

BUSINESS SWEDEN



CHINA AUTOMOTIVE INDUSTRY STUDY

**REPORT FOR THE SWEDISH ENERGY AGENCY
AUGUST 2019**

An assignment from the Swedish Energy Agency

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Disclaimer: This report reflects the view of the consultant (Business Sweden) and is not an official standpoint by the agency.

SUMMARY

Economic slowdown and an ongoing trade war with the United States have impacted the Chinese automotive market. In 2018, new vehicle sales declined for the first time in 20 years. Sales totaled 28,08 million units, reflecting a -2.8% y/y.

Electric vehicles remain a promising segment, as the government still provides substantial subsidies to manufacturers, while customers are offered incentives and favorable discounts for purchasing. In order to guide the industry, the Chinese government is gradually reducing subsidies. Stricter rules are also set to raise the subsidy threshold, which will force both OEMs and suppliers along the value chain to increasingly convert themselves into hi-tech companies with core competencies.

The evolution is driven by solutions addressing the three main issues created by the last decade's market boom: energy consumption, pollution and traffic congestion. The Chinese government has shifted its attention from total volume to engine mix and is progressively creating incentives to small and low emission vehicles, while supporting investment in new energy vehicles, mainly electric. In this direction, technologies surrounding new energy vehicles such as power cell materials, fuel cell and driving motor will receive strong support and offer more opportunities. In the light weight area, structure optimization is still the primary ways for OEMs to achieve the weight reduction goal. However, efforts in the development of light-weight materials such as aluminum and magnesium alloy as well as carbon fiber are promising with the cost being reduced. With regards to energy-saving technologies for internal combustion engine, although self-developed core technologies such as TDI engine gradually realizes industrialization, there are still gaps with foreign countries in terms of fuel consumption and core component technologies such as electronic control systems.

Sweden is a global leader in driving the innovation in the automotive industry. As the home of famous OEMs such as Volvo Cars, Volvo Group, Scania, Sweden also fosters a strong supply chain, which is also pushing the industry to achieve the transition towards fossil fuel free fleets and autonomous driving. The reputation and efforts within the above areas have been appreciated by the peers in China. Swedish companies who have strong offerings in the electronic control system, battery storage and management, light-weight materials will find more opportunities to work with Chinese OEMs.

INDEX

BACKGROUND	5
MOTIVATION AND OBJECTIVE	5
INTRODUCTION	5
China Auto Market at a Turning Point	5
Innovative Technologies Drive the Industry Towards A Green and Smart Transformation.....	5
The industry is vitalized by the new cooperation, new players and new business model	6
MARKET OVERVIEW	7
PASSENGER CAR MARKET AND TRENDS	8
COMMERCIAL VEHICLE MARKET AND TRENDS	11
SEGMENT ANALYSIS AND EVALUATION	15
Battery Electric vehicle	15
Battery systems	18
Fuel cell Electric VEHICLE	21
Vehicle LIGHT WEIGHTING	22
Internal Combustion engine (ICE) technologies	23
segment comparative analysis and prioritization	24
POTENTIAL INTERESTING PLAYERS FOR SWEDISH AUTOMOTIVE SUPPLIERS.....	26
SELECTED COMPANIES TO CONTACT	29
CONCLUSION AND RECOMMENDATION	30
SOURCES:.....	31

BACKGROUND

MOTIVATION AND OBJECTIVE

This report describes the Chinese automotive market, with a focus on new energy, technology and material. It is created at the request of the Swedish Energy Agency in order to help identifying areas with relevance for Swedish expertise, and to serve as the basis for identification of potential opportunities of collaboration between Chinese OEM's and Swedish scale-ups.

Together with the Swedish Energy Agency following priority areas have been identified for further analysis Battery electric vehicles:

- Battery systems
- Fuel cell electric vehicles
- Weight reduction
- Internal combustion engine (ICE) technologies

The study consists in an overview of the Chinese automotive industry, an analysis of the selected focus segments, and a description of Chinese OEM's who can be relevant for Swedish companies.

INTRODUCTION

CHINA AUTO MARKET AT A TURNING POINT

China continues to be the world's largest vehicle market with the Chinese government expecting that automobile output will reach 30 million units by 2020 and 35 million by 2025.

After enjoying over a decade of surging growth, the Chinese automotive market is reaching a critical point in its development. Chinese passenger-vehicle sales fell in 2018 for the first time since 1990 as economic uncertainty weighed on consumers. Chinese auto sales in 2018 reached 28.1 million, down 2.8% from 2017, according to the government-backed China Association of Automobile Manufacturers. Passenger-car sales fell to 23.7 million, a 4.1% y/y decline, while commercial-vehicle sales rose to 4.4 million, resulting in a 5.1% y/y increase. Electric-car sales surged ahead, increasing 62% to 1.3 million. A combination of weak consumer confidence and policy changes were key factors contributing to the reduction in sales in China in 2018. With the increasing car park and the economy shift to a "new normal", the overall market is entering a mature path instead of high-speed growth.

The Chinese government opened up the automotive market to foreign companies by cutting the tariffs on automotive products and lifting the cap of foreign investment into the sector. Effective July 1, 2018, China reduced tariffs on imported cars from 25% to 15% of their wholesale value. It also cut tariffs on 218 categories of imported car parts, reducing them to a standardized 6%. Except for special vehicles and new energy vehicles, foreign investment is not allowed to exceed 50% cap of the total investment and can only invest in a maximum of two joint ventures producing the same vehicles. The share limitation for foreign investment in the commercial vehicle sector will be removed in 2020 and the limitation on share and number of joint ventures in the passenger car sector will be removed in 2022. As a result, Tesla decided to establish a fully owned plant in China. BMW also announced to increase its ownership share to 75% in 2022. Removal of foreign ownership cap will allow global automotive companies to be more flexible and agile in terms of investment, strategy and product offerings.

INNOVATIVE TECHNOLOGIES DRIVE THE INDUSTRY TOWARDS A GREEN AND SMART TRANSFORMATION

In 2017, the Ministry of Industry and Information Technology (MIIT), the National Development and Reform Committee (NDRC), the Ministry of Science and Technology (MOST) jointly issued *the Mid and Long-Term Development Plan for Auto Industry*, aiming to make China a “strong” auto power within ten years. It sees the development of New Energy Vehicles (NEVs) and connected cars as providing an opportunity for China to become a global auto nation and leapfrog in auto development. A number of ambitious targets are also set, relating to the creation of national champions in auto parts and auto brands, connected car technology, driver assistance, and partial/conditional automatic systems for driverless vehicles. Additional guidelines further focus on the sub-sectors of NEV engines, plug-in hybrid engines, fuel cell systems and key components, charging poles, battery manufacturing facilities, and testing equipment. Establishing the innovation system is listed as the first task among the six key tasks and the construction of the innovation center is prioritized among the eight key projects to achieve the goal of becoming a leading country in the auto industry.

The Implementation Plan of the Eight Key Projects of the Mid and Long-Term Development Plan for Auto Industry was released in October 2018, which further elaborated the plan and breakdown the tasks to be done. For example, in order to establish the innovation system, the implementation plan suggests to:

- 1) Build up China Auto Innovation Council as the high-end think tank for the whole industry.
- 2) Accelerate the construction of new R&D institutions such as Manufacturing Industry Innovation Center and National Technology Innovation Center.
- 3) Fully utilize the competence of the existing innovative organizations to strengthen the technology supply.
- 4) Build up a public platform with full functions and flexible mechanism.
- 5) Establish a comprehensive education system to cultivate more experts and talents.
- 6) Build up a complete system for collaborations across industries and countries.
- 7) Build up multi funding channels to support the innovation within automotive sector.

The industry evolves under the guidance of the policy and is empowered by the players in the sector. Diversified development of technologies makes it possible for different solutions to be available, from energy-saving vehicles to pure electric vehicles, from alternative fuel to lithium-ion batteries to fuel cell, etc. In the meantime, the construction and development of charging infrastructure and hydrogen refuel stations is accelerated to meet the demand.

Connected vehicles is another area that is continuously being improved. The OEMs, research institutes and the tech firms have invested a lot in developing connected cars. China has issued 101 autonomous driving licenses to Baidu and other companies. A new “5+2” (5G+connected cars and smart transport) landscape is initially formed for the demonstration of connected cars, which effectively speed up the implementation of the new industry.

THE INDUSTRY IS VITALIZED BY THE NEW COOPERATION, NEW PLAYERS AND NEW BUSINESS MODEL

With over sixty years history and forty years market opening-up, Chinese automotive industry enjoyed the rapid development of automotive manufacturing technologies through the joint ventures with world leading automakers. However, there is gap in the core technologies within areas such as engines, electric control, lightweight materials between local manufacturers and leading international players. The rise of new technologies speeds up the transformation in innovation. Advances in new energy vehicle technologies (NEV) and intelligent connected vehicle (ICV) technologies are reshaping the Chinese auto industry in terms of structural relationship between automakers and suppliers. Although the OEMs still take the lead in the technology development, the influence of many technology suppliers especially in the area disruptive solutions is increasing. The OEMs and automotive technology companies are changing from simple supply-demand relationship to deep collaboration based on market and innovation. An example of this is the cooperation between the battery enterprise CATL and a number of Chinese OEMs from product co-development to joint ventures.

New technologies allow new business models to emerge and evolve. New mobility services such as ride hailing, and car sharing have experienced rapid growth. Under the new situation, many OEMs choose to work with each other and extend the business to the new territory. A good example of this is T3, a Mobility Service joint venture created by FAW, Dongfeng, Chang'an, Geely and Daimler to focus on premium mobility service.

MARKET OVERVIEW

Since 2009, China has been the world's largest automotive market and vehicle manufacturing country. The total vehicle output and sales volume in 2018 respectively reached 27.8 million and 28.1 million units. The Chinese automotive sector has become a pillar industry given its contribution to China's GDP. It involves over 100 industries in China.

Since China's accession to the WTO, the Chinese automotive market has experienced unprecedented growth. With steady improvements in product quality, the growth of Chinese automotive brands compounded, resulting in a global expansion. Chinese manufacturers have gained an increasing edge in segmented markets such as commercial vehicles and utility vehicles. Some of these manufacturers have also made significant achievements in the field of new-energy vehicles (NEVs).

