

# CHINA FOCUS

Issue II / 2017

## Plugging Into China's E-mobility Boom

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For years, electric vehicles (EVs) have lagged behind their surrounding hype in terms of technology and penetration. But, with much of the pivotal force coming from China, the global EV market is finally turning the corner. Bolstered by breakthrough growth in Chinese sales, the number of plug-in cars circling the world's roads reached two million in 2016. This momentum is set to continue, with the government's Made in China 2025 plan targeting an ambitious five-fold increase in the country's EV fleet by 2020.

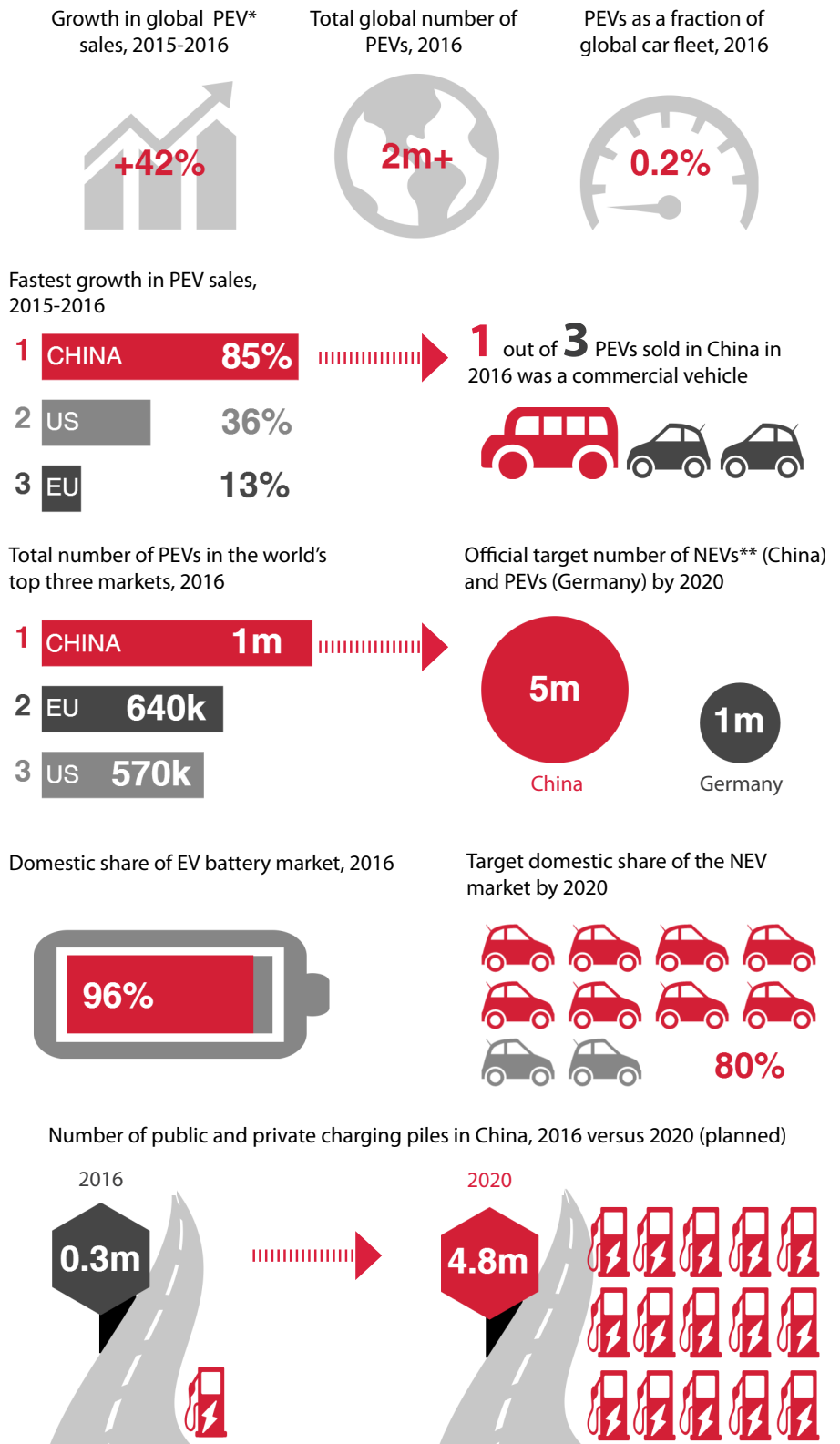
More importantly, this regulatory push, combined with a dynamic market and severe pollution problems, have convinced industry leaders that a battery-powered outlook for the world's most populous country is inescapable. Tencent's investment in Tesla, and the latter's interest in opening a factory in Shanghai, showcase China's growing protagonism in the e-mobility landscape.

