

# Awaiting the big eMobility breakthrough

China already ahead of the game

**On German roads, electromobility has yet to get into its stride.**

Potential customers are only taking hesitant steps, while manufacturers have an uphill battle against numerous other problems which they are largely powerless to influence. As if that were not enough, our politicians are adding pressure by threatening to ban cars with combustion engines. In contrast, China has been going full throttle with eMobility since last year.

**To see the current situation with any degree of clarity, we must make a clear distinction between the different perspectives on the problem. While some see eMobility as part of the great march forward, others are much more sceptical. And rightly so as what we wish for is rarely identical to the reality on the ground.**

For instance, the range of electric vehicles currently on offer in German car showrooms is very modest, although catalogues and the internet offer the same customers a wider choice. Dealers do not like to be lumbered with slow selling EVs. Add to that the lack of guaranteed range or of an extensive charging infrastructure or the current unaffordability of EVs, and the extent of the problem becomes clear. Yet in Norway, things are quite different.

It is easy to persuade residents of cities where charging stations are readily available to acquire an EV. On the other hand, in the country, with a relatively high proportion of home ownership, potential EV buyers have a definite advantage. They can install a charging station in their house quite easily: all they need to do is apply to the local electricity utility. However, homeowners pay between 2,000 and 3,000 euros for their own private charging point.

## A growing trend

Happily, the figures published by the industry association VDA are optimistic. VDA President Matthias Wissmann stated at New Year that sales of EVs have doubled compared to last year. In two years' time, customers will have over 100 German-made EV models to choose from. This represents a threefold increase over the current offering. November 2017 was significant for EVs: they passed the 2% mark for the first time, accounting for 2.1% of all new car registrations. Over the year as a whole, EVs comprised 1.5% of the total, compared to a mere 0.7% in 2016. Overall, 54,500 EVs were sold in 2017: 117% more than in the previous year. The market share for German makes grew from 59% to 65% in the same period. Some 100,000 EVs are currently on German roads.

The German automotive industry will invest 40 billion euros in alternative motors by 2020, but the VDA believes even greater efforts are needed to ensure the electric vehicle market is a success. Only a rapid expansion in charging infrastructure, a smart tax framework, greater battery ranges and tempting prices can ensure that electromobility makes a lasting breakthrough. German motorists will also need to change their attitudes and behaviour.

## Securing raw materials

As if all these obstacles and challenges weren't enough in themselves to put a brake on progress in the electric mobility market, the industry has yet to secure supplies of the key raw materials which will be in greater demand in the future, such as lithium and cobalt. The remaining available, economically viable deposits may run out more quickly than forecast, and become more expensive than predicted due to the increase in demand. This is a particular issue with cobalt, used to produce cathodes in high-performance batteries.

When all is said and done, we have still to see the final bill for this technology. Experts predict a bright future for solid oxide fuel cells: these should come onto the market by 2025 coinciding with falling battery prices. This provides yet another excuse for potential EV buyers to delay making that purchase.



## ▶▶▶ A second life for batteries

If electromobility is to continue to make headway, optimising the economically useful lifetime of the current standard lithium-ion battery will play a key role – a fact which has been largely overlooked in the industry. As the most expensive component in any EV– they currently can cost up to EUR 20,000 (new).

Experts believe that, with careful handling, these batteries should be good for 200,000 road kilometres. That is, unless they are regularly recharged at rapid charging points. However, once they have declined to around 80% of their original power density, it is time for these high-performance batteries to begin a 'second life'. The batteries are retired from in-car service, but can still be reused for several years, perhaps as energy storage for the largely decentralised power system of the future. Another option is to replace old or defective cells from batteries, provided that their overall condition remains satisfactory.

A third option is to recycle LIBs which have reached the end of their useful lives. Since relatively few such large batteries exist at present, no economically viable

procedure for recycling them has become established to date. The aim is not only to recover the lithium they contain, but also up to 95 % of the even more valuable cobalt. Hence there is currently fierce competition to find the best marketing concept for the second life for LIBs. We may look forward with anticipation with suggestions from China.

## A difficult mass market

Despite the various uncertainties, German manufacturers are managing to hold their own. Plans are afoot, designs and manufacturing are largely on schedule: contrast this with Tesla, the U.S. company which once wowed the sector, and whose shine is fast wearing off. Tesla's projections that it would produce 5,000 of its first mid-range model every week have failed to materialise: its US plants have made only 1,500 Model 3s in three months. That's quite a gap between their bold projections and the cold realities of complex mass-market EV production processes. Potential German customers for the Tesla 3 have now had to put their hopes on hold until the second half of 2019.