China's automotive manufacturing sector is heavily regulated. After the automotive manufacturing plant has been established, the manufacturer and each automobile model to be manufactured are then subject to a special 'access permit for automobile manufacturers and their products', which is issued and administered by China's Ministry of Industry and Information Technology (MIIT). To qualify for such manufacturing permit, the manufacturer must meet all the requirements set out by MIIT, including obtaining the venue, capital and personnel necessary for carrying out manufacturing operations, as well as demonstrating capabilities on product design and development, product production facility, product production consistency and quality control, and product sale and post-sale service. MIIT periodically publishes a list of the manufacturers and products for which the permits have been granted. Each vehicle model produced by licensed manufacturers must also:

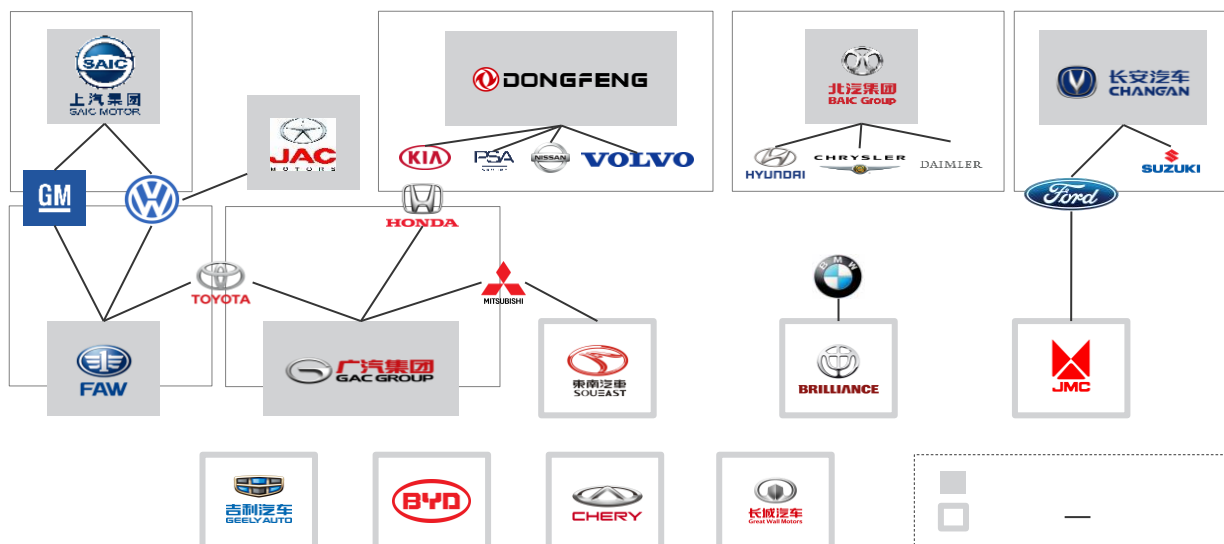
- Meet the relevant standards (as set out in the Items and Underlying Standards for Compulsory Standards Inspection of Automobile Products issued by MIIT);
- Secure the China Compulsory Certification (CCC); and
- Pass inspection performed by a qualified inspection institution.

The Chinese government has in recent years put efforts into streamlining its various administrative approval procedures. One example in relation to the automobile industry is that since the promulgation of the new Provisions on Administration of Investment in Automobile Industry promulgated by China's National Development and Reform Commission (NDRC), which entered into force on 10 January 2019, building a new automotive manufacturing plant (including the building of a new sedan plant by a Chinese-foreign equity joint venture) no longer requires the approval of the NDRC or China's State Council (in the case of a Chinese-foreign equity joint venture sedan plant), but only needs the record filing with the NDRC's local or provincial counterpart.

The production of automobile parts, on the other hand, follows a different licensing regime. First, for many types of automobile parts, a production license issued by China's Administration of Quality Supervision, Inspection and Quarantine (AQSIQ) (now is merged into and becomes a division under the State Administration for Market Regulation or SAMR) is required. Second, the product must be manufactured in accordance with the compulsory standards, known as Guobiao or GB, formulated and kept by the Standardization Administration of China. Those auto parts subject to CCC must also undergo a specific accreditation process.

The policies and regulations have formed a unique automotive manufacturing with a mix of domestic automotive companies and joint ventures between domestic and foreign companies. Joint ventures with international automotive companies account for two thirds of the passenger car market. The rest is mostly taken up by domestic brands.

FIGURE 1: MARKET STRUCTURE OF CHINESE AUTOMOBILE INDUSTRY

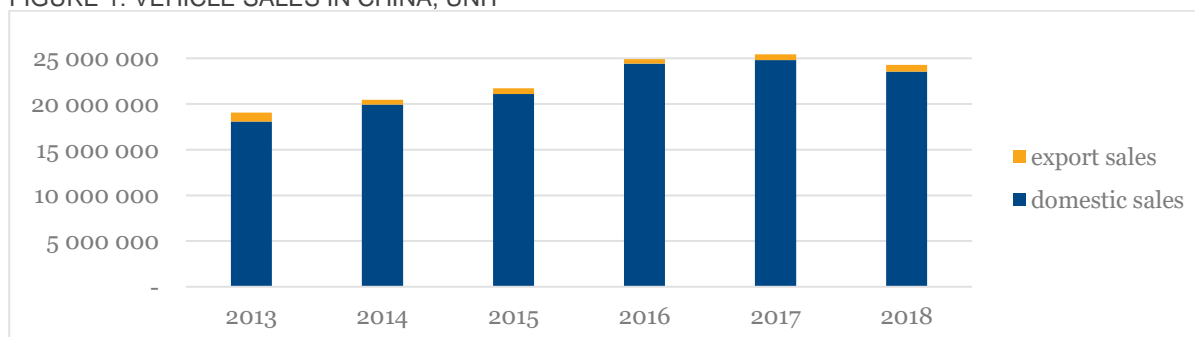


(Source: Business Sweden Analysis)

PASSENGER CAR MARKET AND TRENDS

During the past 20 years, the volume of domestic production and sales of Chinese auto market has increased in a steady way. However, in 2018, for the first time in 20 years, sales declined by 2.8% y/y, while production declined from 29 million in 2017 to 27 million in 2018. For the first half of 2018, sales of each month (except February) were higher compared to the same month in 2017. For the rest of 2018, the automotive market started suffering from negative growth, with the annual growth rate dropping to 2.8% year-over-year basis. The industry was subject to significant pressure since the cumulative growth rate continued to decline in the second half of 2018.

FIGURE 1: VEHICLE SALES IN CHINA, UNIT



(Source: China Association of Automobile Manufacturers)

For the passenger vehicles, production reached 23,529,000 units, reflecting a 5.2% y/y decline, while sales reached 23,710,000 units, reflecting a 4.1% y/y decline. Production of passenger vehicles accounted for 84.6% of the total production; while sales accounted for 84.4%.

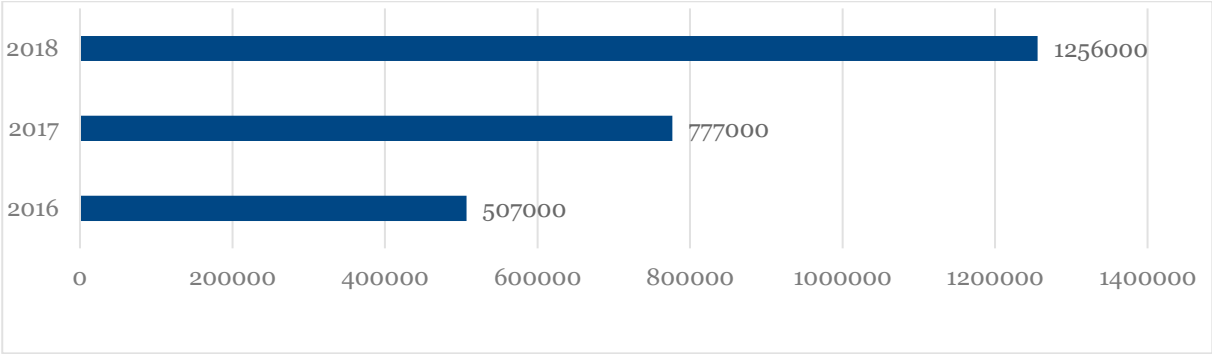
	Jan. - Dec. 2018		
	Units of Production	Share (%)	Y/Y (%)
Sedan/Hatchback	11,465,800	41.2	-4.0
MPV	1,684,900	6.1	-17.9
SUV	9,958,600	35.8	-3.2
Mini Van	420,100	1.5	-20.8
Passenger Cars Total	23,529,400	84.6	-5.2

(New Vehicle Production by Type, Sources: Marklines Data Center)

Economic slowdown and an ongoing trade war with the United States have resulted in economic uncertainties among the consumers. Furthermore, increasing environmental awareness among China's younger population, and a rising

popularity of car-sharing, ride-hailing and bike-sharing apps have decreased the needs to own a vehicle. Environmental awareness resulted in a tendency to consider more environmentally friendly options, such as electric vehicles. According to Global Automotive Survey 2019, China is today a global leader in terms of battery electronic mobility with the help of its battery electric vehicles.

FIGURE 2: NEW ENERGY VEHICLES SALES



(Source: cada.cn)

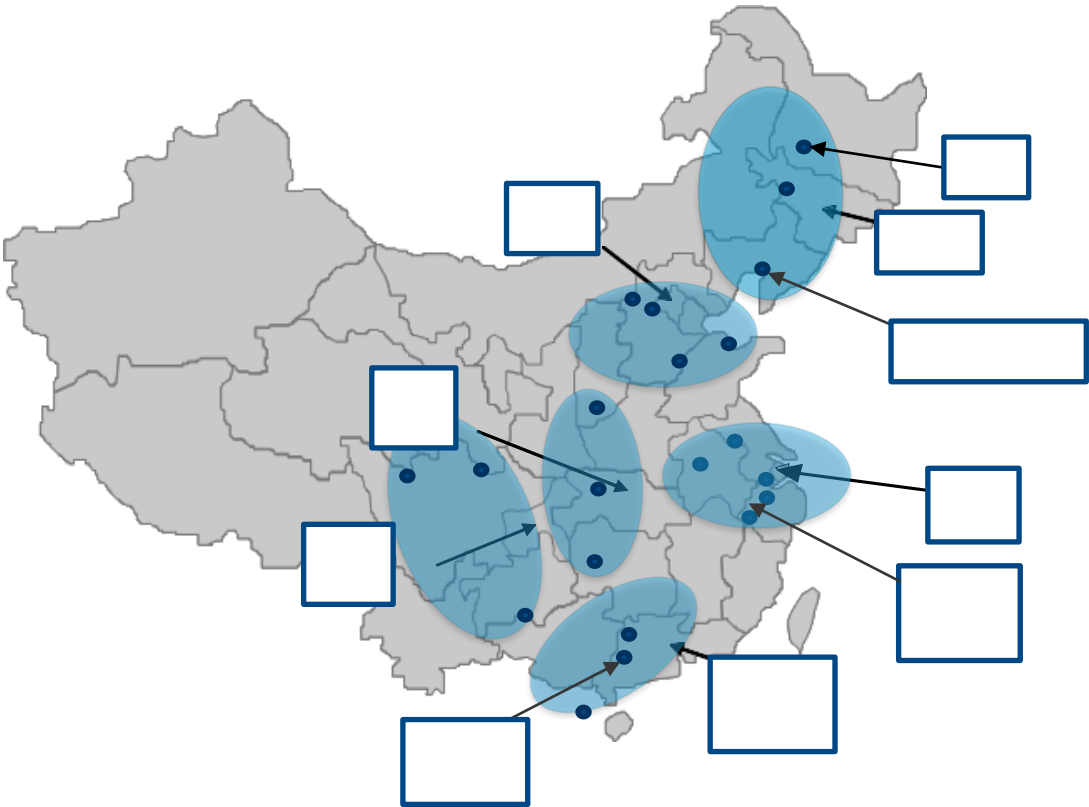
	Jan. - Dec. 2018		Jan. - Dec. 2018	
	Units of Production	Y/Y (%)	Units of Sales	Y/Y (%)
Electric Vehicles	985,600	47.9	987,700	50.8
Plug-in Hybird Vehicles	284,900	122	268,300	118
New Energy Vehicle Total	1,270,500	59.9	1,256,000	61.7