In the automotive industry, where scale effects are crucial, China's promising EV market has unmatched power to trigger transformation. Our work in the sector shows us that change is already underway, even though plug-ins remain a niche segment. Companies along the supply chain are facing a decision: prepare for change, or risk being left behind.

In this China Focus, we take a snapshot of the Chinese EV market and zoom in on players that are choosing the forward-looking path. From OEMs to suppliers, they are scanning the market for opportunities, building strategic partnerships, and ramping up their R&D. Read on and talk to our experts to explore how your company can secure a place in China's promising low-emission future.

*Stefan Kracht*

### CHINA'S EV MARKET IN FIGURES



\*PEV (Plug-in Electric Vehicles) include battery electric and plug-in hybrid vehicles  
\*\*NEV (New Energy Vehicles) is the term used in China battery electric, plug-in hybrid, and fuel cell vehicles

## Competing in the E-mobility Era

Though still at an early stage, e-mobility is already affecting players all along the automotive supply chain. Those at the forefront are developing and launching breakthrough technologies. The less risk-taking are, at the very least, considering EV-dominant scenarios when developing their long-term strategies. Below, we look at two key implications of the e-mobility revolution and how industry participants are adjusting.

**1. The battery, rather than the internal combustion engine (ICE), becomes the vehicle's value-defining element.** This major change will render many of the technological achievements of conventional car makers and part suppliers irrelevant for competing in the EV market. As shown below, electric-first OEMs - who have focused purely on innovative battery systems and products - are leading the PEV segment. Battery makers and charging infrastructure providers are also set to gain from this shift, as shown in

the diagram below. Traditional OEMs and component suppliers, on the other hand, must be flexible and build up their innovation capabilities to compete in the plug-in market. Even suppliers who are less affected by the phasing out of gas engines, such as paint and lacquer makers, are adapting to the market's growing concerns with energy efficiency. They are developing functional technologies, such as cooling coatings, to minimise air conditioning waste, thus reducing energy consumption and increasing the range of electric cars.

**2. Alternative forms of mobility are emerging in which vehicle ownership is no longer a given.** This trend is set to be particularly strong in China, where a combination of chronic traffic congestion, a dynamic tech scene, rapid consumer adoption, and favourable regulations are pushing it forward. The country's bike-sharing boom is the clearest indicator of consumers'

readiness for alternative forms of mobility. Now, an on-demand car-sharing market is on the rise. An estimated 30,000 shared cars are already in circulation, 95 percent of which are NEVs. The number is expected to reach 600,000 by 2025. Forward-looking OEMs, such as Geely and SAIC Motors in China, are jumping on this car-sharing trend early on. Others, such as Build Your Dreams (BYD), are focusing on another promising segment: emission-free public transportation. Further down the supply chain, the search for new ways of getting from A to B is opening up opportunities for developers of enabling software and hardware.

The table below shows how certain industry clusters are more likely than others to win from the shift to green cars. Even those most threatened by e-mobility, such as ICE component suppliers, are finding their way into the EV supply chain through diversification and innovation.











### More to win

#### Innovation-driving OEMs



These are the world's top 10 carmakers ranked by their share of the global PEV market in 2016.

