Stockholm: implementing a public electric vehicle charging network (Sweden)

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In brief
Stockholm has the ambitious goal to become one of the world’s leading clean vehicle cities by 2030. To achieve this, it was decided to boost the city’s electric vehicle (EV) charging infrastructure by expanding the existing charging infrastructure and build a fast charging network. The project started in 2014 with the aim of installing 10 new fast and 100 normal charging points – all intended for public use - and developing a plan for future network expansion.

Context
When deciding on EV charging infrastructure, authorities are faced with a ‘chicken or the egg’ situation. Drivers must be able to charge their vehicles to switch to EVs, but there first needs to be EV demand for authorities to install charging points.

To counter this, Stockholm decided to establish a comprehensive vehicle charging network. In 2014, the City Council commissioned the building of 10 new fast charging stations and 100 normal ones. The city’s Traffic Committee, Environment and Health Committee, and other groups were tasked with doing so.

The fast charging network is an important addition to the normal one. With it taking 6-8 hours to fully charge the batteries found in most current electric vehicles, a fast charging station network acts as a safety net to prevent cars becoming stranded. They can charge batteries in under 30 minutes. The network is also important for commercial vehicle fleets conducting short inner city trips, such as taxis and delivery vans.

In action
The Environment and Health Committee, Stockholm Parkering AB (a city-owned company responsible for Stockholm’s parking infrastructure), three municipal housing companies, and the Traffic Committee worked together to expand charging infrastructure. In early 2014, a working group was set up comprising representatives from these groups.

Eva Sunnerstedt, the Head of Unit responsible for the City of Stockholm’s work on electric vehicles and charging infrastructure, explains their roles: “Stockholm Parkering AB and the housing companies are responsible for installing normal charging points, with the Traffic Administration and Environment and Health Administration responsible for faster ones. Throughout, working group members have shared their progress and experiences with each other. The KTH Royal Institute of Technology was invited to support the evaluation process.”
The business model sees private companies offered free access right agreements for parking places in exchange for installing charging points on or near their premises. City authorities set clear standards with regards to the charging facilities, including reliability and access to user data. Access right agreements are granted for five years. Following this, they can be extended annually if both parties agree.

Results

During 2017, 15 on-street charging points have been added, with 8 fast and more than 100 normal charging points built in total. 101 of these are on-street charging points. Petrol stations, fast food restaurants, and large supermarkets have proven to be the main types of business choosing to install charging points.

The usage of fast and normal charging infrastructure differs. Fast charging is comparable with refuelling, i.e. only a short stay, whilst normal charging is similar to parking. Most EVs are charged overnight.

Data from normal charging stations shows that:

- They are used more on weekdays than weekends, implying that EV usage is linked to work/commuting. In addition, when they are used depends on location. In some places, evening charging predominates, whereas in others morning charging is more common.
- Their usage doubled during each quarter of the project's evaluation period (May 2014 – October 2015). The number of charging facilities also doubled in this time. The charging period typically lasted 1 - 5 hours.

Data from fast charging stations shows that:

- Most users are commercial EV drivers.
- When payment was introduced in 2015, usage declined. Although there has since been a slow increase, many previous customers have stopped using the charging points.
- Fast chargers are used in two different ways: a “top-up” of up 10 minutes, and longer charging sessions of 10-30 minutes. The charging point's location affects what type of behaviour predominates.

Most fast charging stations are located in Stockholm's inner city.

Challenges, opportunities and transferability

The transition to EVs necessitates continuous collaboration with academia and industry on the deployment of charging infrastructure. Setting targets is also important: Stockholm's City Council has decided on a common long-term goal, whilst in the short term it aims to have 500 on-street charging points installed by 2020.

In this way, existing and planned charging infrastructure must be evaluated thoroughly, with authorities aware of the market and in contact with suppliers.

Cooperation and sharing experiences and lessons learned with other municipalities is highly important for accelerating EV take-up.

Solving associated administrative and legal issues is time consuming. Issues such as traffic signs and access right agreements proved more complicated than expected, whilst existing legislation does not seem suited to new EV technology.

By using a business model in which private companies install charging points at their own expense and cover service and maintenance costs, local authorities can avoid a high outlay. Some form of incentive is required to generate interest, however; free access rights represent one possibility.

With regards to indoor public parking, Eva Sunnerstedt says: “it is best to create lots of parking spaces and not reserve them all for EVs. However, those for non-EVs should be further away from the entrance. That way, car parks are filled both with people charging EVs and conventional vehicles. It also ensures continuous revenue streams.

However, she is also unsure as to "what constitutes the right mix of regular and fast charging infrastructure. Chargers require lots of street space - are they a good use of it? We should use our streets for walking, biking, bus lanes, and moving cars. Fewer locations with fast/ultra-fast charging points are perhaps better, and will be needed for courier companies and taxis.

In Depth
To read the evaluation report entitled “Experiences from setting up public charging facilities for electric vehicles in Stockholm (2016)”, click here.

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