Map of OEMs and automotive clusters in China

(Source: Marklines Data Center)

China has six major automotive industry zones. It can be seen on the map that most of the OEM plants are located in the north-east or south-east of China.

FIGURE 3: AUTOMOBILE MANUFACTURERS PLANTS



The Northeast Zone:

City: Shengyang, Chuangchun and Harbin

Main automakers: FAW Group (FAW-VW, FAW Car, Sichuan FAW Toyota Changchun), Brilliance Jinbei (Brilliance BMW), Shanghai GM Norsom, Haafei

The Yangtze River Delta Zone:

City: Shanghai, Nanjing, Wuhu and Ningbo

Main automakers: SAIC (Shanghai GM, Shanghai VW), SAIC Nanjing, Chery, Geely, etc.

The Pearl River Delta Zone:

City: Guangzhou, Haikou and Shenzhen

Main automakers: GAIC (Guangqi Honda, Honda China, GAC Toyota), Dongfeng Nissan, BYD, Hafei Shenzhen and Haima.

The Bohai Zone:

City: Beijing, Tianjing, Dalian, Jinan and Yantai

Main automakers: Beijing Benz, Foton, FAW Toyota, Tianjin FAW Xiali, Chery Dalian, Sinotruk, Shanghai GM.

The Central South Zone:

City: Wuhan, Zhengzhou and Xiangtan.

Main automakers: Dongfeng (Dongfeng Peugeot Citroen, Dongfeng Honda), Great Wall, Geely Xiangtan, etc.

The Southwest Zone:

City: Chongqing, Chengdu and Liuzhou

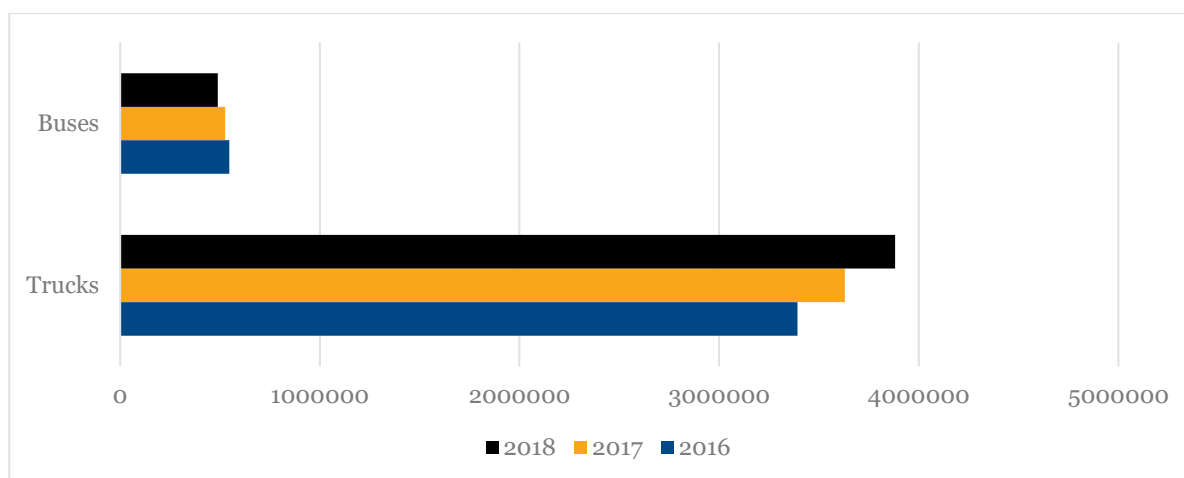
Main automakers: CHANA (Chang'an Ford Mazda, Chang'an Suzuki), Lifan, Sichuan FAW Toyota, FAW -VW Chengdu, SAIC-GM Euling, Dongfeng Liuzhou, etc.

COMMERCIAL VEHICLE MARKET AND TRENDS

The production volume of commercial vehicles in China increased from 3,791,000 units in 2014 to 4,182,700 units in 2018. Although it showed a YOY decrease in 2015, it kept rising from 2016 to 2018. Especially in 2018 when the production and sales of automobiles declined, the production and sales of commercial vehicles both achieved growth.

	Jan. - Dec. 2018		Jan. - Dec. 2018	
	Units of Production	Y/Y(%)	Units of Sales	Y/Y(%)
Heavy Trucks	1,112,400	-3.2	1,147,900	2.8
Middle-Sized Trucks	172,600	-26.3	172,200	-22.7
Light Trucks	1,787,800	8.0	1,895,500	10.2
Mini Trucks	620,800	12.0	666,600	17.1
Trucks Total	3,693,600	2.9	3,882,200	6.9

FIGURE 4: SALES OF COMMERCIAL VEHICLES



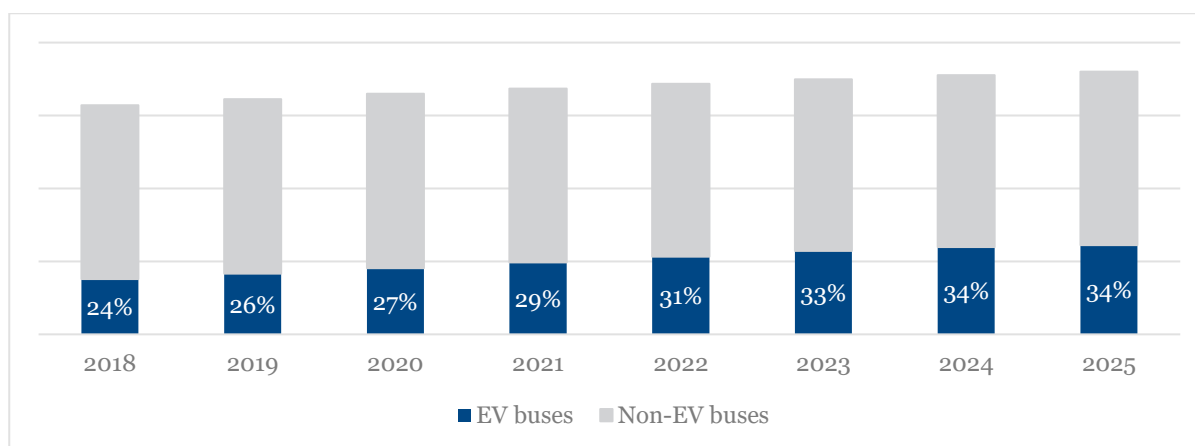
(Source: China Association of Automobile Manufacturers)

	Jan. - Dec. 2018		Jan. - Dec. 2018	
	Units of Production	Y/Y(%)	Units of Sales	Y/Y(%)
Large Bus	78,100	-16.2	77,000	-18.2
Middle-Sized Bus	75,100	-11.9	73,600	-13.3
Light Bus	335,900	-3.4	334,600	-3.9
Bus Total	489,100	-7.0	485,200	-8.0

China's electric bus market

China's electric bus players have enjoyed a booming domestic market, while positioning themselves for aggressive growth in overseas markets. The Chinese government has been committed to electrification of the domestic bus fleet and wields large influence across the value-chain in the automotive industry. In 2018 China had the largest fleet globally with 99% of global electric buses in operation.

FIGURE 5: TOTAL BUS FLEET IN CHINA (ELECTRIC % OF TOTAL)

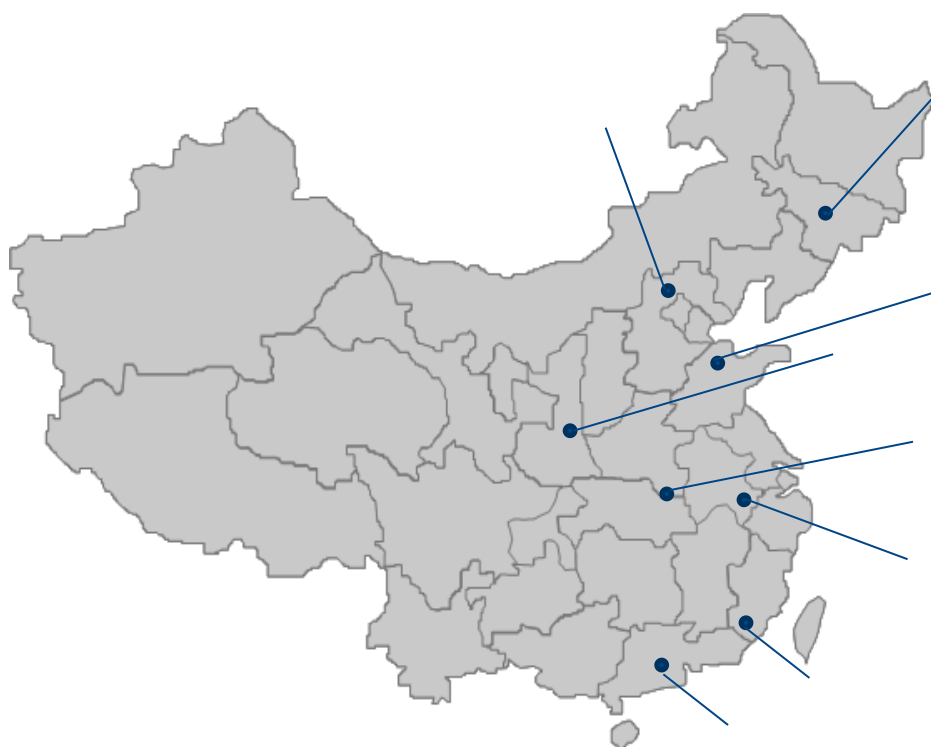


(Source: China Association of Automobile Manufacturers)

China has become a world leader in the electric bus segment. As a result, Chinese companies are more competitive than ever before. BYD (Build Your Dreams), a company that started out as a battery manufacturer in 1995 have become a global leader in the electric bus segment due to the progress of the Chinese automotive industry. The company recently stated that their electric busses were used in 300 cities across the globe and aim to double bus sales in Europe the coming years.