*Top Ten PEV Manufacturers*      *Market Share*

1.		BYD	13%
2.		Tesla	10%
3.		VW Group	8%
4.		BMW Group	8%
5.		Nissan	7%
6.		BAIC	6%
7.		Zotye	5%
8.		GM	4%
9.		Mitsubishi	4%
10.		Renault	4%

#### EV component suppliers



- ▶ E-motors
- ▶ Electric powertrain components
- ▶ Battery cells
- ▶ E-mobility enabling software/ hardware (e.g. automated driving technology)

#### E-mobility service and infrastructure providers



- ▶ E-mobility service providers (e.g. car-sharing platforms)
- ▶ Charging equipment/facilities

### More to lose

#### Conventional car part suppliers



- ▶ Combustion engines
- ▶ Exhaust and ignition system
- ▶ Transmission-related parts, especially the gearbox and clutch
- ▶ Lubricants and transmission fluids

#### Conventional automotive service providers



- ▶ Providers of maintenance services not needed for EVs (e.g. fluid and oil changes)

### Not affected



Due to the nature of their product applications, some industry participants will not face a strong pressure for change in the shift to e-mobility. Among them are manufacturers of car interiors, chassis, exterior parts, and coatings. Nevertheless, they must remain agile and sensitive to changing market demands. Forward-looking companies in this sector are, for instance, investing in R&D to develop energy-saving and emission-reducing materials. ☼

**“China's EV market is the largest in the world and it hasn't taken off yet. Once there is further consolidation in the Chinese EV industry, it will become more attractive for large scale, international suppliers.”**

In the shift from conventional to electric cars, battery makers play a key role in pushing the energy efficiency of vehicles up and their cost down. Heitkamp & Thumann (H&T) is part of this technological drive. Already a leading producer of battery components for the consumer electronics market, the German-owned company is looking to become a major supplier for lithium-ion batteries used in hybrid and electric cars.

To achieve this, timing their entry into different markets is key. In 2016, H&T opened a large plant in Nevada to supply a leading electric carmaker. In China and Singapore - despite having a strong presence and two production facilities - the company is not yet supplying the EV market. Reinhard Scholle, Managing Director for Technology and Manufacturing for H&T Group in Asia Pacific, spoke to us about the importance of keeping an eye on China's EV industry developments to identify the right moment and most suitable partners to step into the market.



### **How does the EV market in China differ from that of the USA and Europe?**

China's EV market is the largest in the world, and it hasn't taken off yet. There is vast room for development. Until now, it has been driven by government subsidies, which have created a highly fragmented EV landscape with several domestic OEMs and battery suppliers operating on a regional level and small scale. Chinese manufacturers of electric buses and cars use varying battery formats, sourced from several suppliers in small volumes.



*H&T manufactures a wide range of battery parts: from cylindrical and prismatic cans, to sub-assemblies and components for emission-reducing hybrid car batteries.*

This makes it difficult for global component suppliers like us to produce for the Chinese market in sufficiently large volumes.

### **What opportunities will the Chinese EV market hold for global component manufacturers in the middle to long term?**

Once there is further consolidation and chemical standardisation in the Chinese EV industry, it will become more attractive for large international suppliers. In the near future, it will be key for us to observe how the industry structure develops and to identify the right timing and the right partners. Meanwhile, our China business is focusing on alkaline components for consumer electronic batteries.

In the middle term, we do expect China to become an important market for our lithium-ion battery components. This is not only due to its sheer size, but also due to favourable conditions. The government is pushing strongly for e-car adoption and usage through subsidies, tax incentives, and institutional buying patterns. The question facing the market is whether demand will stay strong now that subsidies are being scaled down.

### **How challenging is the competitive landscape for global EV suppliers in China?**

In terms of technology and know-how, Chinese competitors lag behind. There is much to catch up on in chemical materials

and process technologies for rechargeable batteries. For example, lead acid batteries are still being used. These are an older, more cost effective, but less power dense storage alternative to lithium-ion batteries.

