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Incentives and infrastructure – crucial elements in the build-up of Norway's EV fleet

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Abstract

Electric vehicles play an important role in Norway's efforts to curb greenhouse gas emissions from transport. With more than 13 000 electric vehicles on the nation's roads, Norway is on top of the rank in number of vehicles compared to the number of inhabitants. Explanations for this success are a generous incentive scheme for zero emission vehicles and a fruitful collaboration between the public and private sector. A report on strategy with recommendations for the further build-up of infrastructure was delivered in 2012, which lays the grounds for a national strategy to be delivered within 2013.

Keywords:infrastructure, incentives, policy, Norway

1 Introduction

Norway, a country of 5 million inhabitants, has decided to make domestic cuts of between 15 and 17 million tonnes of CO_2 by 2020 compared to a reference scenario [1]. In 2010, road transport was responsible for approximately 19% of Norwegian greenhouse gas emissions, making it the third largest and the fastest growing source of emissions. Introducing a large number of electric vehicles (EV's) could substantially contribute to halting this trend, especially as Norwegian production and consumption of electricity mainly stems from emission-free hydropower. Estimates show that for every percentage of the vehicle fleet being replaced by EV's and plug-in electrical hybrids, there will be a CO2-saving of approximately 40 000 tonnes a year (2). Transnova is a state entity established in order to cut greenhouse gas emissions from transport, against the backdrop of the Norwegian Reports on Climate in 2007 [1] and 2012 [3] and the subsequent political consensus' on climate in the Norwegian parliament. An important part of Transnova's strategy is to promote an increased number of EVs in the national vehicle fleet, which is being done by contributing to the funding of charging infrastructure and projects enhancing electromobility.

2 EV status

As figure 1 shows, there has been a steady increase in the number of EVs in the last years.

[1] EVS 27 International Electric Vehicle Symposium and Exhibition

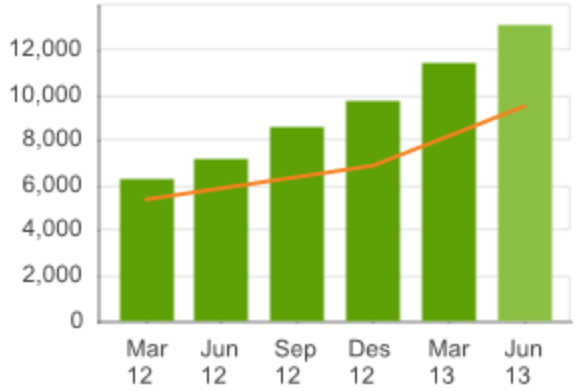

Fig. 1. Growth in number of EVs in Norway from March 2012 until June 2013. The orange line represents a benchmarking of the sales with a prognosis of reaching a goal of 200 000 plug-in vehicles on Norwegian roads by 2020.

At present Norway has more than 13 000 EVs on the roads. This brings Norway to the top of the rank in number of EVs compared to the number of inhabitants, and in total among the top five markets globally. The large majority of EVs in Norway are private cars, but lately businesses and municipalities have shown an increased interest. A generous incentive scheme for zero emission vehicles, the build-up of instrastructure and a fruitful collaboration between the public and the private sector are important explanations for this success.

3 Incentives and infrastructure

Norway has a long tradition of taxing fossil fuels (dating back to 1931) and in 1989 became the first country in the world to set a CO_2 target. The costs of petrol and diesel fuels in general are perceived as very high among the general population, though costs are not particularly high compared to other European countries when adjusted for income. Combined with the relatively low cost of electricity, this makes the EV a very competitive alternative in terms of "fuel" costs. In addition there are other generous public policy incentives promoting the use of EVs which play a substantial role. EVs (and hydrogen vehicles) have

- access to bus lanes
- free parking on public parking lots
- exemption from value added tax
- exemption from car tax
- exemption from tolling on roads
- exemption from tolling on most ferries.