Map of key commercial vehicle OEMs in China

FIGURE 6: MAJOR CHINESE BRAND COMMERCIAL VEHICLES HEADQUARTER



(Source: Marklines Database)

AUTO PART MARKET AND TREND

Driven by the rapid development of automotive industry, the growth of China's auto parts industry has accelerated significantly in recent years. According to the statistics from China Automobile Industry Association, the total sales of Chinese auto part industry reached 4 trillion CNY in 2018, resulting in 8.2% y/y growth. China's auto parts exports have also grown rapidly with Europe, the United States, and Japan being the major destinations.

The advantage of China's car parts manufacturers mainly lies in labor-intensive products. Industrial clusters have been formed in Northeast China, Bohai Rim, Yangtze River Delta, Pearl River Delta, Central China and Southwest China where the labor resource is abundant. However, with regards to high value-added fields, these companies are facing fierce competition from multinational players like Bosch, Continental, and Denso.

According to a whitepaper on auto parts by Roland Berger, total revenue of the Top 100 Chinese suppliers in 2017 was 1.15 trillion yuan, up 36.3 percent from on a yearly basis. The entrance threshold of the list rose from 1.4 billion yuan in 2016 to 1.88 billion yuan in 2017, indicating a larger scale of auto parts companies.

Seventeen suppliers in the global Top 100 posted sales revenue of over 1 trillion yuan (\$143.7 billion) in 2017, lifting the list's benchmark revenue to 13.13 billion yuan. Bosch, Continental, and Denso grabbed the top three places, while China's Weichai Power and Huayu Auto placed 5th and 11th in the list. Weichai Power, the only Chinese company to post a sales revenue of over 200 billion yuan, jumped five places, while Huayu Auto ascended one place registering a sales revenue of 140 billion yuan. In total, there were 18 other Chinese suppliers on the list.

KEY STAKEHOLDERS OF AUTOMOTIVE INDUSTRY IN CHINA

The key stakeholders of the automotive industry in China can be divided into 3 different group: government sector, Automotive Association, and state-owned quality inspection companies.

Automotive associations:

- China Association of Automobile Manufacturers (CAAM)
 - Like FKG, CAAM is a self-discipline and non-profit social organization formed based on the principle of equality and voluntariness, which consisting of enterprises and institutions as well as organizations engaged in production and management of automobiles (motorcycles), auto parts and vehicle-related industries founded in China
 - There are 31 professional sub-committees under CAAM, covering all key components and parts of automotive
- China Automobile Dealers Association (CADA)
 - CADA is a CAAM is a self-discipline and non-profit social organization formed based on the principle of equality and voluntariness, which consisting of enterprises and institutions as well as organizations engaged in sales and dealership in China

Main function:

- conducting industrial and policy research,
- collecting and analyzing industry technical and economic information,
- organizing and holding large-scale domestic and international exhibitions/seminars for Chinese automotive companies to explore domestic and foreign markets, etc.

Government departments:

- Ministry of Industry and Information Technology
 - Department of Equipment Manufacture
 - Main function: formulate and release automotive industrial standard and regulation, release vehicle license
- State Administration for Market Regulation
 - General Administration of Quality Supervision, Inspection and Quarantine
 - Main function: measure the quality of vehicles
- Ministry of Transport
 - Department of Transport Service
 - Main function: vehicle inbound/outbound transportation; monitor and analyze traffic operations and release relevant information; automobile comprehensive performance testing management
- Ministry of Ecology and Environment
 - Department of Air Environmental Management

- Main function: R&D for road pollutant diffusion model, vehicle exhaust emission research, urban road air quality management
- AQSIQ Defective Product Administrative Centre
 - Main function: recall defective vehicles

Government-owned quality inspection Companies:

- China Automotive Technology and Research Center Co., Ltd. (CATARC), a central government-level enterprise belonging to the State-owned Assets Supervision and Administration Commission of the State Council.
- China Automotive Engineering Research Institute Co. (CAERI), mainly engaged in the technical service for automobile and manufacturing operations of automobile industrialization including development of various products, the technical consulting, test and the quality inspection and authentication

Main function:

- R&D of testing, engineering technology, databases research, engineering design and general contracting, NEV, commercialized and strategic rising businesses, etc.

Academia

- China Society of Automotive Engineers
- Tsinghua University
- Tongji University

Main function:

- Consulting in the policy and standard developing, R&D of primary technologies, commercialized and strategic rising businesses, etc.

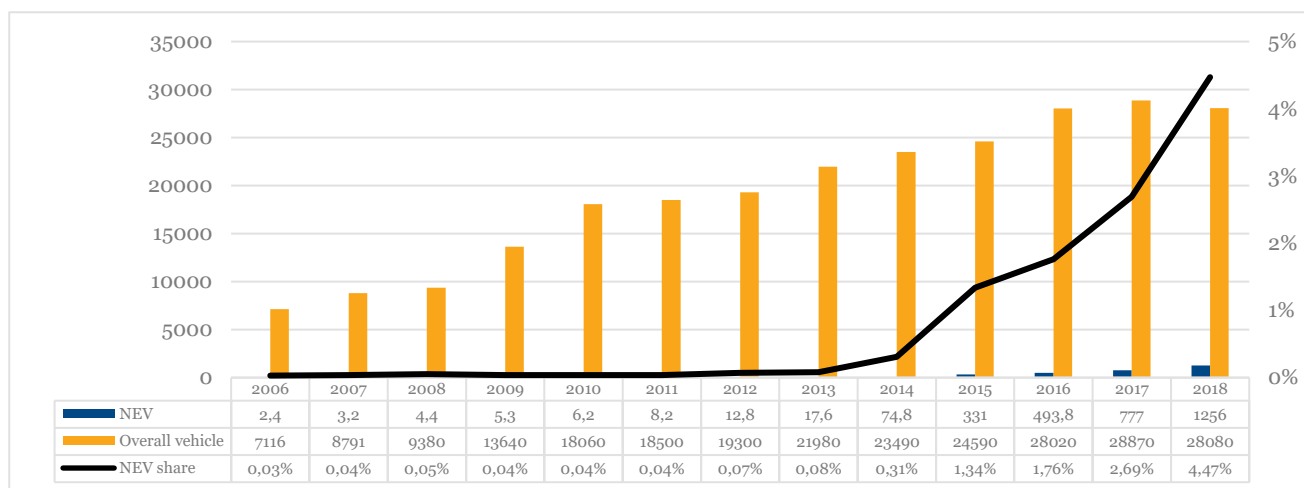
SEGMENT ANALYSIS AND EVALUATION

BATTERY ELECTRIC VEHICLE

Overall development

As pollution and smog continue to plague the market, the Chinese government has extended efforts with new energy vehicles (NEVs) as one facet of tackling the growing concerns. As a result, China strongly subsidizes and incentivizes its NEV industry, resulting in a rapid and technological advancement. China has now become the largest market for NEVs. In 2018, 1,256,000 NEVs were sold in China, accounting for 50,4% of the global NEV sales. The NEV industry is expected to continue to grow rapidly in the coming decades, with NEVs dominating the Chinese vehicle market by 2050.

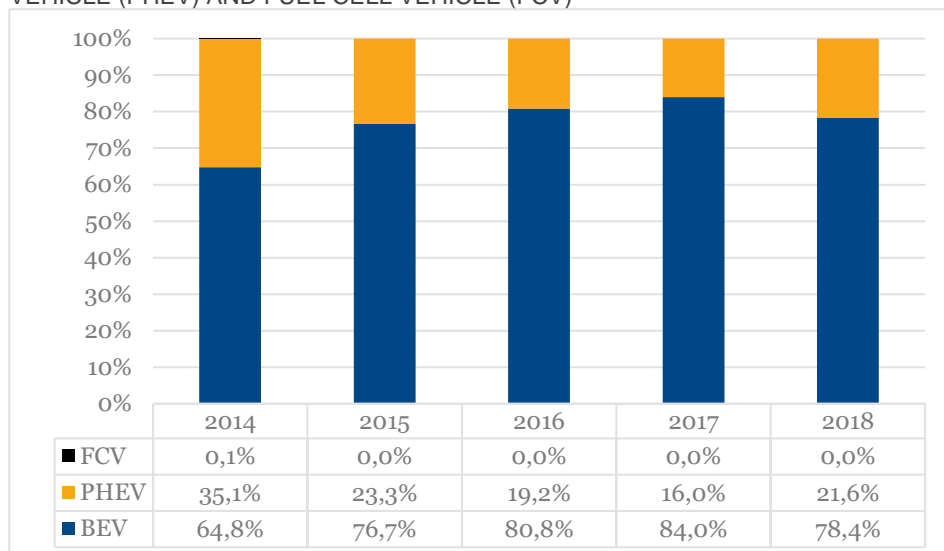
FIGURE 7: NEVS SALES BETWEEN 2006 AND 2018, THOUSAND OF UNITS



(source: China Association of Automobile Manufacturers)

Battery electric vehicles are dominating the market. BEV technology surpassed that of Plug-in Hybrid Electric Vehicle (PHEV). Furthermore, cities such as Beijing and Shanghai have excluded PHEV from the subsidy list, which led to BEV outgrowing PHEV.

FIGURE 2: THE SHARE OF PRODUCTION: BATTERY ELECTRIC VEHICLE (BEV), PLUG-IN HYBRID ELECTRIC VEHICLE (PHEV) AND FUEL CELL VEHICLE (FCV)



Charging infrastructure is still the bottleneck of the development of NEVs. By the end of 2018, 777,000 charging poles were built. The goal is to have 4,800,000 charging poles by 2020, resulting in 1:1 ratio, meaning that there should be one charging pole for each vehicle in the country. With the scale production of electric vehicles, the enforcement of supporting policies, improvement of charging standards, increasing investment from grid companies and market access permission for private companies, charging infrastructure market will gradually reach sufficient scale and profitability.

