



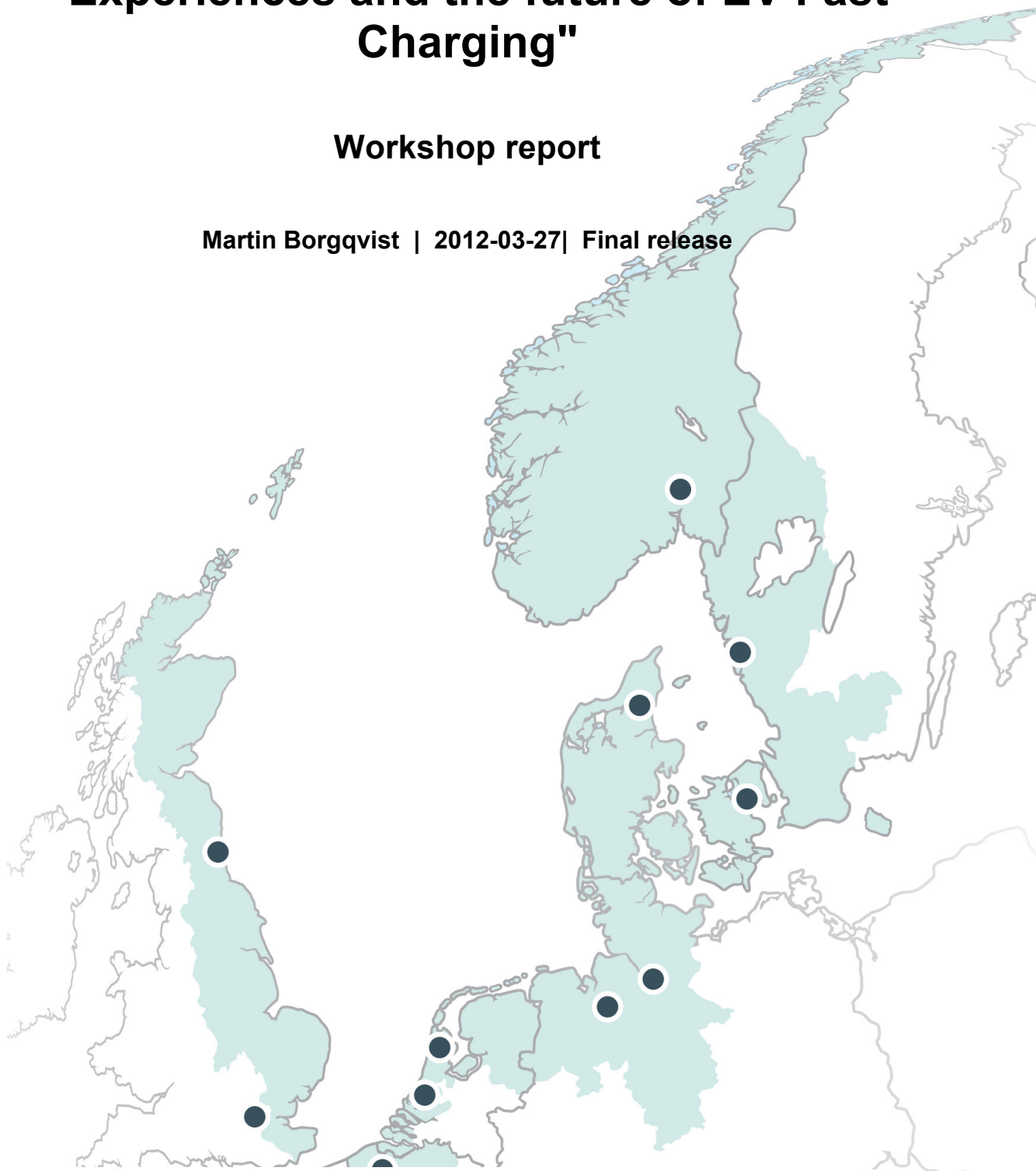
NORTH SEA REGION ELECTRIC MOBILITY NETWORK

e-mobility NSR

1st International Workshop on "Experiences and the future of EV Fast Charging"

Workshop report

Martin Borgqvist | 2012-03-27 | Final release



Summary

The information in this report is based on the outcome of the 1st International Workshop on "Experiences and the future of EV Fast Charging" held in Hamburg on March 15, 2012. The workshop was organised by Lindholmen Science Park and Hamburg University of Applied Sciences in the frame of the Interreg IVB project E-Mobility NSR.