At the beginning of 2009 Norway had less than 200 public charging points. Infrastructure investments were looked to as the next effort to boost EV sales. By the end of 2012, Norway had 3730 Mode A charging stations, of which 1830 have been financed by Transnova. Currently (June 2013) there are more than 70 quick chargers up and running, and approximately 50 more are underway during 2013. The large majority of these have received funding through Transnova. Together with the financial incentives, this has motivated OEMs to give priority to deliveries of EVs to the Norwegian market.

4 Governmental role in establishing a charging infrastructure

Norway has developed a model for the build-up of charging infrastructure where the state has funded or co-funded the investments, but with the ownership and operating responsibility in private hands. There are

some exceptions to this rule, with the municipal charging stations programme of the capital, Oslo, as the most notable exception.

Whether the state or local authorities should have the ownership of the charging infrastructure has not been an issue. Private companies have shown a strong interest in taking this responsibility, especially within the energy sector. We believe this will be a sustainable and functional model also in the coming years. Still, governmental co-funding seems to be crucial if the charging infrastructure network is to meet the needs of a growing EV fleet. Today normal "slow" charging is free, and the owners of quick charging stations are only in the early phase of introducing payments. The goal is however to establish a market on commercial principles.To be awarded funding for fast charging, the applicants are required to submit a long-term business model describing how they intend to finance and operate the infrastructure. Currently the financial returns from operating a charging station are minimal, but it can be serve to attract customers to businesses along the road or to other shopping destinations.

5 Challenges and future strategies

Many challenges remain to be solved. As yet there is not a common national standard for payment, booking and access to the charging points. Until now, interoperability has been achieved as a "mainstreaming" operation after installing. A report with recommendations for a national system securing interoperability regarding payment and equal access to the charging points will be delivered in December 2013.

A report on strategy with the objective of how to develop a rational infrastructure of quick chargers serving 60 000 EVs in the market was published by Transnova in 2012. A report on strategies for expanding the quick charging infrastructure was released in 2012. Though there are examples of EVs in use throughout the country, the report recommends that the further build-up of the infrastructure pinpoints areas with the most favourable climate combined with a relatively dense population, which largely overlap. The exemption from this rule will be the placement of a few quick chargers in three different corridors connecting the two major strategic regions. The two major strategic regions and the three corridors are illustrated in figure 2.

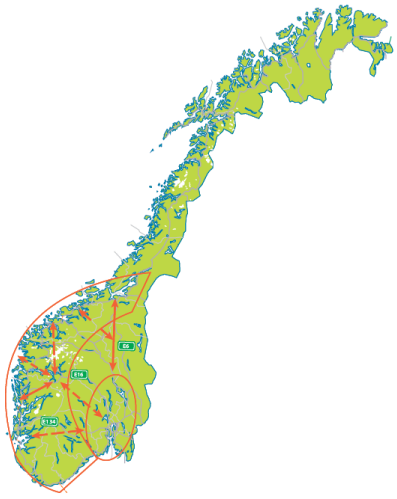

Fig. 2: Strategic areas for the build-up of the fast charging infrastructure

Ninety per cent of the population will be served by providing 105 quick chargers in the Oslo region, 143 quick chargers in the coastal region and 9 quick chargers in corridors. At present the demand for more chargers among users is high, especially in areas without quick chargers. By the end of 2013 Transnova will develop a national strategy for the build of charging infrastructure for all kinds of charging.

6 Conclusion

Collaboration between a central governmental agency and private or municipal authorities has proved to be a good model for the build-up of an infrastructure for electric vehicle charging in Norway. Though Norway at present probably has the most extensive infrastructure for EVs, there are other nations which have also prepared for the introduction of EVs by building quite extensive infrastructures. However, as Norway has by far the strongest sales figures of EVs, it seems likely that the establishment of an infrastructure should go hand in hand with attractive incentive schemes in order to break the current market barriers and make EVs a viable alternative in the vehicle mass market. A similar kind of incentive structure is also possible to develop for other countries. However, high Norwegian taxation of conventional private cars gives an extra effect of tax exemption for EVs in Norway. But not all the incentives are financial. Giving access to bus lanes has proved to be an important incentive. This can also be adopted for other countries regardless of the taxation system, though it might only be feasible in small and mid-size cities.

7 References

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