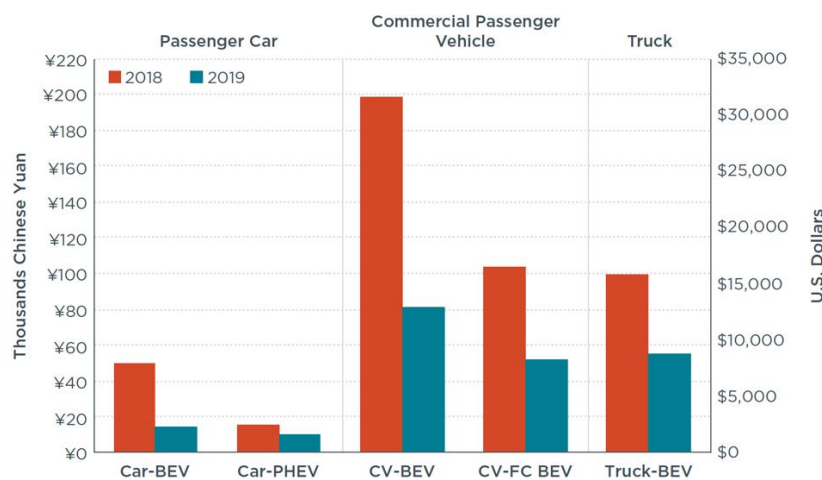
National strategy, policy and legislation

Since 2009, the State Council and relevant ministries issued a number of policies including *the Energy-saving and New Energy Vehicle Industry Development Plan (2012-2020)* by the State Council, and specific measures such as the procurement subsidies to promote the NEVs in 88 demo cities. By the end of 2018, total subsidies from the central government for NEVs reached 95,84 billion CNY. The demo cities also echoed the national strategy by providing equivalent local subsidies. In addition, the local governments also released encouraging measures to promote the NEVs.

Subsidies, from both the central and provincial/municipal governments, have played a significant role in boosting domestic NEV sales. MIIT announced in December 2016 that it would cut the maximum subsidies by 20 percent for 2017 and eventually phase out all subsidies by 2020. In late March, China announced the 2019 adjustment plan to its decade-long central subsidy program for new energy vehicles (NEVs). The program was introduced as the Ten Cities, Thousand Vehicles project in 2009, and is set to be phased out after 2020. The incremental phase down and ultimate elimination of NEV subsidies serves to make NEV market growth in China less dependent on fiscal support. It also relieves the financial burden on the central government. Together with a new NEV mandate policy that requires a certain percentage of electric vehicles in new fleets starting in 2019, this has the potential to drive China's electric vehicle market after 2020.

Despite reduced subsidies, China continues to solidify its leading position in the global EV market with other forms of supportive policies. For example, the NEV quota system imposes credit targets for automakers. This quota system assigns a specific number of credits to a NEV model depending on metrics like electric range, energy efficiency, and rated power of fuel cell systems. Higher performance vehicles are assigned more credits, capped at six credits per vehicle. Automakers must meet a positive credit balance at the end of the year, or they'll be forced to purchase credits from other automakers, reduce production of internal combustion engine (ICE) vehicles, or stop production of new models and receive a monetary fine.

FIGURE 9: COMPARISON OF NEV SUBSIDIES IN 2018-2019. CV-BEV REFERS TO A REGULAR BATTERY ELECTRIC COMMERCIAL PASSENGER VEHICLE AND CV-FC BEV REFERS TO A FAST-CHARGING BATTERY ELECTRIC COMMERCIAL PASSENGER VEHICLE.



(Source: The International Council on Clean Transportation)

NOTE: SEE BELOW FOR THE VEHICLE MODELS USED TO DETERMINE THE SUBSIDY VALUES IN FIGURE 3. ALL VEHICLE SPECIFICATIONS ARE FROM THE MINISTRY OF INDUSTRY AND INFORMATION TECHNOLOGY:

CAR-BEV: ROEWE ERX5 (320KM ELECTRIC RANGE)

CAR-PHEV: BYD QIN PRO DM (80KM ELECTRIC RANGE)

CV-BEV: BYD6101LGEV10 (535KM ELECTRIC RANGE)

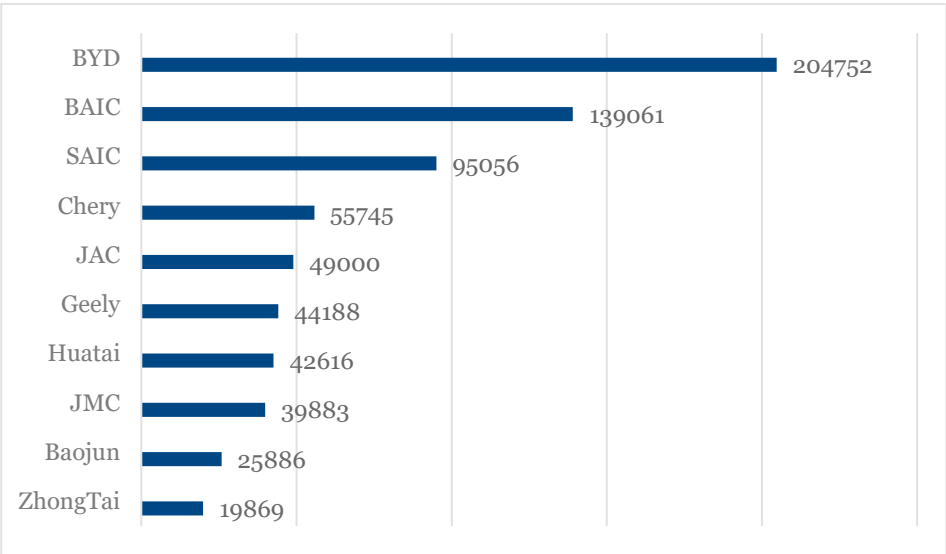
CV-FC BEV: BFC6128GBEV6 (3.38C CHARGING SPEED)

TRUCK-BEV: XZJ5181GQXDBEV (255KM ELECTRIC RANGE)

Top players

In contrast to gasoline vehicles, the current sales of new energy vehicles are mainly dominated by domestic manufacturers. The market has seen a large influx of digital technology enterprises and emerging NEV manufacturers, such as NIO, Xiao Peng and WM Motor. With the improvement of industry environment, increase of demand and profit potential, more traditional OEMs and new-technology companies will join the competition and provide better products.

FIGURE 10: TOP 10 NEV OEMS, TOTAL SALES UNIT (2018)



(Source: China Association of Automobile Manufacturers)

BATTERY SYSTEMS

Overall development

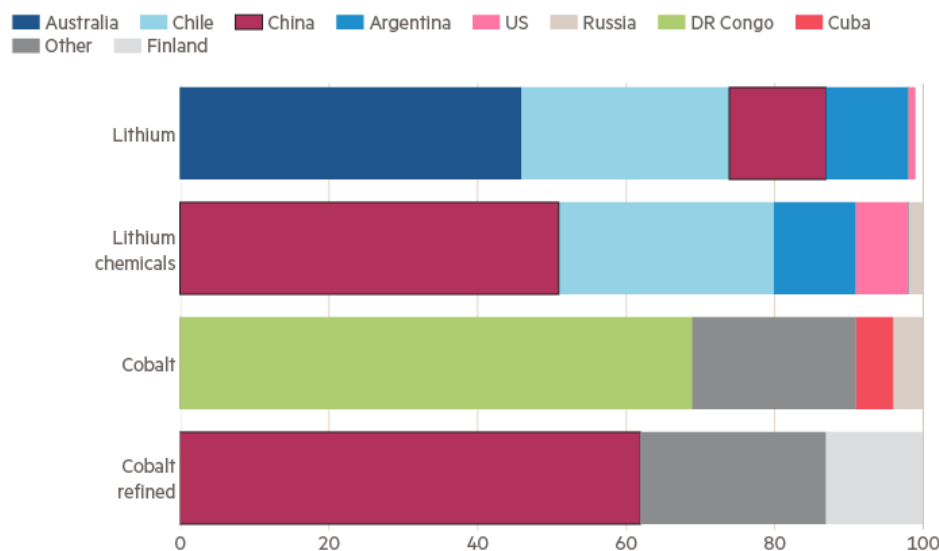
Raw Materials

Driven by the national policy to promote new energy industry, the Chinese lithium industry has experienced rapid growth. In order to meet demand, lithium suppliers are quickly scaling up their production. During 2018, lithium miners around the world announced capacity additions that could potentially bring production to 635,000 metric tons of lithium carbonate equivalent (LCE), putting downward pressure on lithium prices. However, since Q4-2018 and Q1-2019, more than 200,000 metric tons of LCE have been hit by delays or have faced other challenges. The situation of short supply of lithium carbonate will continue in the domestic market. The gap between lithium carbonate demand and supply is estimated to be 12,000 tons. Due to the lack of high-grade lithium resources, the Chinese companies have started to look into other countries and regions with enriched lithium resources, such as Australia, Argentina, Chile, Bolivia and Africa.

While there's little cobalt mining in China itself (1 percent of the world's total output in 2017), Chinese companies have snapped up cobalt mines abroad in recent years, particularly in the Democratic Republic of Congo, the largest source of the metal. Eight of the 14 largest cobalt miners in Congo are now Chinese-owned, accounting for almost half of the country's output. China is even more dominant in the production of cobalt chemicals needed to make batteries than Congo is in cobalt mining. According to data from Darton Commodities Ltd., China accounts for more than 80 percent of the production of cobalt chemicals.

After years efforts, China is increasingly dominating the supply of lithium and cobalt, seen as key to the electric vehicle (EV) revolution.