Fast charging is a way to increase the limited range of electric vehicles of today. A quite large amount of DC – fast chargers are already installed with even more planned across the North Sea Region. E.g. Denmark will have a nation wide fast charger network in place during 2012. One trend seems to be that fast charging (and other charging services) is either offered by specific service providers or by different alliances, e.g. petrol and utility companies in the Netherlands, OKQ8 (petrol company) and Siemens in Sweden, ABB and partners in the ELMO – project in Estonia.

Despite the fact that several installations already are in place, there is not yet a functioning business model for fast charging and it will most likely take between 3 and 10 years before any company makes any revenue out of it (depending on the rate of electric car roll out).

Another barrier to fast charging implementation is lack of standardisation. At the moment the majority of fast chargers installed are of the CHAdeMO standard that is supported by Nissan and Mitsubishi. A competing standard is being developed by the German OEMs. The lack of standardisation imposes an economic risk to service providers since they might end up with the “wrong solution” installed.

The installation of fast chargers involves finding suitable locations and hosts, experience show that this process should not be underestimated.

The catch 22 of fast charging seems to be that the business model is dependent on a certain amount of electric vehicles on the road that can fast charge, while customers most likely requires longer range (realised by e.g. fast charging) in order to purchase electric vehicles. One way to solve the problem could be to subsidize fast chargers, either by governmental funding (which is the case of Norway) or by selling carbon credits (which is the case of the Estonian project ELMO).

About the workshop

The 1st International Workshop on "Experiences and the future of EV Fast Charging" was held in Hamburg on March 15, 2012. The workshop was organised by Lindholmen Science Park and Hamburg University of Applied Sciences in the frame of the Interreg IVB project E-Mobility NSR.

The workshop program, the list of those present as well as the presentation material are appended to this report.

Information presented in this report is based on the outcome of the workshop.

Experiences from electric vehicles and fast charging

In this section follows a short summary of the workshop presentations and the discussions following them.

Electric vehicles

The amount of electric cars on the roads varies between countries and regions see Table 1.

Country/region	Number of electric cars (approx)
North East England	100
Norway	6500 (about 70 % privately owned)
Denmark	400
The Netherlands	1200 (mostly leasing cars)
Sweden	250
Hamburg	323 (mostly corporate fleets)

Table 1, Electric vehicles in the North Sea region (approximate amount)

Among the specific challenges for countries in colder hemispheres such as Norway are the weather, topography and the power grid. However, this may be outweighed by the current opportunities, among them attractive incentives that resulted in 2.9 % of new car sales in February 2012 being electric vehicles.

The ENEVATE – project (www.enevate.eu) deals with the exchange of information regarding electric mobility. The project includes looking into the value chains of electric mobility as well as studying different pilots within its Western European partner countries. The project's current scientific study found that roughly 75 % of the current value chain in the powertrain segment might fall away in the transition from internal combustion engine vehicles to electric vehicles. The value added by the OEMs would decrease and the value added by the suppliers increase, respectively. It remains uncertain who will be the driver for electric vehicles. Within the project,

an EV supply chain database has been developed which stores information on different electric mobility pilots in Western Europe, allowing a white-spot analysis assessing competencies in each region.

Standardisation

Standards are necessary for securing mass-market adoption and interoperability, avoiding different proprietary standards, creating competition among suppliers, customer trust and assuring product safety. When it comes to electric vehicle charging, many different standardisation bodies and standards co exist (UL, SAE, IEC). Since 26 different countries are involved in the process, a large number of comments on proposals are generated. This means that standardisation takes a long time (roughly 36 months from scratch to finished standard). Currently, many of the standards related to electric vehicle charging are delayed and will not be completed on time. E.g. the draft of the standard for normal charging, which has been released already in 2001, is still not finalised yet, despite the fact that electric vehicles already are entering the market. This illustrates the difficulties of e-mobility stakeholders who currently operate in an emerging sector without established regulatory frameworks.

In the workshop it was expressed that there is a lack of standardisation on fast charging (e.g. by Narec, LSP and the Province of North Holland) arising from the fact that the CHAdeMO standard is not supported by a majority of OEMs (currently Nissan and Mitsubishi supports CHAdeMO). In fact VW, BMW, Audi, Daimler and Porsche are pushing for another standard, which is not yet completed (the Combo – plug). The Combo-plug has a combined plug for both AC charging and DC fast charging. As a consequence there is an economic risk for infrastructure providers when making installations, since it is not certain which standard will be used in the future. It might be necessary to change chargers, meaning that a service provider must include this risk in their business case. However, it is believed to be possible to convert CHAdeMO chargers to comply with the Combo standard and perhaps two different standards may co exist in the market.

Fast charger installations

There is currently a number of existing fast charger installations across the North Sea Region and more are planned. In principal all installations are chargers compliant with the CHAdeMO standard. Table 2 gives a rough overview of existing installations of fast chargers per country (based on information stated in the workshop). However, it should be kept in mind that figures are subject to continuous change over time since new installations are planned.