Even so, the market is dominated by Chinese OEMs that are either producing their own battery technologies, or are tied to domestic suppliers. Government regulations are creating hurdles for global players trying to make their way in. The best example is that some global players failed to obtain government certification for their EV batteries last year (see page 4).

### **What is H&T's strategy to take on a leading role in the production of key technologies for lithium-ion batteries?**

Continuous innovation and heavy investment in the global market for rechargeable batteries are elements of our core strategy. Both investing in our new plant in Nevada, and working with a leading EV manufacturer for the US market, are major milestones towards building up our production capacity and specialised technology. We are confident that once the Chinese EV market consolidates and opens up to larger, global OEMs and battery producers, we will be ready with the technology and know-how to ensure a successful entry. ☺



### China is cutting EV subsidies and tightening technical requirements. This will trigger consolidation and technology-based competition, making the Chinese market more attractive for global competitors.

**E**-mobility optimists and sceptics agree on one thing: an emission-free future is largely in the hands of policy makers. In Norway, the country with the highest number of EVs per capita, and China alike, government action has been key in accelerating EV penetration. Regulations drive consumer adoption, help build up charging infrastructure, and push industry players to improve the technology, price, product variety, and convenience of green cars.

The question is how soon and how strongly governments will push, and whether the industry will gain its own momentum. In China, an additional concern is whether regulations will disproportionately favour domestic players, given the target of a home-grown NEV market by 2020. Based on these regulatory trends, our outlook for global automotive companies in the Chinese electric car market is predominantly positive:

#### 1. Subsidies and purchase benefits

##### License plate lottery system exemption-

In large Chinese cities, car buyers must go through a lottery system to get hold of a license plate. Electric car buyers can bypass this process.

**Subsidies-** NEVs in China receive grants from the central and local governments. In 2015, China spent US\$4.5 billion on NEV subsidies. Last year, a plan to phase out subsidies by 2020 was announced, with the purpose of pushing out small, subsidy-reliant, and fraudulent players. Central government grants for passenger NEVs were cut by 20 percent this year, and local-level subsidies were capped at 50 percent of the value of central grants.

**Technical requirements-** Stricter technical standards for subsidy approval have been introduced to encourage innovation. Fast-charging e-buses, for example, will receive over 60 percent higher subsidies than those that charge at normal speeds.

Subsidy rollbacks caused a dip in Chinese EV sales in January, but Q1 ended with a 41 percent increase over the same period last year. With thinner subsidies, market consolidation and technology-based competition will be strengthened. So far, subsidies have favoured local players indirectly, because they understand better and act more vigorously on policy, and directly, as the government seeks to promote local technology. Samsung SDI and LG Chem batteries, for instance, were excluded from the subsidies program in favour of BYD and CATL.

#### 2. Emission standards

##### Zero-emission vehicle (ZEV) mandate-

Taking inspiration from California's successful ZEV programme, China has drawn up a scheme that would force automotive manufacturers in China to either produce more EVs, purchase carbon credits from peers, or face fines. The rules would require 8 percent of OEMs' sales to be made up of PEVs by 2018, rising to 12 percent by 2020. A trial will initiate this year, with full implementation planned for 2018.

The proposal has raised concerns for its strict requirements and short time-frames. But a number of OEMs have reacted by increasing rather than reducing their China investments. Following GM and VW, Daimler recently scaled up its EV investments in China through a new agreement with its JV partner BAIC. Toyota has also announced two made-in-China plug-in hybrid models for 2018, shifting away from conventional hybrids that don't fall into China's NEV classification.

#### 3. Expansion of charging infrastructure

China targets a 15-fold increase in charging points by 2020: one for every EV on the road. The 13th Five Year Plan introduced incentives for local authorities and private enterprises to construct and/or operate charging stations. This will be crucial for the widespread adoption of EVs and their suitability for long-distance traveling. In this way, China is effectively addressing on a national scale one of the largest consumer adoption hurdles EVs are facing in Europe. ☼

Publisher: Fiducia Management Consultants  
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