FIGURE 11: CHINA'S STRONG POSITION IN KEY RAW MATERIALS AND CHEMICALS, % OF TOTAL GLOBAL SUPPLY, 2018



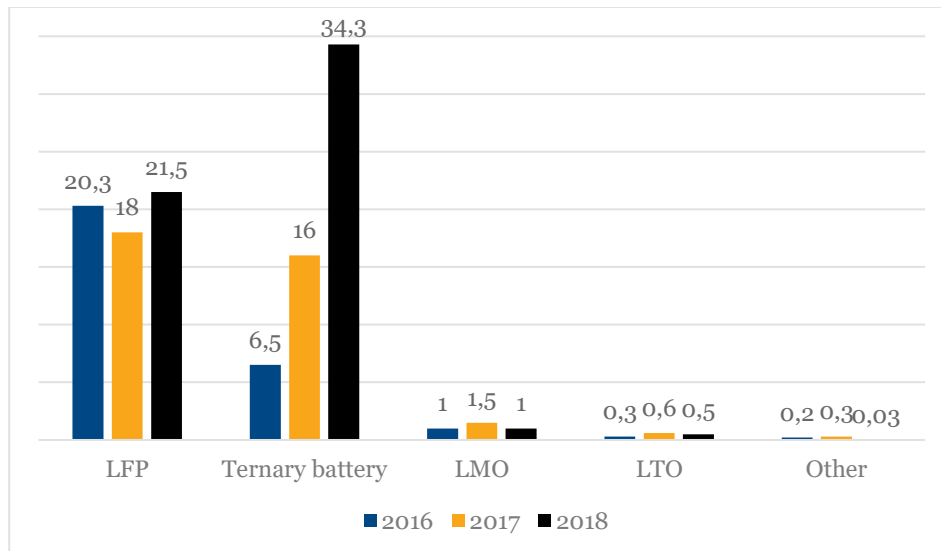
(Source: Benchmark Mineral Intelligence, FT)

Battery production

In 2018, the installed capacity of EV batteries was 57.35 GWh, with a 57.0% y-y increase. The installed capacity of new energy passenger cars reached 32.86 GWh, accounting for 57.3% of the total installed capacity, which increased by 137.0% from last year, and became the main driver of EV batteries growth. The accumulated installed capacity of the top 10 battery manufacturers reached 43.36 GWh, accounting for 81% of the total installed capacity. The installed capacity of CATL was 23.54 GWh in 2018, which is more than double that of BYD, the second player following CATL. CATL has partnered up with the major domestic OEMs including FAW, BAIC, Geely, SAIC, Chang An, Nio, GAC, Chery, Great Wall, Dong Feng and JAC. BYD have started to supply NEV manufacturers, however, the amount accounts for a small share of the company's total production. The top 2 players controlled 60.4% of the total market share in terms of installed capacity. The market concentration is expected to further increase in the coming years.

Lithium-iron phosphate (LFP) has the largest market share in the early stage of EV battery market due to its advantages in safety, life cycle and price. However, when the subsidy links to the energy density, ternary battery becomes the mainstream choice of the passenger EVs thanks to its high energy density. With the surge of the passenger EV production and market share, ternary battery rapidly surpassed LFP dominating the market.

FIGURE 12: THE INSTALLED CAPACITY OF DIFFERENT TYPES OF EV BATTERIES (GWH)



(Source: ofweek.com)

As China phases out subsidies for electric vehicles next year, it also ends a related policy that effectively shut out foreign battery makers. China began reducing its massive subsidies two years ago and will move to a credit system next year. The scrapping of the battery lists comes at a time when China welcomes foreign EV firms in other ways. The foreign EV battery companies returned to the market through joint ventures with the upstream suppliers in short term and localizing the production in the long run.

1. Joint ventures with the upstream suppliers to avoid the market and policy risks

- LG Chemical cooperated with Hua You Cobalt by setting up two joint ventures worth 4 billion CNY in investment. LG and Hua You each holds the major shares of one of the two joint ventures
- SKI will restart its investment in a plant for battery materials announced in 2016

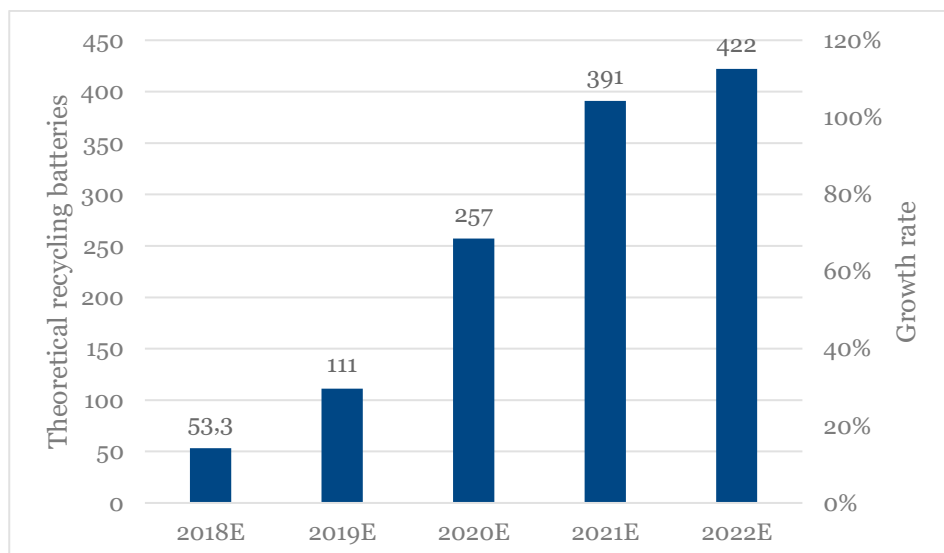
2. Invest in new plants to prepare for the full phaseout of the subsidies

- Samsung SDI plans to move the factories in Xi'an, China, Cheonan and Ulsan Korea to Wuxi, China before 2023
- Panasonic plans to invest billions of US dollar to build two new production lines in its battery plant in China, which will increase the capacity by 80%. The production base for cylindrical battery in Wuxi will start to produce batteries for low speed EV instead
- LG Chemical announced an investment of 13.8 billion CNY to build a factory with capacity of 32 GWh in Nanjing in July 2018. In January 2019, an additional 7.2 billion CNY was announced as an investment in the Nanjing plant

Battery Recycling

China's new energy vehicles have been mass-produced since 2014, with service life of power batteries being between 5 to 8 years. This means that the earliest batch of electric vehicle batteries on the market is already at the critical point. It is expected that the lithium battery recycling market will show rapid growth in the next three years. By 2020, the market size is expected to exceed RMB 15.6 billion, with a GAGR of 41%.

FIGURE 13: 2018-2022 THE THEORETICAL RECYCLING EV BATTERIES IN CHINA, 1,000 TONS



(Source: ofweek.com)

National strategy, policy and legislation

In March 2017, MIIT, NDRC, MOST and Ministry of Finance (MOF) jointly issued *the Vehicle Traction Battery Industrial Development Action Plan* in order to integrate the EV battery industry, enhance and accelerate the development.

The plan set out an industry-wide target of 100 GWh capacity batteries by 2020, with the emphasis on higher quality and lower cost. It also calls for more fundamental research efforts and technological developments in order for the industry to achieve more breakthroughs in the next eight years and turn China into a world leader by 2025.

MIIT announced in June 2019 that it is dropping its practice of publishing lists of battery makers that met technical standards. The policy, put in place in 2015, was meant to help develop the industry. Supplying the information to get on the list was supposedly voluntary, but in reality, using the batteries on the ministry's lists made it more likely that vehicle manufacturers would qualify for government subsidies. As of 2016, the last time the list was updated, it included a total of 57 companies—none of them foreign firms.

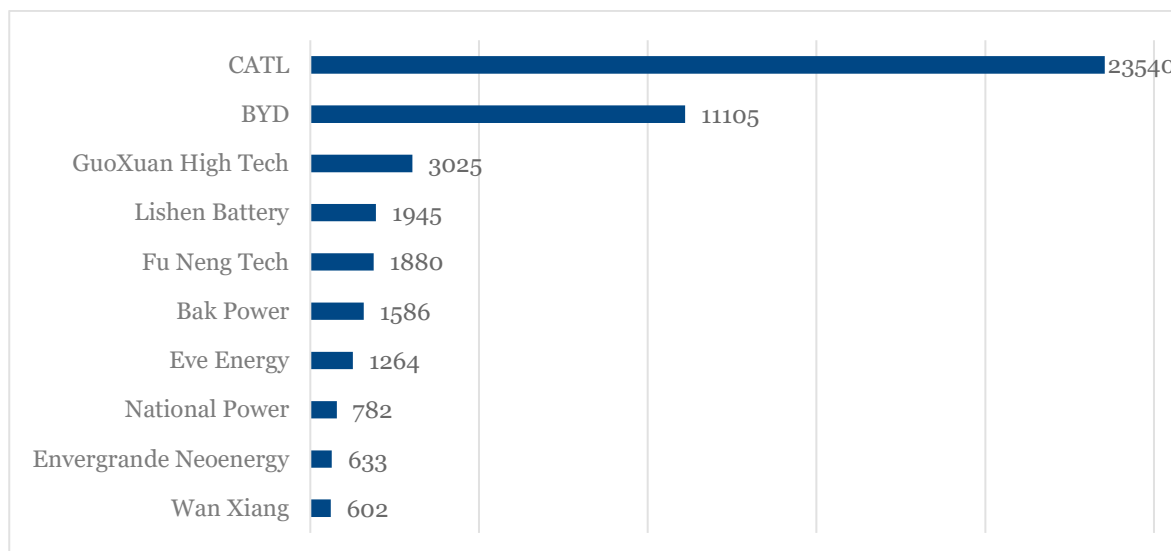
In March 2018, MIIT, MOST, Ministry of Ecology and Environment (MEE), Ministry of Transport (MOT), Ministry of Commerce (MOFCOM), State Administration for Market Regulation and National Energy Administration jointly released *the Notice for Demo Project on EV Battery Recycling*, urging the industry to establish a recycling system, exploring new business models, encouraging close collaboration along the value chains and promoting the use of EV batteries. MIIT also released list that included companies complying with *the Standard Conditions of Scrap EV Battery Comprehensive Utilization* released in 2018.

Top players

TOP RAW MATERIAL SUPPLIERS

- Tianqi Lithium
- Ganfeng Lithium
- Zhejiang Huayou Cobalt
- Jinchuan Group (Cobalt)
- China Nonferrous Metal Mining Group

FIGURE 14: TOP 10 BATTERY MANUFACTURERS, GWH (2018)



(source: libattery.ofweek.com)

TOP BATTERY RECYCLING COMPANIES

- Quzhou Huayou Cobalt New Material Company
- Ganzhou HighPower Technology Company
- GEM Co., Ltd
- BRUNP Recycling
- GHTECH Company

FUEL CELL ELECTRIC VEHICLE

Overall development

In 2018, the annual sales of FCEVs in China reached 1,527 units, totaling 3,428 units in all time sales. With unfilled orders included, China is highly likely to achieve the goal of selling 5,000 units in 2020. Certainly, there are some price ranges depending on the categories, but if assuming that all of them are middle-sized FCEV buses which cost 3 million CNY each, the sales of FCEVs would have already created a 10 billion CNY market. Like the BEVs, subsidies from the government helps the industry to develop at an early stage until it enters an organic growing track. The upper limit of subsidies for PHEV and BEV, both of which are going through an expansion period, reduced to 180,000 RMB.

