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<i>Industry Study</i>
<p>E-Mobility 2019:</p> <p>An International Comparison of Important Automotive Markets.</p> <p>Consolidated sales trends for full-year 2018 and forecast for 2019</p>
Prof. Dr. Stefan Bratzel, CAM
<i>Bergisch Gladbach, 16. January 2019</i>

- *Global demand for e-vehicles grows to 2.1 million in 2018.*
- *China with 1.05 million electric passenger cars and 1.25 million new e-vehicle registrations*
- *E-market share increases to 4.5 percent.*
- *Almost every second new vehicle registered in Norway is an e-vehicle.*
- *Germany remains below average in international comparison.*
- *For 2019, Germany is forecast to grow moderately to 90,000 units. Around 2.7 million e-vehicle sales are expected globally.*

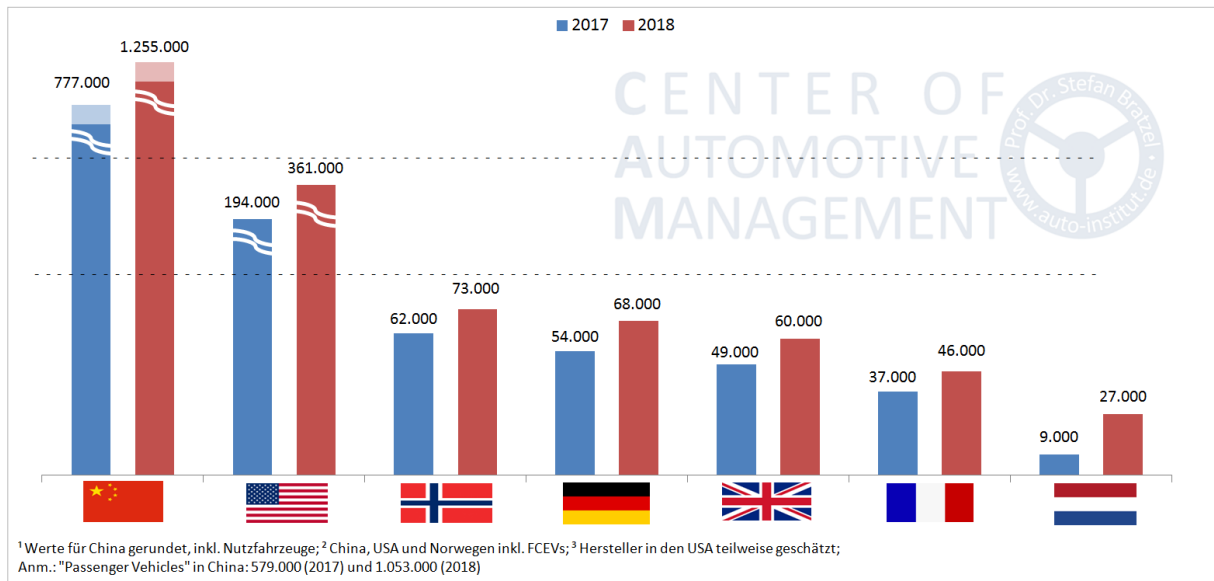
E-Mobility: Sales Trends in Key Global Markets 2018

E-mobility growth is being driven more than ever by China. For the full year 2018, sales of e-vehicles (including Commercial Vehicles, CV) increased by 62 percent to a record of 1.255 million. These include 202,000 electrically operated commercial vehicles. Even stronger is the growth in e-mobility in the passenger car sector (excluding CV), which has grown by 82 percent to 1.05 million vehicles (see Figure 1). The market share of e-vehicles increases from 2.7 to 4.5 percent (Passenger Vehicles, PV = 4.4 percent). The share of pure electric vehicles (BEV = Battery Electric Vehicles) is 75 percent (PV), with plug-in hybrids (PHEV) gaining market share. The Chinese automobile market is dominated to about 95 percent by Chinese car manufacturers.

