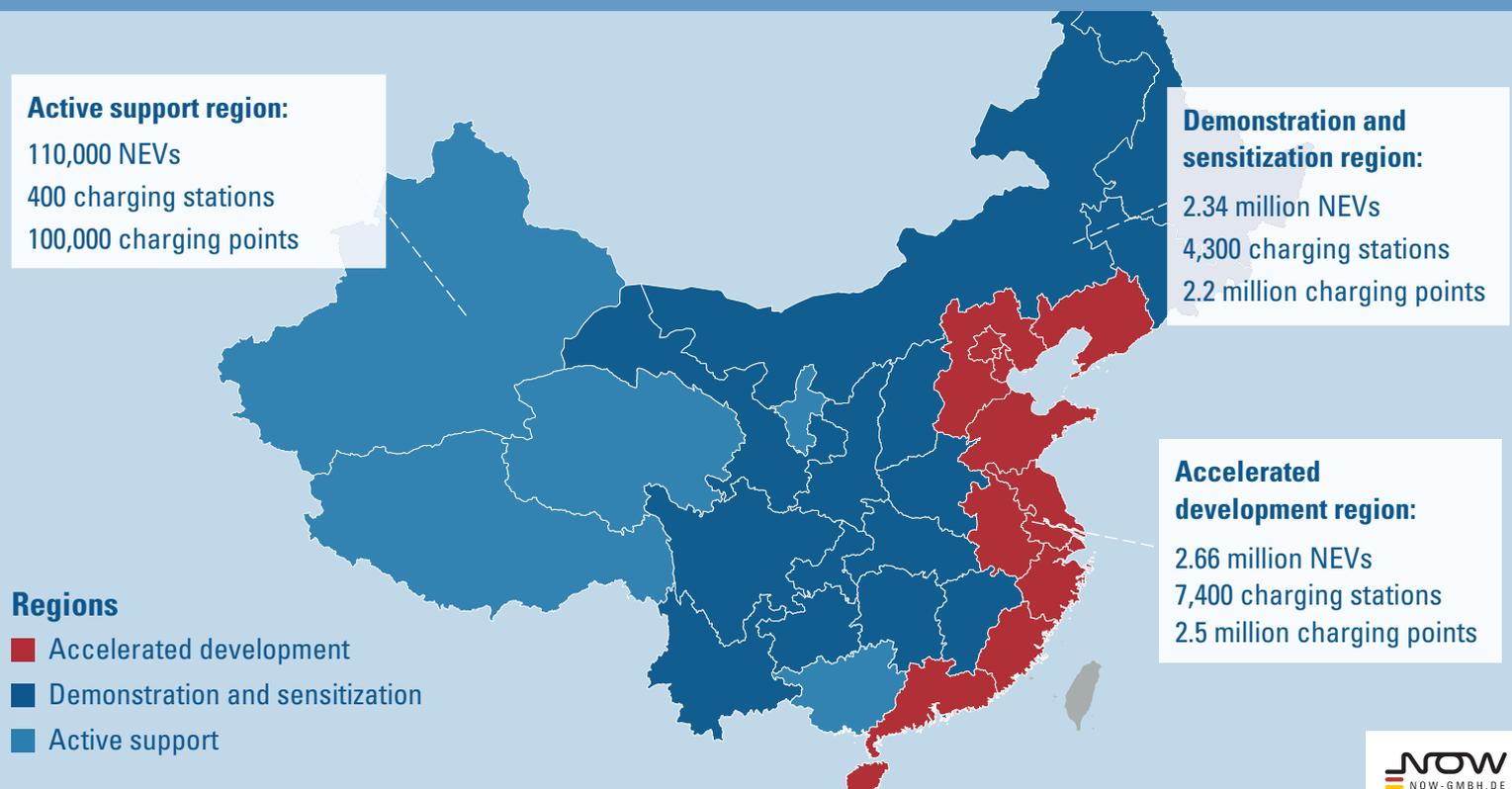
Special attention will be given to strengthening innovation in the new development plan. Important areas are the drive technologies of BEVs, PHEVs and FCEVs as well as certain key components. Aside from further funding NEVs, 'intelligent and connected vehicles', or ICVs, as well as sharing and smart city concepts will be given high priority. According to this plan, in 2030 a share of 40% for NEVs and 70% for ICVs will be achieved.