It is notable that China clearly focuses on buses and delivery cars (trucks and vans) as the early market of FCEVs. Since such commercial vehicles travel longer distances a day than private passenger vehicles, most BEVs in the present market of China are not likely to meet the requirement of driving range. In addition, fuel consumption for commercial vehicles running on regular routes is predictable, which makes it easier to locate refueling stations and operate them with some certainty of sales. It can help the operators with economic feasibility too.

Yet, a hydrogen refueling station (HRS) is made up of very expensive equipment and logistics chain of hydrogen fuel is still challenging, which increases not only the initial costs but also the operation costs. In order to promote new industries in the region and boost local economy, the local governments will provide financial support to the developers or the operators. The encouragement resulted in over 20 HRSs newly constructed in 2018.

Chinese fuel cell industry falls behind Japan, Korea, U.S. and Europe. In order to change the situation, Chinese companies hopes to integrate foreign advanced technologies through collaboration and acquisition. In May 2018, BYD announced its cooperation with US Hybrid Corporation to develop fuel cell buses for Honolulu airport. Weichai Power, Chinese biggest state-owned diesel engine producer, acquired 20% share of Ballard for 184 million USD in November last year. Recently, Weichai also acquired a 20% stake in British fuel cell manufacturer Ceres Power for 48 million GBP.

National strategy, policy and legislation

Ambitious to be the world leader in the automotive industry with its NEV production, China positioned FCEVs as a priority area following BEVs. Hydrogen and FCs are described as a new strategic industry in the “13th Five Year Plan on Energy Technology Innovation” which was released in 2016. In the same year, the China Society of Automotive Engineers developed the “Technology Roadmap for New Energy and Energy-Saving Vehicles” directed by the Ministry of Industry and Information Technology, and two years later “Made in China 2025: Technological Innovation Green Book for Key Areas and Technology Roadmap (2017).” was issued. In these documents, China set the aggressive goals of producing 5,000 FCEVs in 2020, 50,000 units in 2025, and 1 million units in 2030.

The government also provide subsidies to the buyers of FCEVs, with up to 500,000 CNY per vehicle. Another encouragement for logistics companies to purchase FCEVs is the regulation which bans diesel delivery cars to enter some cities. Furthermore, another regulation in some provinces forces logistics industry to switch all the vehicles to NEVs after a certain period (or depreciation).

Top players

1. SinoHytec
2. SinoSynergy
3. Re-Fire Tech
4. Weichai Group
5. Vision Group
6. CEMT
7. Telos Auto
8. Troowin
9. Hongyun Hydrogen
10. Bing Energy

VEHICLE LIGHT WEIGHTING

Overall development

Lightweight is one of the important ways to save energy in traditional vehicles and improve the driving range of new energy vehicles. More and more research institutions and automotive companies have focused their R&D research efforts on lightweight vehicles and components.

In comparison to Europe and United States, China is still at an early stage when it comes to the development of lightweight technologies. With government support and OEMs effort, the process of lightweight development is expected to accelerate. According to the study by the China Association of Automobile Manufacturers (CAAM), the market size of lightweight materials for automotive will be 500 billion CNY in the coming 3 years.

TABLE 1: TARGETS AND ACHIEVEMENTS OF THE LIGHTWEIGHT AUTOMOTIVE

Area	Target (compared with 2015)	2016 Status
Vehicle Weight Reduction Target	2020: -10% 2025: -20% 2030: -35%	The main OEMs such as Dong Feng, FAW, Chery, Chang An, managed to reduce the weight by 5%-8% on average compared with 2015. Some BEVs of BAIC and Chery managed to reduce the weight by over 10%
High Strength Steel	2020: The application of AHSS steel with strength above 600MPa reaches 50% 2025: The application of 3 rd generation auto steel reaches 30% 2030: 2000MPa above is used in auto manufacturing	The application of high strength steel at 600 MPa and above is 30%-50%. The application in some OEMs products such as FAW, SAIC, Great Wall, Chery and BAIC is close or above 50%.

Aluminum Alloy	2020: The amount of aluminum used in a single car reaches 190 kg 2025: The amount of aluminum used in a single car reaches 250 kg 2030: The amount of aluminum used in a single car reaches 350 kg	The aluminum alloy is mainly used in the power system, bumpers and luggage racks, which amounts 120 kg in a single car. The share of full aluminum car body is still very small.
Magnesium Alloy	2020: The amount of magnesium used in a single car reaches 15 kg 2025: The amount of magnesium used in a single car reaches 25 kg 2030: The amount of magnesium used in a single car reaches 45 kg	The magnesium alloy is mainly used in the steering wheels and meter structures, which amounts less than 3 kg in a single car.
Carbon Fiber	2020: Carbon fiber is used to a certain amount, and the cost is reduced by 50% compared with 2015 2025: The share of carbon fiber reaches 2%, and the cost is reduced by 50% compared with 2020 2030: The share of carbon fiber reaches 5%, and the cost is reduced by 50% compared with 2025	The local OEMs are still studying the technologies from Europe and US, such as HP-RTM, but also looking into other technologies.

National strategy, policy and legislation

The plan for automotive development in "Made in China 2025" emphasized the importance of lightweight. "Lightweight automotive" has become a key part of the national strategy and clearly stated in the technology roadmap for auto industry aiming to reduce energy consumption and carbon emission.

Top players

In close collaboration with OEMs and new material companies, universities take the leading role of R&D of new materials and structures to reduce the weight of vehicles.

- Composite material
 - Jiangsu Hengshen Co., Ltd
 - China National BlueStar (Group) Co., Ltd
 - Zhongfu Shenying Carbon Fiber Co., Ltd
 - China Composites Group Corporation Ltd
 - China Titan Stone Group
- Alloy
 - Wanfeng Jinyuan Holding Group
 - Zhongwang Group
 - Aluminum Corporation of China
 - Guangdong Hongtu Technology (holdings) Co., Ltd
 - Nanjing Yun Hai Special Metal Co., Ltd
- Light weight component
 - Huayu Automotive System Co., Ltd
 - Lingyun Industrial Corporation Limited
 - Suzhou Tongjie Automotive Technology Company
 - Wanxiang Group
 - Yongzhe Group

INTERNAL COMBUSTION ENGINE (ICE) TECHNOLOGIES

Overall development

In terms of ICE, Chang'an and other domestic OEMs have developed a variety of gasoline engines, with a displacement of 0.8-6.0L, and a relatively complete product portfolio; Great Wall and Yunnei Power have also developed diesel engines for different passenger cars. At the same time, technologies such as GDI+PFI dual injection, Atkinson cycle, twin power

turbo, high pressure common rail injection system have been successfully developed. In terms of transmission, GAC, FAW and BYD have developed DCT independently and realized mass production. Shengrui developed the world's first horizontal 13AT; Jianglu Rongda developed CVT. In addition, energy-saving technologies such as CHS system and natural gas multi-point sequential injection engine management system for light vehicle also indicate that China has made substantial progress and breakthroughs in the field of hybrid and alternative fuels.

However, compared with foreign advanced technologies, the gap in fuel consumption level of domestic brands is still relatively big. Core component technology is still dependent on foreign companies. Taking the engine as an example, the current high-pressure GDI, new boosting system, EGR system, etc. are basically supplied by foreign brands; the development of engine electronic control system is heavily dependent on a few foreign enterprises.

TABLE 2: MAIN SUPPLIERS OF CORE COMPONENT OF DOMESTIC ICE

Area	Technology	Foreign Supplier
Gasoline	High pressure GDI	Bosch, Delphi, Denso, Continental
	New boosting system	Honeywell, Valeo
	New VVT/VVL	BorgWarner, Schaeffler, Hitachi, Delphi
	Inter cooler EGR	Delphi, BorgWarner, Pierburg
Diesel	High pressure common rail injection system	Bosch, Delphi
	VNT booster	Honeywell, BorgWarner
	EGR system	Pierburg, Delphi, BorgWarner, Continental

So, the future of Internal Combustion Engine technologies will be focusing on the following aspects:

1) Electrification of the drive system

Under the impact of the electrification era, traditional engines need to be iterated and updated. Electrification is one of the best options for the ICE. For instance, in 2017, Chang'an Automobile held a new energy strategy conference with the goal of building three new energy-specific platforms in 2020, and it will completely stop the electrification of traditional-purpose fuel vehicles and full-spectrum products in 2025.

2) High Energy density

Under the same cruising range situation, "Range Extender + Battery" can completely achieve "cost / weight" reduction compared to "Battery" only. There is a precondition here that the energy density of the range extender is high enough to greatly surpass the energy density of the battery. The "Energy Technology and New Energy Vehicle Technology Roadmap" released in 2018 mentioned that the specific energy target of pure electric vehicle power battery is 350Wh/kg in 2020, 400Wh/kg in 2025, and 500Wh/kg in 2030. The energy density of internal combustion engines is much higher than battery at the current level. Giving up the internal combustion engine means using a more cumbersome battery, resulting in higher vehicle weight and higher energy consumption.

SEGMENT COMPARATIVE ANALYSIS AND PRIORITIZATION

The prioritization ranking of the segments have been made respectively for passenger vehicles and commercial vehicles. The following criteria have been chosen.

Encouragement from Chinese government

In China, the government's guidance and support is absolutely a key factor for industry players when making strategies.

Investment focus of Chinese players

The Chinese companies are interested in technologies and products that are related to their investment strategies.

Swedish offering

It is crucial for a successful cooperation that the Swedish offering is relevant and competitive.

TABLE 2: PRIORITIZATION RANKING OF THE SEGMENTS FOR PASSENGER VEHICLES

Passenger vehicles	Battery Electric Vehicle	Battery Systems	Fuel Cell Electric Vehicle	Vehicle Light Weighting	ICE Technologies
Encouragement from Chinese government	3	3	1	2	0
Investment focus of Chinese players	3	3	1	3	1
Swedish offering	2	1	2	2	2
Total	8	7	4	7	3

TABLE 3: PRIORITIZATION RANKING OF THE SEGMENTS FOR COMMERCIAL VEHICLES

Commercial Vehicles	Battery Electric Vehicle	Battery Systems	Fuel Cell Electric Vehicle	Vehicle Light Weighting	ICE Technologies
Encouragement from Chinese government	3	2	2	2	1
Investment focus of Chinese players	2	2	2	3	1
Swedish offering	2	1	2	2	2
Total	7	5	6	7	4

Note:

Scale 3 = Strong

Scale 2 = Medium

Scale 1 = Low

Scale 0 = None

Electrification or developing electric vehicles is a top-down national strategy that the Chinese government has pushed forward. It is also regarded as an opportunity for Chinese automotive industry to “overtake” those countries who are stronger at conventional vehicles. For Chinese players, advanced technologies on electric motor and control system are most attractive.

