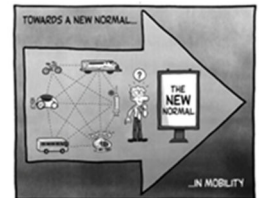
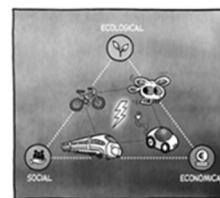


## FUTURE OF THE AUTOMOTIVE INDUSTRY



### Theses on the significance of bidirectional charging in China

Chinese OEMs have become pioneers in electric mobility in recent years. In China, electric vehicles (new energy vehicles, NEVs) account for almost 50% of new car sales, which is higher than anywhere else in the world in a volume market. It therefore makes sense not only to create charging solutions for these vehicles, but also to use them as mobile energy storage devices (e.g., Baumgartner et al., 2022) that can be charged and discharged via bidirectional charging (e.g., Meyer et al., 2025).

In Germany, bidirectional charging is being researched and tested at home (Vehicle-2-Home, V2H) and in an industrial context (Vehicle-2-Industry, V2I). Here, this charging solution is seen as a potential lever for the economic optimization of electric vehicle operation, whether by covering the vehicle's own electrical energy requirements or by marketing flexibility options in the event of grid fluctuations on the energy market. This approach is expected to increase the attractiveness of electric mobility and promote its market penetration.

This raises the question: How important has bidirectional charging been in China so far? Here are three theories<sup>1</sup>.

#### Thesis 1: Difficulties in implementing economically viable business models for bidirectional charging in China

China lacks business models for charging electric vehicles that offer visible customer benefits. This is primarily due to the highly regulated electricity market there. Electrical energy is generally inexpensive, and the price of energy is set seasonally by the government. The largest price fluctuations between high and low tariffs are between day and night (1 RMB/kWh).

Since fossil fuels, especially coal, accounted for around 58% of China's electricity mix in 2024, there is little volatility in the grid and therefore less demand for grid services. However, with the expansion of

<sup>1</sup> The theses are based on discussions held by the Chair of Business Administration & International Automotive Management at the University of Duisburg-Essen in China with managers at BYD (from the High Voltage System Department), NIO (an Executive Vice President), and during a panel discussion on the topic "After the Electrification Strategy - Is the Software-defined Vehicle next and what is needed for this?" at the 33rd Gerpisa Colloquium in June 2025 in Shanghai.

renewable energies and China's goal of using 100% renewable energies by 2060, a change is to be expected here in the longer term.

Vehicle-to-home applications are also difficult to implement in China due to the prevailing residential structure. The majority of the population lives in multi-family high-rise buildings, many of which do not yet have charging solutions, and single-family homes – as are widespread in Germany – are much less common. Since the charging infrastructure in China is now already being taken into account in the planning and construction of new residential buildings, it can be assumed that this problem will become less relevant in the long term.

## **Thesis 2: Minor problems due to battery degradation**

From the perspective of Chinese OEMs, bidirectional charging offers the opportunity to preserve batteries in the long term, as neither very high nor very low charge states are reached. While battery degradation in electric vehicles is seen as a major obstacle in European markets, this hurdle is being circumvented in various ways by national manufacturers in the Chinese market.

For example, electric vehicle manufacturer NIO provides batteries separately from the vehicle for a monthly fee. This means that the risk of battery degradation remains with the OEM instead of being transferred to the customer through the purchase of the vehicle. Like most other OEMs, BYD vehicles come with a long-term warranty on the traction battery. However, bidirectional charging is not currently seen as having a major impact on the battery warranty.

## **Thesis 3: Chinese OEMs want to integrate the advantages of bidirectional charging into their business models.**

Chinese automakers are certainly looking into the possible applications of bidirectional charging. They see the potential for supplying power to households, but also for industrial applications such as optimizing internal demand, stabilizing the energy grid, and trading stored energy. Chinese OEMs therefore see the potential for generating revenue through grid services or arbitrage effects.

In practice, however, bidirectional charging is being tested more as a technical “gimmick” given the lack of opportunities to implement these business models. Scenarios such as power supply for camping or mobile emergency power sources are more likely to be seen as additional functions that can improve the image of electric vehicles.

In the longer term, however, Chinese manufacturers are also very interested in integrating bidirectional charging into their business models. For external marketing purposes, Chinese car manufacturers are also aiming to set up their own virtual power plant, for example, which aggregates the capacity of individual vehicles and thus enables economies of scale.

In addition, Chinese OEMs are increasingly recognizing the importance of bidirectional charging for the European market and European customers. They are therefore establishing partnerships with European energy companies in order to offer bidirectional charging in Europe as well. BYD recently announced a partnership with the energy company Octopus to offer customers in the UK a vehicle-to-grid solution. This example illustrates how Chinese automotive companies are strategically building expertise in electric mobility through partnerships and acquisitions in developed markets. It is to be expected that they will also use this expertise in a targeted manner to strengthen their competitiveness in their home market.

## Literature

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