Country/region	Existing public fast charger installations
North East England	8
Norway	15
Denmark	12
The Netherlands	21
Sweden	7 (+ 4 more at test tracks)

Table 2, Existing fast charger installations (approximate amount)

Below follows a short summary on where fast chargers are being installed and on the future plans in different countries and regions:

- In Denmark, the service provider ChoosEV is building up a nation wide network of fast chargers located at different private facilities (e.g. restaurants). In total 56 chargers will be installed in 2012. Most facility partners have been found, but at the moment it is necessary for ChoosEV to finance the installations since the business case for fast charging is not yet in place.
- In Norway fast chargers have been installed at e.g. gasoline stations and shopping centres. Another 50 fast chargers are planned.
- The fast chargers in Sweden are located at Nissan dealers, winter test facilities and at companies using electric cars. Also, there is a plan of making a fast charge corridor in the middle of Sweden along Green Highway (www.greenhighway.nu).
- In Hamburg the charge infrastructure is capable of 40 kW (three phase fast charging) but the electric vehicles are not yet prepared to use it. Analysis of the demand and possible use cases will be conducted. The biggest barriers are believed to be cost and demand.
- In the Netherlands the growth projections for 2020 are 1500 fast chargers; 200 000 AC slow chargers; 200 000 electric cars (hereof 100 000 fast charging cars).
- In Estonia the companies ABB, NOW! Innovations and G4S will cooperate in the project "ELMO" in order to install 200 fast chargers in a nation wide network, provide service on fast chargers and provide a 24 h help centre for electric car users. A total of 1000 Mitsubishi iMiEV will be used in the project, 500 will be driven by social workers and another 500 by private users. Selling Estonian carbon credits to Mitsubishi has funded the project.

It should be noted that in Denmark and Estonia nation wide networks of fast chargers will be in place in near term. In Denmark there will also be a nation wide network of battery swap stations in place in 2012 (it will be installed by the service provider Better Place).

The Installation process of fast chargers involves different activities such as procurement, permissions and physical installation. Narec (<http://www.narec.co.uk/>) in the UK has made a complete package of documentation for the tendering, permission and installation process of fast chargers (based on UK legislation). One issue in the installation process is finding suitable locations and hosts for fast chargers. In the Charge Your Car project in the UK, this activity was underestimated, there is a serious commitment needed from an organisation hosting a fast charger at their site.

Business models for fast charging

In some places in Europe, specific service providers install fast chargers. E.g. in Denmark, the company ChoosEV is building up a network of fast chargers that will be offered to customers. Also, in Denmark the service provider Better Place is putting up their business. In Sweden the petrol company OKQ8 have announced that together with Siemens they will install fast chargers at filling stations. In the Province of Friesland and City of Amsterdam the municipalities finance fast charging, but in all other provinces it is left to the market. Due to the poor business case at the moment, petrol and utility companies in the Netherlands form alliances in order to cooperate on the implementation of fast charging. As mentioned above, in Estonia a nation wide network of

fast chargers will be installed and operated by a consortium consisting of ABB, NOW! Innovations and G4S.

When it comes to the actual use of fast charging, experiences from the Charge Your Car project in the North East of England show that the total use in their network is typically 25 fast charges per month, among 8 chargers and about 100 electric cars. In Norway, some experiences show that people tend to fast charge for about 10 – 15 minutes (rather than the full 25 minutes it roughly takes to reach 80 % charge).

There is some figures available regarding pricing of fast charging:

- In the Charge Your Car project in the UK the cost of using the fast chargers is 10 GBP (about € 12) per month for access to the complete network or 5 GBP (about € 6) per fast charge if you don't have a subscription.
- In Norway the existing fast chargers can be used for free at the moment, however there is one station where the customer is charged 29 NOK (about € 3.80) per 10 minutes of charging.
- ABB has experienced that customers that install their products typically charge € 4 – 8 per fast charge to electric car users.

It will probably take about 3 – 10 years before any service provider makes a business case out of selling fast charging to users, depending on the rate of electric car roll out.



NORTH SEA REGION ELECTRIC MOBILITY NETWORK

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About E-Mobility NSR

The Interreg North Sea Region project North Sea Electric Mobility Network (E-Mobility NSR) will help to create favorable conditions to promote the common development of e-mobility in the North Sea Region. Transnational support structures in the shape of a network and virtual routes are envisaged as part of the project, striving towards improving accessibility and the wider use of e-mobility in the North Sea Region countries.

www.e-mobility-nsr.eu

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