Most Chinese passenger vehicle OEMs have chosen to make power battery electric cars, while Geely wants to have one more card, which is fuel cells. Unlike passenger vehicles, Chinese commercial vehicle OEMs are more favorable for fuel cells solution.

China is already a major worldwide producer of power battery pack and materials. However, the stability and safety of the battery system is crucial to the development of the market and the whole BEV industry. Thermal runaway is the main reason causing autoignition of the battery. In order to improve the stability as well as the energy density of the batteries,

technologies to reduce cobalt or remove cobalt from cathode material, add silicon to anode material, reduce organic solvent in electrolytes and solid lithium battery is in high demand. In the meantime, battery recycling technology and solutions from Sweden will still be very interesting for players on the value chain, in particular, for Chinese OEMs, as today it is OEMs' major responsibility to make sure that the batteries will be recycled, according to the regulations in China.

For electric car manufacturers, light weight solutions have become a must. It is commonly agreed that light weighting is the direction that both OEMs and suppliers in China are striving for. Both structural design and new materials will attract attentions from Chinese players. Among others, R&D on carbon fiber for application in vehicles has been a relatively new area for investment during the past years. Therefore, Swedish technologies and solutions in vehicle light weighting, especially composite, are areas that are worthwhile for further exploration.

Alternative fuels for ICE vehicles are not prioritized in China, partly due to the resource situation. Biofuels, for example, have not received the same level of subsidies from the Government as electric cars. Hence, Chinese interest in Swedish bioenergy transportation solutions has been very limited.

In one word, electrification and light weight are suggested to be the segments with the biggest potential.

POTENTIAL INTERESTING PLAYERS FOR SWEDISH AUTOMOTIVE SUPPLIERS

Based on the previous analysis of prioritized technologies both pushed by the government and driven by the industry, Business Sweden has mapped out the key OEMs in China according to their business performance, development focus and relevancy with Swedish industry.

BYD



Company name:	BYD Company Limited
Location:	Shenzhen (HQ)
Establishment:	1995
Revenue (2018)	130 billion CNY (+2,78 billion CNY profit)
Sales (2018):	502 000 units
Ownership:	Listed company, 60% of public shares owned by US investors. Warren Buffet's Berkshire Hathaway owns 9.9%
Core business:	Tradition fuel and new energy passenger cars and commercial vehicles; rechargeable batteries and photovoltaic products; mobile phone parts and assembly
Markets:	China, the United States, Europe and South America
Market position:	BYD's NEVs have ranked No.1 in global sales for three consecutive years (since 2015-2018)
Connection to Sweden:	Nobina, Sweden and the Nordic region's largest bus operator owns a fleet of 36 BYD electric buses in Sweden, with another 20 are in the pipeline for delivery to Sweden.
Homepage:	www.byd.com

Dong Feng



Company name:	Dongfeng Motor Corporation
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Location:	Wuhan (HQ)
Establishment:	1969
Revenue (2018):	104,5 billion CNY (+12,98 billion CNY profit)
Sales (2018):	3 052 200 units
Ownership:	State owned
Core business:	Full range of commercial vehicle, passenger cars, NEVs, military vehicle, key components and spare parts, auto equipment and relevant business
Markets:	China, Middle East, Africa, Southeast Asia, East Europe, South America
Market position:	Top Chinese commercial vehicle OEM
Connection to Sweden:	Owns T-engineering in Trollhättan; JV with Volvo Group
Homepage:	www.dfmc.com.cn

NIO



Company name:	NIO Inc.
Location:	Shanghai (HQ)
Establishment:	2014
Revenue (2018):	4,95 billion CNY (-9,6 billion CNY profit)
Sales (2018):	11 348 units
Ownership:	Listed on New York Exchange
Core business:	designs, manufactures and sells smart and connected electric vehicles; provides vehicle charging solutions
Markets:	China
Market position:	Emerging automotive company
Connection to Sweden:	N/A
Homepage:	www.nio.com

GEELY



Company name:	Zhejiang Geely Holding Group
Location:	Hangzhou (HQ)
Establishment:	1997
Revenue (2018):	106,6 billion CNY (+12,7 billion CNY profit)
Sales (2018):	1 523 100 units
Ownership:	Majority ownership is still the founder family
Core business:	Passenger cars, NEVs, electric commercial vehicles, mobility service
Markets:	China
Market position:	The best-selling Chinese auto brand for passenger cars
Connection to Sweden:	Owner of Volvo Cars, Lynk & Co and Polestar; CEVT in Sweden
Homepage:	www.geely.com

BAIC



Company name:	Beijing Automotive Group Co., Ltd
Location:	Beijing (HQ)
Establishment:	1958
Revenue (2018):	480,7 billion CNY (+30,1 billion CNY profit)
Sales (2018):	2 402 000 units

Ownership:	State owned
Core business:	Conventional and new energy passenger cars, components
Markets:	China
Market position:	A leading passenger car manufacturer and service provider in China
Connection to Sweden:	-
Homepage:	www.baicgroup.com.cn

SAIC



Company name:	SAIC Motor Corporation Limited
Location:	Shanghai (HQ)
Establishment:	1955
Revenue (2018)	902,2 billion CNY (+36 billion CNY profit)
Sales (2018):	705 000 units
Ownership:	State owned
Core business:	Both passenger and commercial vehicles; Auto parts: R&D, production and sales; Auto-related services: logistics, e-commerce, mobility and new energy service; Auto-related finance, insurance and investment; Overseas business and international trade; Big data and artificial intelligence.
Markets:	China, Thailand, the United Kingdom, Indonesia, Chile, Australia, New Zealand, the Middle East
Market position:	Top Chinese Automotive player with a complete value chain
Connection to Sweden:	Volvo Buses and SAIC Motors Form Joint Company for New Energy Driveline Systems in 2019
Homepage:	https://www.saicmotor.com/

Chery



Company name:	Chery Automobile Co., Ltd
Location:	Wuhan (HQ)
Establishment:	1997
Revenue (2017)	61,2 billion CNY (+264 million CNY profit)
Sales (2018):	642 666 units
Ownership:	State owned
Core business:	Production of passenger cars, vehicles assembly and component manufacturing facilities
Markets:	China, Russia, Brazil, Iran, Venezuela
Market position:	A major OEM
Connection to Sweden:	-
Homepage:	http://www.cheryinternational.com/

JAC Motors



Company name:	Anhui Jianghuai Automobile Co., Ltd.
Location:	Hefei (HQ)
Establishment:	1964

Revenue (2018)	50 billion CNY (-0,8 billion CNY profit)
Sales (2018):	74 000 units
Ownership:	Listed on Shanghai Stock Exchange
Core business:	Conventional passenger cars, electric vehicles, trucks, buses, components
Markets:	China and exports
Market position:	A leading OEM in China of both passenger and commercial vehicles
Connection to Sweden:	-
Homepage:	http://www.jac.com.cn/

Hawtai



Company name:	Hawtai Motor Group
Location:	Beijing (HQ)
Establishment:	2000
Revenue (2018)	14.8 billion CNY (+0.7 billion CNY profit)
Sales (2018):	120 826 units
Ownership:	Private
Core business:	New energy vehicles, conventional vehicles and components
Markets:	China, Angola, Southeast Asia
Market position:	Low-carbon life, smart travel, become the practitioner of China's manufacturing strong country dream
Connection to Sweden:	-
Homepage:	http://www.hawtaimotor.com/

JMC Motors



Company name:	JMC Motors
Location:	Nanchang (HQ)
Establishment:	1947
Revenue (2018)	28 billion CNY (+0.1 billion CNY profit)
Sales (2018):	416 000 units
Ownership:	Listed on Shenzhen Stock Exchange
Core business:	Mainly commercial vehicles and electric vehicles
Markets:	China
Market position:	A leading OEM of light commercial vehicles
Connection to Sweden:	-
Homepage:	http://www.jmc.com.cn/

SELECTED COMPANIES TO CONTACT

BYD

Reason: Strong sales in Nordics; planned Nordic HQ in Stockholm; largest electric bus OEM in the world

Dongfeng

Reason: Largest commercial vehicle OEM in China; having JV with Volvo Group

NIO

Reason: Representing China's new generation car maker; having strategy in entering the Nordic market

BAIC

Reason: Representing China's state-owned OEM; financially strong; strong in both passenger and commercial vehicles

CONCLUSION AND RECOMMENDATION

Electrification will become mainstream in Chinese automotive industry, and it is promoted both by the government as well as by the OEMs and suppliers. Technologies and solutions either improving the performance or addressing the challenges of the EV, from electric control systems to battery materials, are on top of the industry agenda. With regards to weight reduction, the long-term focus will be on light-weight material development. However, before any larger commercialization of new materials is possible, the OEMs and suppliers will continuously optimize the structural design to reduce weight. Swedish companies in the above areas will have bigger chance to collaborate with domestic players and eventually expand their business in China.

Swedish companies should be well prepared for the complexity of the market. Unlike the European market, China is not as uniform and homogenous in terms of economic and industry development. The best way to approach the business in China is by recognizing the regional differences and develop a set of criteria that will be used to determine which cities, regions or clusters to focus on. This should take into account all factors ranging from local preferences to local purchasing power and infrastructure, policies and certification bodies. For automotive industry specifically, it is following the OEMs footprints and formulating five clusters in China: Jilin and Liaoning, Beijing and Tianjin, Yangtze River Delta, Wuhan and Guangzhou.

In addition to the strong offerings in the prioritized segments, a proper local presence is also important to succeed in China. Swedish companies should consider establishing their local presence by working with local partners to setting up sales or technical support teams, especially in the automotive segment that the suppliers are most likely to be asked to provide support to different subsidies or in multiple locations by the OEMs. A pilot project or reference case involving international OEMs and 1st tier suppliers will always be a convincing way to showcase the company's competence in the relevant field. Knowledge and experience in helping companies outside Europe to get into the European market or get EU certified will be highly appreciated by the Chinese counterparts.

The automotive industry is a very active one with many activities going on every day, from exhibitions to workshops focusing on specific topics. Swedish companies should choose the platforms and activities in a strategic way not only to stay relevant with the Chinese automotive market but also to build relations within the community to create impact.

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