This is the result of an industry study by the Center of Automotive Management (CAM) in Bergisch Gladbach near Cologne, which regularly analyzes the market trends and innovations of manufacturers in the field of electromobility in an international comparison.

In the US, sales of e-vehicles in 2018 increased 86 percent year-on-year to 361,000 units. This was mainly due to the new registrations of the Tesla Model 3. The United States is thus by far the second most important market for electromobility after China. Overall, the market share of e-cars in the US almost doubled from 1.1 percent to 2.1 percent in 2018 (see Figure 2). About two-thirds of the sold e-vehicles are BEV.

FIGURE 1: ELECTRICITY DISTRIBUTION OF ELECTRIC CARS (BEV, PHEV) IN IMPORTANT MARKETS: 2018/17



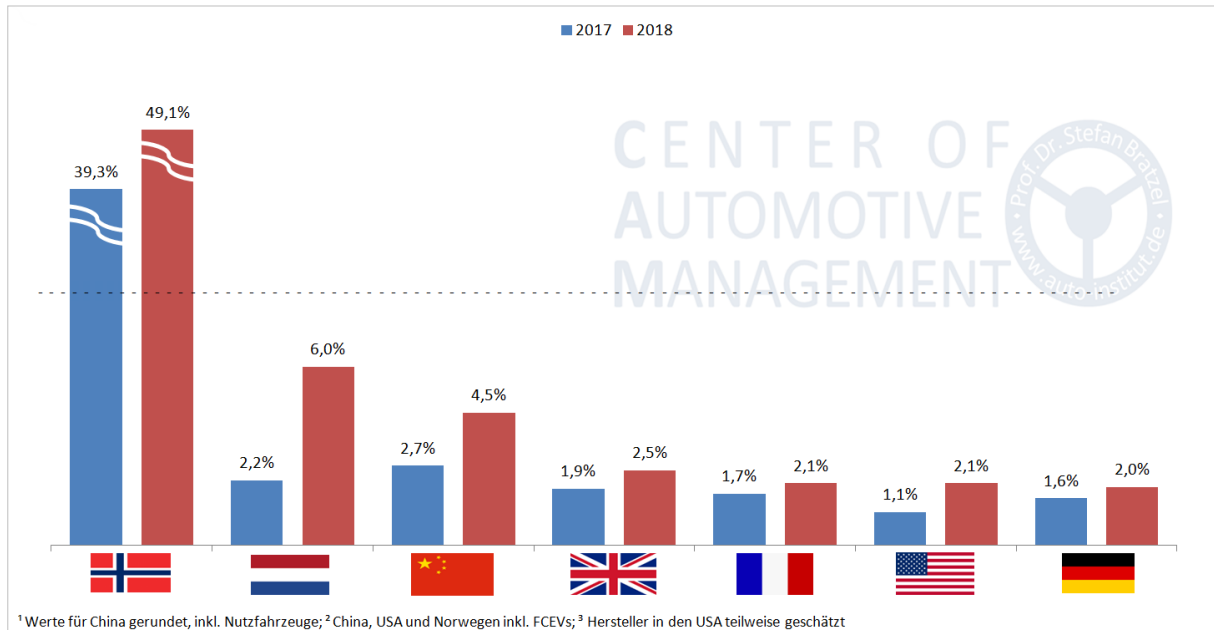
Quelle: CAM

Norway remains the most important electromobility country in Europe, following sales figures and market share. For the full year, new registrations of e-cars are increasing to 73,000 units (+ 18%). At the same time, the country is maintaining its exceptional position in the market share of e-vehicles, rising from 39.3 percent in the previous year to 49.1 percent (!) In 2018. Around 63 percent of e-vehicles are BEVs, while - with a downward trend - 37 percent are approved as PHEVs.

In Germany, new e-registrations for the full year 2018 will grow moderately to around 68,000 cars, an increase of 24 percent. The market share increases from 1.6 percent to 2.0 percent, which is low compared to the major automotive countries. Pure e-cars (BEV) increase proportionately to 53 percent, while 47 percent of the e-vehicles sold are PHEVs. Overall, in terms of e-mobility, Germany "only" underperforms in international comparison.

