



chargeBIG – A NEW CHARGING INFRASTRUCTURE FOR ELECTRIC DRIVE VEHICLES

The chargeBIG project is a joint development effort with MAHLE Group and the Eliso company to create a new kind of charging infrastructure for electric drive vehicles. The resulting system is to be cost efficient, highly scalable, and will contribute to stable grid operations. The goal is the large scale electrification of parking garages by placing a charging option at every parking space of a parking garage as cheaply as possible.

Conventional technologies are very expensive and car park operators often decide against complete electrification. Instead, they install charging stations for electric cars only at a few designated spaces; with the disadvantage of finding that the charging station is often blocked by already fully charged vehicles.

Charging infrastructure for all parking spaces

The vision of chargeBIG: In place of expensive components at a few parking spaces, the necessary technical components are combined at a central location and just one tower with a charging cable is needed for each parking space. In effect, the requirements at each parking space are reduced to a minimum. The centralized concept provides substantial savings, both in manufacturing costs as well as current maintenance expenses, with the benefit of low-cost electrification of as many parking spaces as possible.

A parking garage as an actual lab

In joint development with ITWM, MAHLE has already developed a chargeBIG prototype with 18 charging points. This serves as a blueprint for a demonstrator with 108 charging points to be installed in a MAHLE parking garage in Stuttgart. The garage is a real laboratory for testing the effectiveness of grid operations. In addition to the charging infrastructure, we installed a storage battery system, a DC-DC fast charging station (i. e., a station for charging an e-vehicle directly with DC current from a stationary battery), and a dedicated photovoltaic system.

The Amperix energy management system developed by Green by IT Group optimizes component usage with a view towards increasing local self-sufficiency, reducing peak loads (peak shaving), and the adoption of flexible electricity prices. The chargeBIG project is funded by the Immediate Action Program "Saubere Luft" of the Federal Ministry for Economic Affairs and Energy (BMWi). As part of the accompanying scientific research, ITWM is also analyzing and evaluating the project's contribution to the reduction of nitric oxide (NOX) emissions in the city of Stuttgart.

1 Rendering of the chargeBIG charging infrastructure; the charging towers are connected to the chargeBIG central.

2 Left: Charging towers with charging plugs, right: Prototype of the chargeBIG central for 18 charging points

