



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:
Hamburg, Helsinki, Nantes

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<https://mysmartlife.eu/>

Helsinki demonstrator site

Coordination:
The City of Helsinki
European grant: 5,6 M€
7 partners

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ACTION OVERVIEW

Helsinki

Data from Charging Infrastructure (A21)

This action was implemented by VTT Oy and Forum Virium Helsinki. A full report (D 4.14), written in English in November 2019, is available on <https://mysmartlife.eu/publications-media/public-deliverables/>

► OBJECTIVES

- › To analyse the impact of the electric bus fleet charging on the electricity distribution grids
- › To collect detailed measurements of the pre-commercial pilot e-buses and extend this operational analysis to the growing fleet from roll-out
- › To study the impact of e-buses on the residential areas using air quality and noise sensors

► IMPLEMENTATION



CHALLENGE / CONTEXT

Electric buses are a very effective means for reducing public transport emissions, with a longer-term goal of becoming a carbon neutral state or municipality. Electric buses can also help reduce other local pollutants, such as particle matter and noise.

Helsinki Region Transport Authority has set the goal of having 30% of the bus fleet being electric by 2025, which means 390 e-buses. This initiative started in 2016 with 3 e-buses, was then expanded to 12 e-buses in 2017 during a piloting phase and finally achieving 164 e-buses in 2021, which is equivalent to 13% of the bus fleet. For 2022, the goal is to reach 260 e-buses.

Electric buses require a systemic change in the operation, compared to running diesel buses, including building a suitable charging infrastructure. Data from pilot operations and from the growing fleet is needed to be able to effectively procure electrified traffic.

PROGRESS

At the beginning of the mySMARTLife project, there were 10 pilot e-buses operating in the Helsinki region. The buses were evenly distributed among the bus lines and operators (typically 2 e-buses per bus line and 2 e-buses per bus operator). Data from the operation was collected from the operators during the pilot phase. This data served as the basis for the definition of the criteria for the first commercial e-bus procurement, including a requirement for a minimum number of electric buses.

The first commercial procurement including electric buses by HSL, the local Public Transport Authority (PTA), took place in autumn 2019, and it resulted in 35 new e-buses entering service during 2019 - 2020. The procurement required a minimum of 5 e-buses, so the result was a positive surprise. In addition to this, one of the current bus operators decided to add two e-buses voluntarily to the Vuosaari route (route number 90/96). Thus, the total number of e-buses in service was 47 by February 2020.

In order to enable data collection from the e-bus operations, HSL (organisation for public transport and systems in the Helsinki region) has planned to include requirements regarding data submission into the bus and charging infrastructure service contracts. Unfortunately, this was not included in the contracts in the end.

Data from all public e-bus chargers was integrated into the Forum Virium Helsinki (FVH) Urban Platform during 2020, in collaboration with the Charging Point Operator (CPO). However, the data from the buses themselves was more difficult to collect, because there were three operators of electric buses, who own the data. In the end, aggregated data from all buses (energy consumption), was made available for the project, as an offline data set. Electric grid measurements at the bus depot were offered to be taken for the bus operator with the largest e-fleet, but this has not been possible so far.

During the monitoring period, data from the chargers and offline aggregated data sets from the e-buses will be utilised for different analyses.

Sensors to measure the impact of e-buses on the district level air quality and noise have been partially deployed. New sensors to monitor noise have been deployed within the project. Air quality monitoring will make use of the sensors already installed in the city. It has been identified that the measurement of the effects will be challenging due to the small number of e-buses considering the overall traffic.

▶ LESSONS LEARNT

- › Data ownership models need to be defined for monitoring prior to signing pilot or operation agreements, especially in environments, where the transport or charging is procured as a service. Otherwise, data availability may become difficult.
- › With a small number of e-buses, the effect on air quality is difficult to measure, as the effect will be diluted by surrounding other polluting traffic.

FURTHER DEVELOPMENT

The monitoring and analysis of the data from the ten pilot buses resulted in the development of new business models for adapting the charging in the Helsinki region. The new model offers the possibility of charging entirely as a service and has significantly improved the availability of the charging infrastructure.

As the battery capacity of the new e-buses are increasing, more and more lines can be operated with overnight or depot charging. This means that there is less need for opportunity charging in cities, and this will also move most of the charging energy needs to night-time and to the operator-owned depots, where the data may be difficult to retrieve for research purposes.



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