Expansion of infrastructure in China

The availability of charging infrastructure is an important factor for the BEV and PHEV market ramp-up. The national government sets these goals for each province. These are then implemented through the province's own strategies and funding programmes. The regional and local governments thus also determine the mix of alternating current charging points, decentralized public fast-charging points and large fast-charging parks. The central government's plan for developing charging infrastructure divides China into three regions, in which the electrification of transport will be rolled out at different speeds and intensities.

Regions for the initial construction of charging infrastructure



The two Chinese electricity grid operators, State Grid and Southern Grid, play a central role in the expansion of charging infrastructure and participate in many public-private partnerships. Companies often come together from different sectors for the installation and operation of charging points and charging parks - companies such as energy companies and car service/rental operators (e.g. BP and Didi Chuxing), electricity grid operators and automobile manufacturers (e.g. State Grid and a number of automobile manufacturers) as well as electricity grid operators and private operators of charging infrastructure (e.g. State Grid and Southern Grid with Teld and Star Charge).

Charging infrastructure 2020:

550,000

public charging points

7,290

charging parks

703,000

private charging points
(plan: 4.4 million in 2020)

The typical charging capacity for fast-chargers is 150 kW.

The development of charging infrastructure increasingly happens through public-private partnerships between state energy companies and e.g. vehicle manufacturers or charging infrastructure operators.

Source: EVCIPA 2019-2020

Development of public charging points from November 2018 to May 2020

Number of public charging points



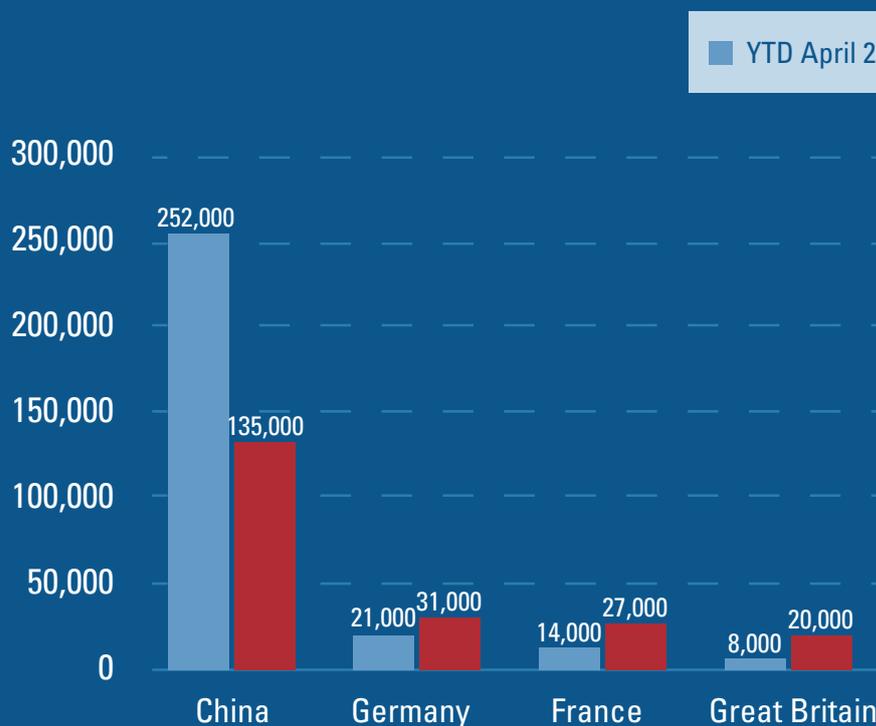
Source: SGEC Monitoring report, B/I/2020

In contrast to say, Germany, exchanging batteries in battery swapping stations plays a significant role. These are operated by OEMs NIO and BAIC, whose activities include supporting a group standard related to battery exchange safety.