View of the engine bay of the e-Golf



As a comparison, the engine of a Golf TDI

“The growing **international trend towards** electric-drive cars has served to intensify the move away from diesel, not just on German markets.”

The Chinese have internalised the necessity of mastering higher production volumes and are therefore spearheading international market activity, well ahead of the USA. In 2017, 777,000 EVs were sold in China: a 53% increase over 2016. Of these, 90% were also produced by Chinese manufacturers.

The USA is the second-largest market, albeit significantly smaller, with 194,000 new registrations (up 24%). Activity on the European market is dominated by a single, relatively small country: 62,300 EVs were registered in Norway in 2017 (up 39%). EVs' share of the new car market there was 39.3%; in 2016 it was only 29.1%. Shipping and air travel are also to be progressively electrified. The huge take-up of electric mobility in Norway is driven in part by the availability of cheap hydropower.

## China wants more

China is not satisfied with the major lead it currently has on Europe and the USA. It is applying some rather drastic regulations to promote electromobility, partly for environmental reasons. A minimum of one in ten vehicles will be required to have an alternative drive system in the the future. A quota is being introduced for manufacturers placing over 30,000 internal combustion engine vehicles a year on the Chinese market. The quota will apply from next year, and will start at 10%; the following year, it will rise to 12%. Financial penalties will be imposed if manufacturers fail to meet the quota – although the system allows points to be bought from other manufacturers. The Chinese government has also set as a long-term goal a complete ban on vehicles with conventional combustion engines, without setting an exact date for this.

German manufacturers in particular face tough conditions on European markets. Within two years at the latest, the sector will need to sell significantly more EVs if Germany is to meet its European CO2 targets, and in order to avoid large fines in Germany itself. The VW Group alone must sell 350,000 EVs by 2023. The big question remains whether car buyers will play ball. The decision to buy a car will be significantly influenced by the ground gained by driverless vehicles, which will weaken demand for owning your own car – a trend that is already evident in cities, especially among the younger generation.

The growing international trend towards electric-drive cars has served to intensify the move away from diesel, not just on German markets. Between January and September 2017, diesel's share of the German market fell from 46.5% to 40.3%, a trend which was also identified on Europe's second-largest diesel market, France. Diesel's share there fell from 53% to 48.6%. In contrast, the EV share of new car registrations rose by 23% to around 26,500. This leaves France behind Germany in the international ranking. The UK also lags behind Germany, at 35,400 EVs (up 21%). Yet electric vehicles account for 1.7% of the market in both the UK and France, still higher than the market share in Germany.

In its latest quarterly report on the global market, the Center of Automotive Management (CAM) based in Bergisch Gladbach, Germany, finds that German manufacturers stand a very real chance of competing with China, indisputably the leading market for electromobility: “Our activity is late in coming, but not too late. There are good prospects for German manufacturers to succeed in the long-distance race for the electric mobility markets of the future.”



## FEATURE



Wolfgang Bernhart, a partner at Roland Berger, explains: “China’s success is supported by national subsidies and preferential vehicle licensing. There are also many technologically-advanced startups on the Chinese market, which are steadily becoming established on the premium market, with sufficient capital.”

## ▶▶▶ Behind in technology terms

Not all experts share this optimism. The latest ‘E-mobility Index’, produced by Roland Berger and Forschungsgesellschaft Kraftfahrwesen mbH Aachen (fka) for the second quarter of 2017, shows Germany losing its top spot in the technology ranking to France. In the first quarter, the two countries shared the top spot. The main reason behind this setback for Germany is that its manufacturers increased the proportion of their ranges devoted to plug-in electric vehicles. These have smaller electrical ranges and lower top speeds. PEVs have smaller battery capacity, and therefore use simpler charging technologies.

The ‘E-mobility Index’ regularly compares the competitive standing of seven car-producing countries in terms of electromobility: Germany, France, Italy, the USA, Japan, China and South Korea. The countries are assessed according to technological, industrial and market indicators. In the second quarter of 2017, China took the top ranking overall for the first time, due to its industry and market leadership.



**In other words,** Daimler, BMW, Audi and VW must take several steps forward in 2018 if they are to regain the technology top spot. There is some consolation in the thought that Chinese manufacturers cannot go on growing at their current pace. According to the latest figures from December 2017, growth was slowing down somewhat compared to 2016 – which was a real boom year. Overall, 2018 is expected to regain a bit more dynamism. ■

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