

# CHARGED UP

Electromobility is upon us. Its success and popularity will depend on a new approach to fueling—a dense network of high-powered charging stations. The Porsche sports-car maker is tackling this project itself. Its specialists are working on a high-powered charging solution—and not only for its own cars.

📷 PETER WEIDENHAMMER   📷 JÖRG EBERL

**Superb fit:** Michael Kiefer (born in 1975) directs the high-voltage systems department at Porsche Engineering, which develops charging solutions. He's holding the key component of a charging station—in scaled-down size. In front of him stands a model of the Porsche Mission E concept study. When this electric car comes on the market in 2019, the charging stations should already be in place.





**W**e think the charging infrastructure is one of the most crucial issues for introducing electric cars," says engineer Michael Kiefer. He heads a new department at Porsche Engineering that concentrates on every imaginable topic related to electric cars—except for the cars themselves. That's new territory for Porsche AG, because the non-automotive sector has other rules and processes than the conventional automotive industry. But there's no way around the situation. "For customers to have a complete experience, the infrastructure has to harmonize with what the cars can do," says Kiefer. So by developing a charging station, Porsche is creating value for itself. In so doing, it is relying on an internal partnership: specialists from Porsche Engineering are designing technology that Kiefer describes as "uniquely Porsche," while experts from Porsche Consulting are developing lean and rapid processes and helping turn a vision for the future into a sound business model.

#### "RECHARGING LIKE REFUELING"—IN JUST 15 MINUTES

The background: the electric sports car from Porsche, whose Mission E concept study was presented at the International Motor Show (IAA) in 2015, will set the brand's typical standards in combining power with streamlined everyday usability. A key element of the concept consists of rapid charging technology based on 920 volts and a charging power of up to 320 kilowatts. This will make it possible to "fill up" a car with power in about 15 minutes. "The success of our electric sports car hinges on fast charging times," says Kiefer.

An initial market analysis of the available infrastructure yielded sobering results. The engineers did not find overall concepts that meet Porsche's requirements, and the consultants did not find economically viable solutions. "There's not much available, and what does exist is too expensive or unsuitable," says Kiefer. However, in order to acquire operators for charging stations, it's absolutely essential to have a concept that makes business sense. So Porsche decided to develop a charging station to the point where it is ready for series production in both technical and economic terms.

#### NEW EXPERTISE NEEDED

Together with Porsche Consulting, the company created a process to develop the charging infrastructure. It was based on Porsche's product engineering process, which the consultants enriched with their experience from other industries and optimized for the task at hand. In the spring of 2016, the Porsche board approved the project for launch. The first step was to form a development team, which now numbers around 50 highly qualified engineers and specialists from different depart-



**The power and cooling modules for the charging parks are housed in cube-shaped shells that can be located at flexible distances to the charging columns.**

ments. It draws not only on the core areas of automotive engineering, but also includes transformer and software experts. This situation is unusual for Porsche Consulting as well. It usually focuses on optimizing existing structures and processes, but this time was asked to help set up a completely new department. Without any type of model. "We had nothing to go on," says Kiefer. "The people at Porsche Consulting brought their project management experience and gave us serious decision-making support in all areas. So we were able to come up with solid results quickly and stick to our schedule."

#### START-UP ATMOSPHERE WITHIN THE CORPORATION

The team led by Kiefer still has a start-up feeling. After all, a department of this type didn't exist before. A structure had to be created, and plans laid for specific steps that often required approval from the board. Although Porsche's product engineering process served as the basis, it is designed for the much longer period of four years. By contrast, this industrial project brings different requirements—the team has only 18 months to present a marketable product. Once again, the partnership has proved to be extremely beneficial. Porsche Engineering is concentrating on developing the technical side, and Porsche Consulting the commercial side. "In just one year we have made

progress in developing not only the hardware but also the associated business model," reports Kiefer.

There is a reason for the fast pace and tight schedule: plans call for charging column production to start in the winter of 2017/2018. "Before customers start thinking they want to buy an electric car, we have to make it clear they'll find charging stations; otherwise, they simply won't be interested," observes Kiefer. Porsche wants to facilitate the requisite dense network of rapid charging stations by means of the right infrastructure, and is therefore pressing ahead with the project. Future opera-

tors, such as highway service stations, can expect a complete package of future-oriented technology at a reasonable price. Plus an operating strategy. There will also be a high degree of flexibility in integrating the system into existing facilities. The only parts of the future charging station in direct proximity to the cars will be the column and a compact cube containing the power electronics—future-oriented technology in an attractive package. Developed in accordance with international standards and equipped with standardized charging plugs, the system can also charge all other standard electric cars on the market. "Strength in numbers," remarks Kiefer. He is charged up. ←

**This is what one of the charging parks in a dense network along European highways could look like. With 920 volts and charging power of up to 320 kilowatts, Porsche's columns enable very rapid "recharging like refueling." The plugs conform to international standards, which means electric cars from other companies can also use the parks.**

