

Fast charging infrastructure for electric vehicles

A Sustainable Urban Mobility Solution

SMART SOLUTION 11: ALTERNATIVE FUEL DRIVEN VEHICLES



- Fast charging stations provide electric vehicles with fully charged batteries in less than 30 minutes
- Electric Vehicles increase in share of cars sales and charging infrastructure is important to facilitate the transition to an improved vehicle fleet in cities
- Experiences from fast charging in Barcelona and Stockholm show that fast charging is crucial for commercial fleets like taxi and courier companies.



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Barcelona	<ul style="list-style-type: none"> • Technical partner: Endesa Contact: ana.garcia@enel.com

What is the solution?

In Barcelona and Stockholm, Endesa and Fortum are providing public fast charging on public and private land, in partnership with city authorities.

Five fast charging stations have been installed in Barcelona and one in Stockholm, each offering three 'standards' of charge:

CHAdeMO is a charging standard developed by Japanese car manufacturers, delivering up to 50 kW DC via a special connector. The name CHAdeMO is a grammatical pun, which in Japanese means roughly "While you drink a cup of tea". Tesla vehicles can use CHAdeMO fast charging if they bring an adapter.

CCS, Combined Charging Standard, has been developed jointly by German and North American car manufacturers. This is an AC charge with a multiple purpose connector that also supports normal charging (Mennekes type 2-kontakt), 50 kW. The EU has decided that CCS standard is the minimum requirement for all new and refurbished public fast charging stations from 2018.

AC 43 or AC 22 is a fast charging standard developed by French car manufacturers. As the name indicates, this is AC current charge of up to 43 kW or 22 kW.

How does it work?

There are different ways of recharging Plug-in Electric Vehicles (PEVs). The most common is to charge the car battery over a longer period, usually overnight at a low current. Fast charging, on the contrary, allows for an almost empty battery to be

fully charged in less than half an hour at a high power charging-station.

While low current charging is done while the vehicle is parked, the speed of fast charging is similar to fuelling a petrol or diesel car.

Barcelona

In the City of Barcelona, the fast chargers are located on public land and are operated by Barcelona City Council. The chargers have been provided by Endesa and a collaboration agreement has been signed by both parties for the promotion of e-mobility in the city.

The City Council has decided to provide e-mobility energy services for free to early adopters of EV until approximately 2017 with the aim of promoting clean transport in the city. Until then, the Council will be analysing different business models that could be implemented for fast charging, taking into account user data collected through the GrowSmarter project as well as other cities' best practices.



By 2016, the fast charging network in Barcelona will be made up of 17 fast chargers, five of which will be Endesa FASTO chargers developed within the GrowSmarter project.

In order to ensure the chargers stay available, only electric cars are allowed to park in areas with a fast charger and PEVs can only park in these areas while charging. Conventional vehicles and PEVs which aren't charging are subject to fines if parked in these slots. So far, the fast chargers in Barcelona are mainly being used by taxis (22 out of 10,500 are electric taxis).



Both the City of Barcelona and Endesa have committed to promote electric vehicles and to facilitate the future implementation of e-mobility. Within the GrowSmarter project, a technical and usability demonstration in a real urban environment will be developed.

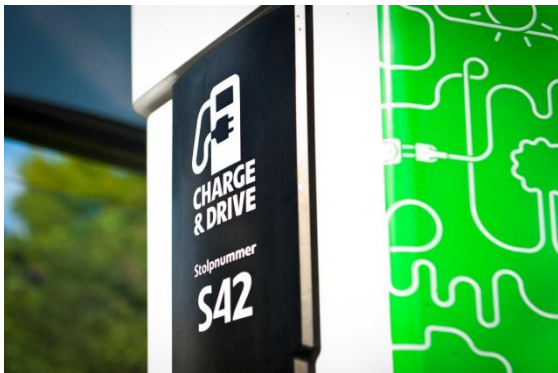
Several measures have been implemented in Barcelona and in other municipalities of Catalonia in order to promote e-mobility and facilitate a growth of EV usage in the region. In Barcelona, EVs can be parked for free in regulated areas and EVs users can access toll roads run by the Generalitat Government for free from Monday to Friday.

Stockholm

The City of Stockholm is using a business model based on access rights agreements signed between the city and electric utility companies. The access rights agreements have not required any payment for the company supplying the fast charger so far.

The agreements are signed either for three or five years. The fast charger suppliers grant actors the right to use space on public land for fast chargers and related installations. The actors themselves finance the charging equipment, power supply and necessary power lines, as well as signage and marking-out of the area.





So far, experiences with this specific business model have been positive. The access rights agreements provide a clear understanding between the city and companies on installation, operation and phasing-out. The operators also have to regularly provide the city with data concerning the usage and operation of the fast charging stations. The fast chargers also need to be in an appropriate colour to blend in with the city environment.

In future, access rights agreements the Traffic Administration intends to stipulate that charging stations must offer all three charging standards and to add requirements for reliability which will be equally applicable to all actors. A reasonable requirement would be that the station is running and functioning at least 90-95 per cent of the time.

Some of the fast chargers in Stockholm have also been established on private land. In these cases other types of agreements have been signed between the operator and the land owner without any involvement from the city. The fast charging station within the GrowSmarter project in Stockholm is established by Fortum together with McDonald's at the parking facility by McDonald's restaurant very close to the Valla Torg (one of the show case areas in GrowSmarter Stockholm).

The operator may charge for the service. The price in Stockholm is currently between 0.20 - 0.25 €/minute with no special parking fee for the fast chargers. Courier companies and taxis are the most frequent users, while other PEV users in Stockholm tend to very rarely use fast charging. According to surveys among the users this is because they are content with home charging during the night.

Expected impact

In Stockholm PEVs have doubled in number each year for the past four years and are expected to continue to do so for the years to come. Electric vehicles are more energy efficient and powered with electricity which can significantly reduce emissions. For example, the Nordic energy mix reduces CO₂ emissions by over 80 % compared to a standard diesel car. Electric vehicles have no local exhaust emissions and make much less noise than conventional vehicles.

PEVs are increasing in numbers in many parts of Europe and almost every vehicle supplier on the European market has PEVs for sale. Charging facilities for PEVs are something that most energy utility companies and cities are considering. Although there are over 1,000 fast charging facilities in Europe, a clear business model is still lacking. Co-operation between different stakeholders seems to be a sensible approach.



About GrowSmarter

GrowSmarter (www.grow-smarter.eu) brings together cities and industry to integrate, demonstrate and stimulate the uptake of '12 smart city solutions' in energy, infrastructure and transport, to provide other European cities with insights and create a ready market to support the transition to a smart, sustainable Europe.

GrowSmarter project partners



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