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DYNAMICS IN THE GLOBAL ELECTRIC VEHICLE MARKET

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New research on electric mobility reveals Chinese OEMs produced 43 percent of EVs worldwide in 2016 and highlights other trends in supply and demand.

China has increased its lead in electric vehicle (EV) production, according to new McKinsey research (Exhibit 1). Chinese OEMs produced 43 percent of the 873,000 EVs built worldwide in 2016. The country now has the largest fleet of EVs on the road, overtaking the US market for the first time (see "Our methodology" below).

China extends EV industry leadership

China extended its industry leadership by making gains across all dimensions of the EV supply side, including current and projected production of EVs and their components, such as lithium-ion battery cells and electric motors. One important factor is that the Chinese government provides subsidies to the sector in an effort to lower fuel imports, improve air quality, and foster local champions. Whereas Chinese OEMs accounted for 40 percent of EV production in 2015, this increased to 43 percent in 2016. Leading Chinese EV manufacturers all ranked among the top ten global EV producers in 2016. Given the rapid increase in production capacity by domestic suppliers, China's lithium-ion battery-cell players increased their global supply share, reaching about 25 percent in 2016. This is mainly at the expense of Japanese companies, which lost significant market share year on year – though they still accounted for the greatest share in 2016, with around 48 percent. South Korean suppliers expanded their position and now hold 27 percent of the light vehicle battery-cell market.

Overall, Germany and the United States also perform well in the industry, with no major changes in EV production share (23 percent and 17 percent, respectively). However, these countries saw slight losses with respect to electric motor production due to China's expansion.

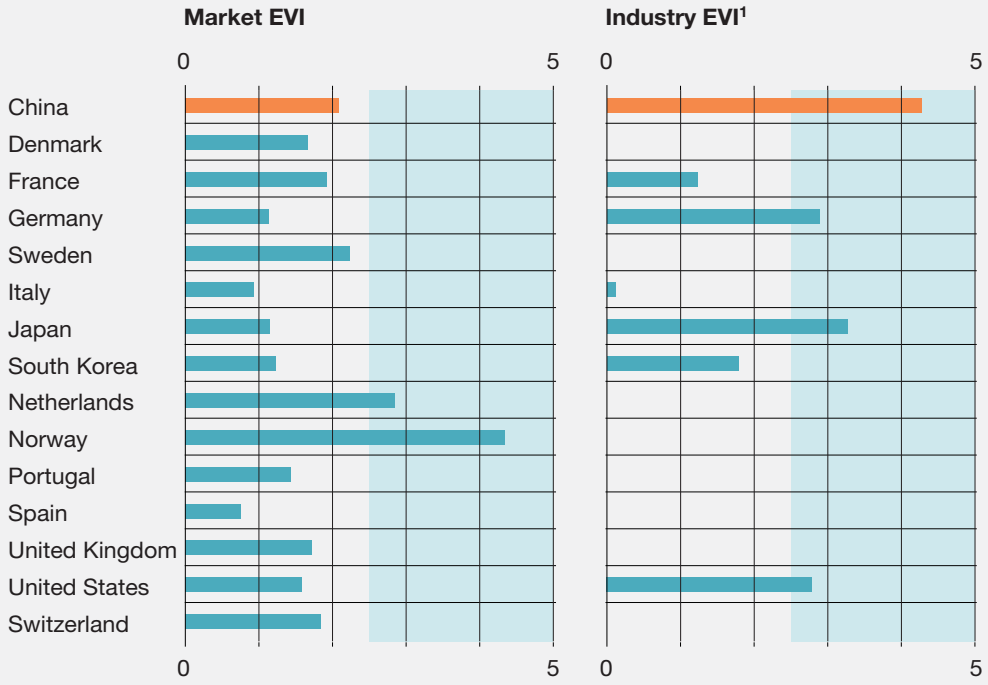
China's domestic EV demand grows, while Europe stagnates

In addition to its leading role in EV supply, the market for EVs in China remained steady in 2016. For the first time, China has overtaken the US market in the total number of EVs on the road. Cumulative EV sales reached 650,000 units in 2016, and the country increased new registrations for EVs by 70 percent year on year, to around 350,000 units (Exhibit 2).

