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 - Nov. 2021
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
Demand management

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ACTION OVERVIEW

Helsinki

Smart personal EV Charger System

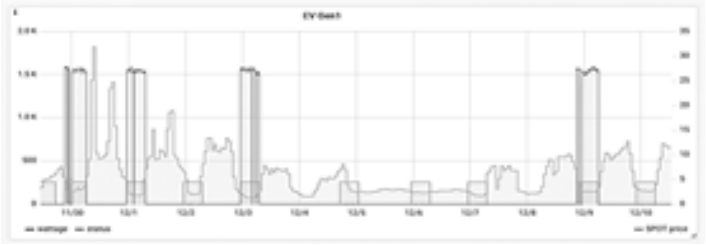
This action was implemented by Forum Virium Helsinki and Salusfin Oy. A full report (D 4.16 and D 4.25), written in English in November 2019, is available on
https://mysmartlife.eu/publications-media/public-deliverables/

OBJECTIVES

- To increase utilisation of environmentally friendly means of transport
- To create a solution for personal EV charging considering grid load balancing and variable price of electricity
- Achieve lower cost per kilometer

IMPLEMENTATION

The Service uses information about electricity hourly spot market prices, the EV battery capacity, the EV battery charge level, the allowed / maximum charging point load and the time available for charging process to calculate the most cost-efficient way to charge an electric car. The service has a support for 1-3 phase charging. A mobile APP is used to communicate with the charger, and as an option, the user can also control the charging with an RFID-tag. The APP supports many languages and provides real-time data on electricity price as a part of the functions.



CHALLENGE / CONTEXT

Personal EV charging approach typically follows two common patterns:

- EV starts charging immediately when it is plugged into a charging point.
- EV starts charging at defined time (if either the EV's software allows the user to configure the charging time or there is a control at the charging point).

There is room for optimisation and savings in case immediate charging is not needed.

PROGRESS

Personal EV-chargers that enable a flexible charging process during the optimal low-cost energy hours were implemented. The charging process is controlled by a cloud service optimising the EV charging. The optimised charging process enables the use of EV battery as a short-term energy storage for renewable grid resources. Prior pilots have shown that the electricity costs can be reduced by 30 % – 40 % by controlling the charging process. The optimisation process considers the grid utilisation or electricity prices, the status of the electric car and customer preferences (when the car needs to be fully charged).

Salusfin Energy cloud

The service was implemented on Salusfin cloud platform to charge electric cars in a smart way. The cloud service has the following features:

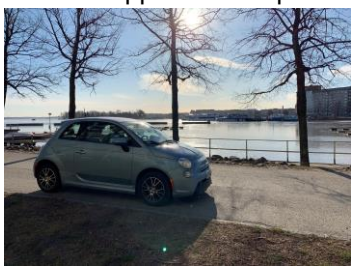
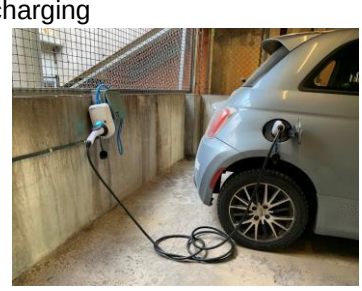
- Controlling the charging process and utilising the volatility of the electricity spot pricing
- Combining controlling capability with optimisation functionality / algorithm
- Dynamic load management: impact on the local grid, provides load limits and allows the charging process to work within the capacity of the local grid in the building by adjusting the charging current.

User interface – iOS and Android application

The control of the EV charger is automatic. However, when the Salusfin application and the optimisation solution are integrated, the customers get an easy access to control the charger.

Charger

- Selection of charger that works on OpenAPI
- Integration to charger over MQTT and secure Websockets
- Data collection and near real time visibility to the charging process
- Development and Support for RFID override of charging process
- Support for 1-3 phase charging

LESSONS LEARNT

Charging optimisation needs to consider the need of the customer, the car model and various cost models due to different pricing of electricity contracts. For example, the distribution fee may be lower during night times under some agreements. It should also be noted that new electric cars have larger battery capacity which has an impact on how the charging optimisation is performed. Finally, connectivity between the car parking and the house was occasionally a challenge.

FURTHER DEVELOPMENT

The service could consider the current energy need of the building and provide load balancing for the EV charging. This information could be added to the cloud intelligence and by knowing the current consumption and historical consumption need, the charger could work more effectively.

In the future, the Smart personal EV charging concept could become even more user friendly when ISO/IEC 15118 will become a standard also on AC charging as it will improve the exchange of information between the electric car and the charger.

my SMART Life

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