



An European urban transition project towards more sustainable cities through innovative solutions, in the fields of mobility, energy and digital.

Smart City

Global project

Coordination: Cartif
European grant: 18 M€
30 partners, 6 countries
Period: Dec. 2016 – Sept. 2022
Demonstrators: Nantes, Hamburg, Helsinki

@mySMARTLife_EU
<https://mysmartlife.eu/>

Hamburg

Coordination: Borough of Hamburg-Bergedorf
European grant: 5,25 M€
14 partners

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Mobility

ACTION OVERVIEW



Charging Infrastructure for Electric Buses

This action was implemented by Verkehrsbetriebe Hamburg-Holstein GmbH in the project area of Bergedorf, Hamburg. A full report (D3.8), written in English in November 2019, is available at:

<https://mysmartlife.eu/publications-media/public-deliverables/>

► OBJECTIVES

- › Implementation of charging infrastructure for 10 e-buses
- › Providing both slow charging for reduced load on the grid as well as fast charging for maximum operational flexibility
- › Implementation of at least one fast charging point with 150 kW power

► IMPLEMENTATION



CHALLENGE

As a public transport company solely focused on buses, VHH had no in-house electrical engineering knowledge at the start of the project. Developing an effective plan to electrify the bus depot was preceded by a strategic analyses which charging system (plug-in or opportunity charging) would best suit both the network and operations of VHH. The energy demand of the future electrification was forecasted and the anticipated increase in clean buses necessitated that a 10 kV area network would be implemented to facilitate future up-scaling of the number of e-buses. The grid connection therefore increased from 250 kW to 5 MW and the charging infrastructure can be installed in a modular way at various locations on the depot in groups of 16 by using a sub transformer station at each location.

The main charging power needed over an allotted charging time of 5 hours is 75 kW. To enable each charging point to also provide 150 kW charging for maximum operational flexibility, the infrastructure in the tender was designed to provide only one set of power modules to provide 2 charging points with 150 kW which is split into 2x 75 kW when both are operating simultaneously. All charging points provide electricity from renewable sources only.

PROGRESS

The complexity of the initially tendered system with a switching mechanism from 75 kW to 150 kW between any of the charging points in each module of 16 charging points proved to be very difficult to procure and VHH received no offers at the beginning. At that time, the market did not have many manufacturers offering a range of systems but was limited to a few players.

After reducing the complexity and only allowing switching between two points, the infrastructure was successfully tendered, and 16 charging points were built by the end of 2019. In 2020, additional 32 charging points were installed.

While the manufacturer of the charging points offered a digital system for monitoring, VHH decided to enter into a public-public partnership with Stromnetz Hamburg, another mySMARTLife partner, who had established a load management system in the project for the public car charging network in the city. This enables VHH to up-scale further bus depots with electric buses without having to use multiple systems from various manufacturers. This keeps all the charging points from various locations in one central spot and allows VHH to reduce the complexity of the operations of each depot.

To maintain and manage the charging points, a new team for infrastructure has been introduced at VHH which also includes HV (High Voltage) trained personnel.

LESSONS LEARNT

- › New technology may force you to expand into a new field of expertise. Also rethinking your processes and investing in people to support the new field is important.
- › For large fleet operators, it is beneficial to invest in separate software for the digital back-end to keep operations efficient and not be tied to one manufacturer for future tenders.
- › Expect to find knock-on effects of large infrastructure building projects such as the necessity to update aging electronic systems or finding that 50-year-old drainage pipes might need to be replaced in the process of updating your depot to electromobility. Plan some emergency budget for unexpected need like the ones previously mentioned.