Exhibit 1

From a global perspective, China is on its way to becoming the overall market and industry leader in electric mobility

Market and industry electric vehicle index (EVI)
Scores range from 0 to 5



[1] Countries without data either do not have domestic OEMs or their OEMs are too small to be relevant for our industry EVI scoring

McKinsey&Company | Source: McKinsey analysis

In comparison, Europe saw a sales increase of only 7 percent during the same period, after sales had doubled in the previous year. The stagnation of the European market largely stems from a big drop in new registrations in the Netherlands, attributable to changes in the incentive scheme for plug-in hybrid vehicles. In the United States, EV sales were at 160,000 in 2016, a 37 percent increase.

The sales dynamic in China has been supported by the launch of many new EV models. Roughly 25 new EV models were introduced to the market in 2016. Overall, Chinese customers can now choose from around 75 EV models – the most of any market.

While China outperforms in absolute terms, the country does less well if considered in relative terms: in 2016, EV penetration in the overall light-vehicle market was only 1.4 percent. Norway outperforms here; about one in four cars sold in the country in 2016 was electric.

Exhibit 2

China is clearly leading EV sales in absolute terms, while the market in Europe is almost stagnant

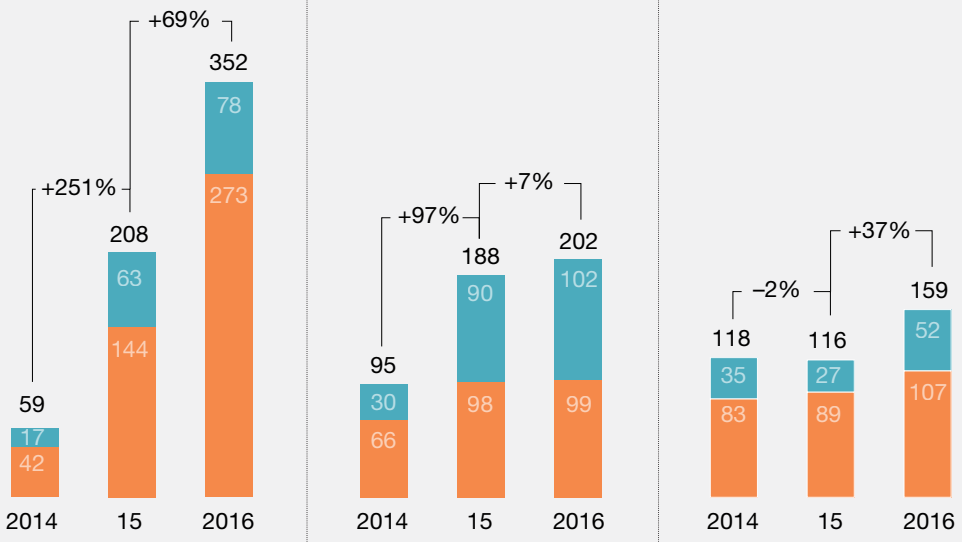
New registrations of EVs
Thousands of units[1]

Plug-in hybrid electric vehicle (PHEV)
Battery electric vehicle (BEV)

China
Expanded its market-leading position with growth of 69% in 2016

Europe[2]
Rather low market growth, 7% in 2016

United States
Growth recovered to 37% in 2016

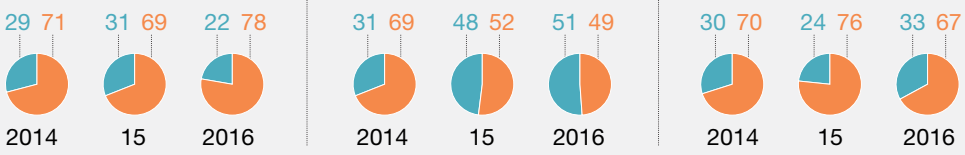


New registrations of EVs, percent

China
BEVs dominate, with 78% market share in 2016

Europe
PHEV sales just exceed BEV sales in 2016

United States
Market momentum is driven by increasing demand for PHEVs



[1] Figures may not sum to 100%, because of rounding
[2] Includes 11 key markets: Denmark, France, Germany, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom

