



Stand-alone EV chargers becoming obsolete? New BCG report highlights modular charging infrastructure as the future of e-mobility

A joint report by BCG and EcoG reveals modular architecture to be the more sustainable and cost-effective alternative to traditional EV charging architecture

Detroit, U.S. / Munich, Germany, 2024: As the e-mobility industry continues to grow rapidly, a new report from Boston Consulting Group (BCG) and EV infrastructure company EcoG (ecog.io) finds that modular architecture is the more competitive alternative to traditional, standalone architecture.

The global EV market is expected to grow at a rate of ~28%, requiring more than 122 million charging points worldwide by 2030. According to the report — “EV Charging: Will Modular Architecture Be the Holy Grail?” — charge point operators (CPOs) must explore modular architecture as the scalable solution to meet the demands of e-mobility’s explosive market growth.

Facing uncertainties about the speed of EV uptake, CPOs must ensure that charging site capacity aligns flexibly with the expected growth. Building up infrastructure too fast risks deteriorating the utilization and profitability of CPOs, while underinvesting in their infrastructure expansion might dampen demand for EVs altogether.

The report concludes that the modular, power-unit/dispenser architecture could become the preferred standard for charging infrastructure in the coming years, as its flexibility provides significant advantages over traditional systems.

Stand-alone vs. Power-unit / Dispenser architecture

The report compares two architectures available to CPOs: the traditional standalone architecture and the emerging power-unit/dispenser architecture.

In a standalone architecture, all components necessary for fast charging and driver-EV interaction are housed in one monolithic charger. In a modular architecture, power modules and their thermal management are externalized into a separate power-Unit which acts as the fast-charging power source for consumer-facing dispensers. With an external power module, each dispenser in a modular architecture can be more compact and is more often specialized for specific applications.

The report examines the advantages and disadvantages of both architectures in three typical application scenarios: semi-public charging stations at retailer locations, fast-charging stations along highways and depot charging stations for commercial vehicle fleets. In each of these scenarios, the Power-Unit/Dispenser architecture demonstrates clear functional advantages,



particularly scalability and flexibility. This architecture allows CPOs to expand their infrastructure incrementally, optimizing for both costs and efficiency in the long term - within a modular architecture, CPOs can make site-specific decisions to find the right solution for their needs.

Cost advantage of modular architecture

Modular architecture offers crucial cost benefits, especially for larger sites. Currently, investment cost advantages of modular architecture emerge only for sites with six charge points and more. By 2030, the average site size and the cost for both layouts will change: for a typical site, the power-unit/dispenser layout is expected to be 38% more cost-efficient compared to the standalone, bringing the cost-effective tipping point lower, to four charge points.

Overall, the report shows that investing in the rollout of the power-unit/dispenser architecture early is key to CPOs meeting the future needs of EVs.

[Markus Hagenmaier](#), Partner & Associate Director, Mobility Innovation & Digitalization of BCG, says: "Charging infrastructure needs to reach the next evolutionary stage to meet the growing demand for charging - in many applications, this will require more scalable hardware. This is feasible with modular systems where the power electronics are separated from the power outlets."

[Joerg Heuer](#), CEO and Co-Founder of EcoG, says: "Modular architecture will be crucial to efficiently and sustainably meet the growing demand for charging infrastructure. Modular architectures give CPOs the flexibility to expand their infrastructure as needed without jeopardizing profitability. For larger charging parks expected to grow in the coming years, the power-unit/dispenser architecture is already the most economical solution."

Download the report, "EV Charging: Will Modular Architecture Be the Holy Grail?" here: get.ecog.io/bcg-x-ecog

About EcoG

EcoG is a global IP and technology company dedicated to the rapid expansion of sustainable charging infrastructure for electric vehicles. With its charge controllers, reference designs, and software, EcoG enables companies to bring products and services to market quickly and scale profitably. Having secured more than 15% market share in Europe by 2022, EcoG's products serve industry giants such as Siemens and one of the world's largest gas station equipment suppliers and demonstrate a strong presence in the Indian and North American markets. The company continues to grow in 2024, with commitments to invest \$14.4 million via its North American headquarters in Detroit, Michigan.



About Boston Consulting Group

Boston Consulting Group partners with leaders in business and society to tackle their most important challenges and capture their greatest opportunities. BCG was the pioneer in business strategy when it was founded in 1963. Today, we work closely with clients to embrace a transformational approach aimed at benefiting all stakeholders—empowering organizations to grow, build sustainable competitive advantage, and drive positive societal impact.