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

@mysmartlife_EU
https://mysmartlife.eu/

Helsinki demonstrator site

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

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Mobility
Electric Vehicles

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ACTION OVERVIEW

Helsinki

Electrification of the Maintenance and Logistics (A22)

This action was implemented by VTT Oy. A full report (D 4.19), written in English in November 2019, is available at https://mysmartlife.eu/publications-media/public-deliverables/

OBJECTIVES

- To promote the transition to an electric sustainable transport system by electrifying maintenance and logistics
- To develop the measurement and monitoring of the fleet to collect big data for operational and impact analysis
- To perform an analysis of the operational concept for the operation of the electric maintenance fleet and to facilitate the innovation of the operational models for the expansion of the operations
- To analyse the performance and operation of the maintenance fleet as a whole, including shares of fully electric, hybrid and conventional machine operation

IMPLEMENTATION

Three electric vehicles: Niinivirta electric truck, Linkker electric bus and VTT's electric car

CHALLENGE / CONTEXT

The electrification of transport started with the passenger cars and electric buses, with electric buses having currently the largest market share. However, the electrification trend continues towards other transport, and in cities, the next segments to be electrified are commercial vehicles like taxis, vans and delivery trucks, which also need suitable charging infrastructure. There is also emissions and noise reduction potential in the electrification of urban work machines like street sweepers, maintenance trucks or snow ploughs.

This action is linked to the charging infrastructure actions (see info sheets Data from Charging Infrastructure and Electromobility Charging Node) which integrate the charging infrastructure for the maintenance fleet in optimal synergy with the electric bus fleets to support the charging and operation of the electric machinery fleet.

PROGRESS

In the project preparation, two pilot vehicle groups were identified for this action: city delivery and city maintenance vehicles. The local partners who developed the pilots were Niinivirta European Cargo, with a plan to start operating an electric truck in the region for deliveries in the inner-city district in Helsinki, and Helsinki City Construction Service Stara, who had plans on deploying a hybrid-electric municipal maintenance vehicle during the project. In the Electromobility Charging Node action (see infosheet), a shared charger was piloted for these user groups.

After the initiation of this project, a new project was launched to pilot an electric truck for waste collection, which was also linked to the mySMARTLife piloting, to utilise the same charging station. The focus for Stara shifted from piloting a hybrid-electric municipal maintenance vehicle to retrofitting a 26-ton diesel truck with a battery electric powertrain. mySMARTLife provided the necessary support for the conversion project coordinated by Forum Virium Helsinki, by performing simulations of the most common tasks of the vehicle like snow plowing and bulk transport, and thus helping in sizing the required battery capacity and powertrain for the vehicle. This also created new information, which will be disseminated through a scientific publication.

The Niinivirta delivery truck started to operate in the Helsinki region in 2018. As part of the mySMARTLife project, simulations were carried out for the truck routes, to chart out the potential of using the shared charger piloted in the Electromobility Charging Node action. The simulations proved that with the availability of superfast charging infrastructure (300 kW) for e-trucks, the operations could be more versatile than with depot charging only, e.g. ad hoc deliveries and pick-ups could be performed, if the truck could be charged during the operator's lunch break. A test setup for modifying the Niinivirta pilot truck with 300 kW fast charging was built into a laboratory truck by the Tampere University of Applied Sciences, which is yet to be deployed for the actual operating truck.

The pilot-stage with all three vehicles is expected to start during spring 2022. This has been significantly delayed due to problems in the connecting projects, related to the availability of electric truck chassis and delays in the retrofitting project.

Utilising the data available from Stara's existing vehicle fleet, and the simulations performed by VTT, a roadmap for the electrification of the city's delivery and maintenance fleets has been developed and is in the deliverable D4.19.

► LESSONS LEARNT

- Availability of electric vehicles can cause delays in deployments as the demand is high. In the heavy-duty sector, where series production of the vehicles is just starting up, initial production volumes may be restrained for quite some time, so delays are to be expected.
- The urban work machine sector is starting to roll out, and the first generation of work machines is now available on the market. These typically suffer from a lack of interoperability with public charging infrastructure and also from a lack of efficiency, as the diesel powertrain was usually simply replaced with an electric powertrain. As the second-generation machines start to enter the market, the situation will improve.
- Simulation can be effectively utilised to replace missing data, to assess the feasibility of e-fleets and for assessing the suitability of the available equipment for the tasks.
- Autonomous operation may require a different type of charging infrastructure for the vehicles, as with machines including a human operator (like wireless charging).

FURTHER DEVELOPMENT

The project partners hope to obtain data from Stara's piloting of the retrofitted e-truck in winter operation to validate the simulation results produced, and to assess the benefits and challenges of electrifying the maintenance fleet.

More pilot partners are being actively sought among the companies, that have deployed e-trucks in the Helsinki region lately.

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