Source: China Association of Automobile Manufacturers; EV-sales.blogspot.com; IHS Markit (March 2017)

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Generous incentives are provided to EV customers in Norway, making EVs more affordable than cars with internal combustion engines. The Netherlands also has relatively high penetration, with an EV share of 5 percent, though sales decreased in 2016 (falling by 48 percent year on year). Sales dropped in 2016 after the country announced it would increase the company car tax for plug-in hybrids. Most other markets still do not exceed the 2 percent threshold. Japan was also affected by very low sales in the second half of 2016. These examples show that e-mobility development varies significantly by country.

Markets take different approaches to incentives

Despite the newly introduced EV purchase incentives in Germany, EV sales have only increased by 3 percent since the official launch of the purchase premium in May 2016. The German government and respective OEMs currently offer EV buyers as much as EUR 4,000 for purely BEVs in an attempt to increase sales (Exhibit 3). However, the effect has been limited so far. South Korea also recently increased EV incentives by around EUR 1,600 to stimulate the market, while several other nations announced plans to reduce or phase out subsidies. China, for example, will slowly switch from direct subsidies to nonmonetary incentives after 2020. It currently retains one of the most powerful EV stimulus mechanisms. Certain cities have made EVs exempt from the license-plate lotteries and significant registration fees that apply to cars with internal combustion engines. This is a huge lever for making EVs more attractive, especially among younger first-time car buyers. Other countries that have been reducing or phasing out subsidies include Denmark, France, Portugal, and Norway.

Our methodology

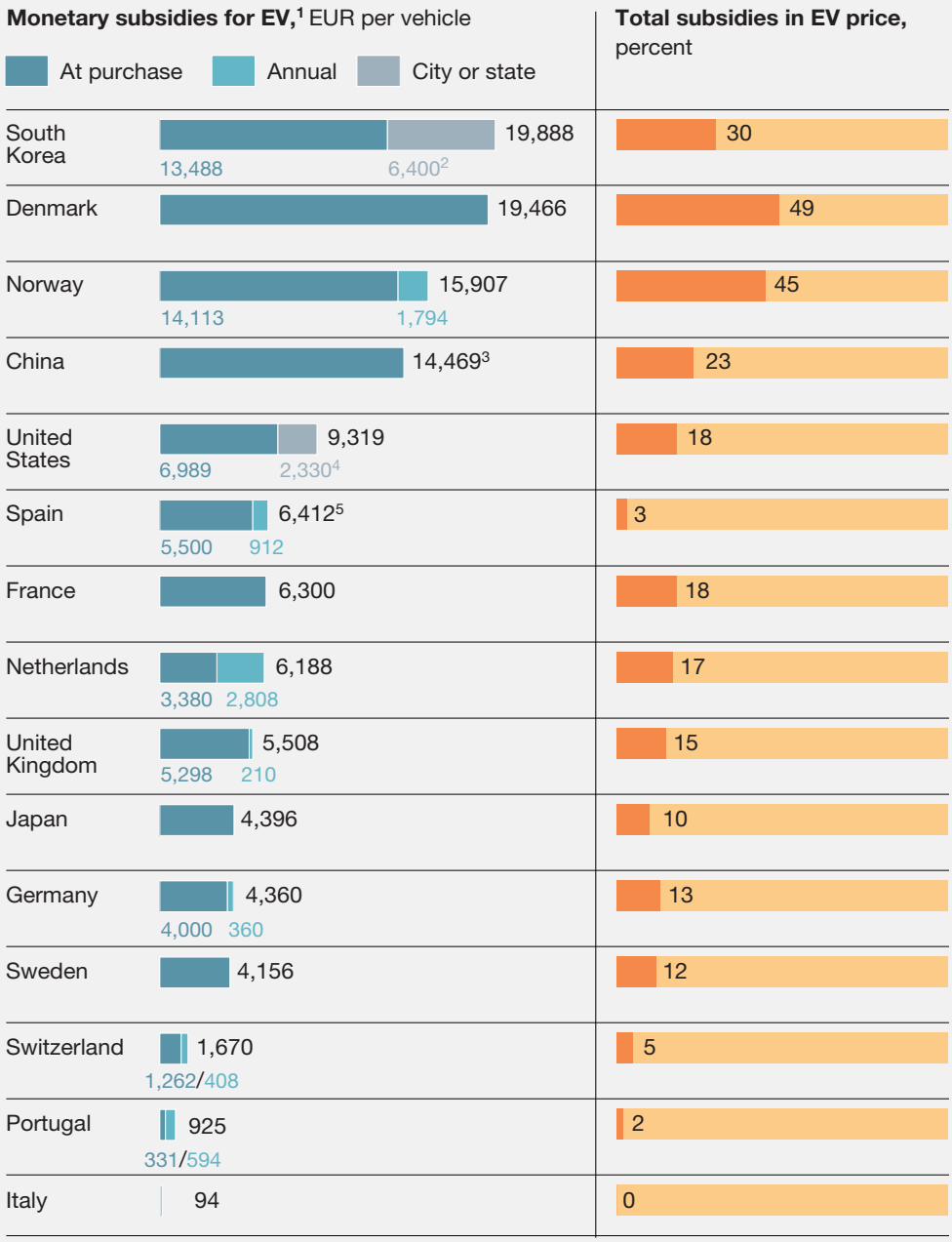
Since 2010, we have measured the overall "maturity" of various countries with regard to the supply of and demand for EVs. In our EVI, we use two equally weighted dimensions: the demand for and use of EVs, and, from the industry (supply) side, the economic significance of the value created from EVs.

