Consumption Profiles for EV Charging Hubs

Customer	ESP Utilities Group
Size of Project	£50k
Start date	October 2021
End date	July 2022

Background

As part of the UK Government's 10 Point Plan for a Green Industrial Strategy, by 2035 all new vehicles will have to be zero emission. Since Electric Vehicles are currently the main viable option, investment is now going towards developing reliable and accessible public charging infrastructure.

As part of this infrastructure development, £950m has been allocated to a Rapid Charging Fund, which aims to massively improve the availability of high-power chargers along motorways and major roads.

An independent electricity distribution network that operates and maintains electricity and gas networks that provide connections to new build housing wished to better understand the requirement for EV charging infrastructure. This project covered providing an overview of existing and potential future ultrarapid EV charging behavior.

Our Approach

EA Technology carried out a review of three international case studies looking into different types of public charging, rated at 23 kW and above. Analysis provided insight into the use of rapid charging at both public destination and en-route sites, providing a view into the behavioral trends of different charge point types and locations.

The objective of this is ultimately to provide indicative demand profiles at a standardized charging hub consisting of eight ultrarapid chargers (150 kW) supplied by an isolated 1.5 MVA substation.

The findings from the case studies were used to establish forecast distribution profiles for daily charging demand, evaluating when charging is most likely to be needed and how that may change with electric vehicle uptake. Data from EA Technology's ConnectMore toolset, an interactive connection tool overlaying network capacity with modelled charging demand, was then used to evaluate how much demand there is likely to be at example locations. This covered:

- Motorways, major roads and areas for public destination charging.
- Four scenarios including both motorway and A-road examples.
- High and low EV uptake assumptions
- 5-year intervals from 2025 to 2050.

Utilizing the distribution profiles generated from the case studies and forecast demand data, indicative demand profiles were developed for each example scenario.

Evaluation was made to the capacity and diversity factor at each charging hub with assumptions made for the average duration of the charging event, based on the average charge demand from the three case studies, as well as the duration of "non charging" action.

This analysis also considered how charge point utilization may change over time as EV uptake increased along with demand for en-route charging need.

Client Benefits

EA Technology's expertise in electricity distribution networks and knowledge, EV charge point requirements and EV charging profiles ensured the network owner was provided with an informed analysis on the anticipated utilization of their proposed installation.

This enabled them to factor this into their strategic growth ambitions and timelines.

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