In the other European countries, the United Kingdom grew by 24 per cent to 60,000 electric vehicles, while in France a total of 46,000 passenger cars (+ 23%) were newly registered. In Sweden, e-vehicle sales rose to just under 29,000 units, achieving a market share of 8.1 percent. In the Netherlands, sales of electric vehicles tripled to around 27,000. There, the market share rises to 6.0 percent.

FIGURE 2: MARKET SHARES OF ELECTRIC CARS (BEV, PHEV) IN MAJOR MARKETS: 2018/17



Quelle: CAM

Overall, the rise in e-mobility is still very heterogeneous and driven mainly by China and the United States. For the first time, more than 2 million electric vehicles have been sold: CAM estimates that global sales in 2018 are 2.1 million electric vehicles (including commercial vehicles). Around 60 percent of e-vehicles are sold in China, while the US accounts for around 17 percent.

E-Mobility forecast in major global markets in 2019

In the current year 2019, CAM expects a further moderate upturn in demand for electric vehicles. Forecasts assume that global e-vehicle sales (including CV) will increase by around 40 percent in 2019 to 2.7 million units. It is expected that the global market share of e-vehicles will increase from 2.4 to around 3.1 percent.

In China, e-vehicle sales will then increase by 27 percent to 1.6 million and market share will rise to 5.9 percent. As a result, the country will continue to be the driver of global e-mobility. In the US, an increase of around 30 percent to 480,000 electric vehicles is expected, which will increase the market share of e-mobility to 2.9 percent of total registrations.

In Germany, an increase of 33 percent to then 90,000 electric vehicles is expected in 2019, mainly due to market launches of new models, such as Tesla (Model 3), Audi and Daimler. The market share should rise to 2.9 percent. Significantly stronger momentum is expected in Germany as well as on a global scale from the year 2020, when many large manufacturers (including Volkswagen) plan to launch e-vehicles.

Study Director Stefan Bratzel: *"Electromobility is already gaining momentum in many countries. The dynamics are driven above all by financial incentives or regulatory framework conditions and attractive model offers of some manufacturers. The "R-I-P" challenges of e-mobility, ie range, infrastructure and price, are still among the key success factors. Electromobility will continue to gain in importance next year as well. However, it is only from 2020 onwards that a very high level of dynamism can be assumed. The deciding factors are the massive product efforts of many manufacturers and the expected regulatory environment in central car markets. For Germany and the EU, an exponential increase in e-car sales is to be expected from 2020, as OEMs have to achieve the CO2 targets and want to prevent penalties. In the optimistic scenario, by 2025, around 25 percent or 23 million newly registered electric cars will be expected on a global level, in the conservative scenario with around 12 percent and around 11 million electric vehicles respectively. The density of charging infrastructures in the countries is a critical factor influencing the market ramp-up. "*

Center of Automotive Management (CAM)

The Center of Automotive Management (CAM) at the University of Applied Sciences in Bergisch Gladbach (near Cologne), Germany, regularly examines the innovations of automobile manufacturers as well as sales developments and trends in key automotive markets in the field of electric mobility. At the core of the research are the vehicle technology innovations of more than 30 automotive groups, which are recorded in various databases, as well as automotive sales trends and framework conditions in relevant countries. Since 2005, around 14,500 technological innovations have been inventoried by car manufacturers and suppliers. Every single innovation is systematically evaluated and weighted according to the M.O.B.I.L approach (maturity / maturity, originality, benefit / customer benefit, innovation level / degree of innovation). The sum of the weighted innovations is applied, for example, to identify the innovative strengths of car manufacturers, brands and regions. CAM also produced a series of in-depth studies on electromobility and other innovation topics.

The information provided in this press release is based on the current "Industry Study Electromobility 2019" by the CAM. Further information on contents and subscription conditions can be obtained via the following contact details.

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