China's electric mobility market in the international context

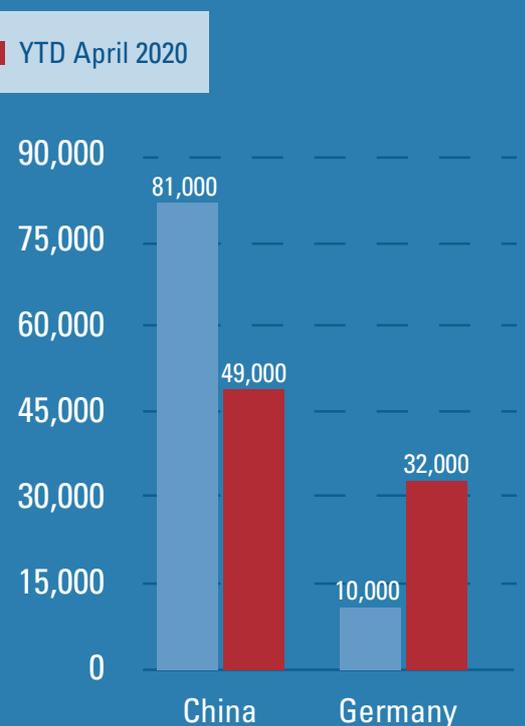
With overall annual sales of over 20 million cars, China is one of the most important markets for German car manufacturers. In 2019 they reached a market share of over 20% in the Chinese car market. Volkswagen plans to sell half of its 28 million electric cars forecasted for 2028 in China. The Chinese market for BEVs and PHEVs has so far been dominated by domestic manufacturers, who now produce around half of the vehicles. During the corona pandemic, markets in Europe and in the US grew, but in China, sales collapsed in the first half of 2020. As a result, the Chinese share of the global electric mobility market overall has dropped off for the time being.

BEV sales January-April 2019 and 2020



Source: Data from the CAM Electromobility Report 2020, on Elektroautos-News.net, 2020

PHEV sales January-April 2019 and 2020 t



Source: MIIT, Tech Sina, 2020

Aside from regulating the market, the import and export of cars also depends on charging standards, which are not yet standardized on an international level. As is the case in other markets, vehicle manufacturers in China deliver their vehicles with different socket systems, like for example, with the European-initiated CCS2, the Japanese CHAdeMO or Tesla's own system. This variety makes establishing the charging infrastructure more difficult. China is therefore pursuing its own charging standard and since 2018, has been cooperating with the Japanese CHAdeMO consortium for this purpose:

A fast-charging standard with > 500 kW charging capacity and backwards compatibility with the existing CHAdeMO systems is the objective.

The next few years will reveal whether the current strategy proposals stabilize the Chinese market as planned and whether previous growth targets will be reached. In addition, in view of the sales collapse during the corona virus, it remains to be seen whether the cuts in subsidies will take place as planned over the coming months.

BMVI activities in SGEC

Since 2014, NOW and the China Automotive Technology and Research Center (CATARC) have been the lead organisations responsible for supporting their relevant ministries in the area of electric mobility. In this context, activities and German-Sino research and development projects have been taking place since 2018 in the virtual centre: Sino German Electro Mobility Innovation and Support Center (SGEC). From the German perspective, the SGEC will drive forward the market rollout of electric cars (battery and fuel cell) in China for German companies and also build upon China's experiences in research and development in electric mobility. National partners from both countries (universities, research institutes, industry partners) will be integrated. The SGEC is led jointly by Germany and China with parallel coordination structures for each country. Each country finances its own national activities in the thematic fields. This factsheet is based on results of monitoring in the thematic field of battery-electric mobility, currently being undertaken by Dornier Consulting International.

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