- **Demand** indicators analyze the share EVs have of an overall market. They also look at incentives, such as subsidies, the existing infrastructure, and the range of EVs available.
- **Supply** indicators determine how successful the respective automotive sector is in each country regarding electric mobility. This involves analyzing factors such as current and projected shares of the global production of EVs; it also incorporates key components such as e-motors and batteries.

This year, we examined 15 markets: China, Denmark, Germany, France, Italy, Japan, the Netherlands, Norway, Portugal, Sweden, Switzerland, Spain, South Korea, the United Kingdom, and the United States. This selection was based on four criteria: sales volume, production volume, vehicle fleet, and the country's anticipated role as an EV leader.

Exhibit 3

Denmark and Norway offer some of the highest EV purchase subsidies



[1] Example BEv model: BMW i3 (60Ah); sometimes benefit can only be derived through delta of comparable internal-combustion-engine car (VW Golf 1.2 TSI Trendline); only national subsidies counted – additional local subsidies/incentives might exist; one time benefits include purchase subsidies and one time tax exemptions; recurring subsidies include tax benefits over 6 years
[2] Several cities grant additional incentives (e.g., Suncheon KRW 8 m) on top of state subsidy
[3] Only locally produced models are granted subsidy, but for better comparability, calculation for i3 was made with subsidy
[4] In the United States, many states grant additional subsidies (e.g., California EUR 2,330)
[5] Spain only grants purchase subsidies for EVs <EUR 32,000 and >90 km range

McKinsey&Company | Source: McKinsey analysis

To support the EV dynamic, China has quickly expanded its EV charging infrastructure, reaching 107,000 public EV charging outlets by the end of 2016 – an increase of 118 percent year on year. Japan and the Netherlands are also investing significantly in building additional charging stations, while progress remains comparatively slow in France, Germany, the United Kingdom, and the United States.

□ □ □

Last year saw an uptick in EV sales in key markets, in line with announcements from several OEMs on new EV strategies and upcoming models. It seems that China in particular – driven by the involvement of the government and its policies, which affect EV buyers as well as vehicle and component manufacturers – is pushing ahead to develop its EV market and industry. As market share grows and governments make the issue a priority in many regions, electric mobility will remain high on the agenda of the auto industry in years to come. □

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