

Beyond Energy Action Strategies



D.3.1.c – Business Plan of Electrical vehicles and their infrastructure in East Sweden Region

Title of the project: Promotion of electrical vehicles and their infrastructure

Location: East Sweden Region



Energikontoret
ÖSTRA GÖTALAND

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1 Summary of the Project/Project at a Glance

The development of the use of electric cars in municipality transports goes very slow in the East Swedish region. The goal for the region is to have a fossil-fuel-free vehicle fleet in 2025. There is a desire and will to increase the number of electric cars in most municipalities, but the lack of knowledge of how a process for such an increase would occur is slowing down the development. There is also a great skepticism and prejudices against electric cars.

The objective is to increase the number of electric cars in the region of East Sweden Region and to improve the infrastructure for charging stations

To achieve greater knowledge and more positive attitudes to electric vehicles and their charging is essential for reaching the objective. Municipalities intentions to buy or lease electric cars or for the establishment of their charging stations will be raised by organizing test periods, seminars and events and also by encouraging applications for financing from European and national funding's.

A regional strategy for reaching a fossil free vehicle fleet in the region will be developed by ESEA/BEAST in cooperation with the Region and the County Council. The strategy will also include the surrounding Regions in the middle parts of Sweden (Uppsala, Västmanland, Örebro and Södermanland) and all fossil free fuels will be considered as possible solutions for reaching the goal.

2 Details of the Proposed Project

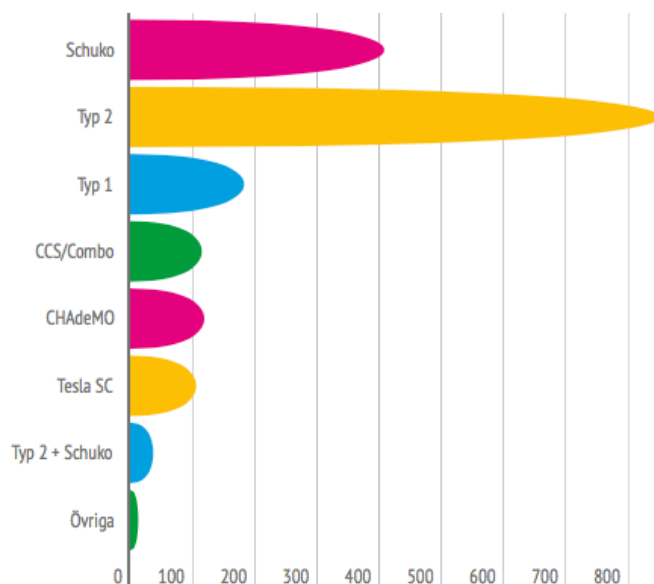
ESEA is focused initially on 6 municipalities but in the time of writing 10 municipalities are engaged in the project along with the Region of East Sweden, local private companies for charging equipment, local car sellers and the Church diocese in the region.

In total in all the municipalities there are approximately 436 000 inhabitants. Many of them are car commuting within the region to and from their workplaces. To get more employers to offer charging stations for their employees could mean that many more dare to choose to invest in an electric car. In the East Region there are now about 40 electric cars in operation and in the whole country close to 15 000 registered e-vehicles whereof 60% are hybrids.

Electric cars are not a first choice when purchasing new cars today. Charging infrastructure is still poorly developed and the price of an electric car is much higher than for another eco-car. In addition, the range of the battery must be consistent with the trips planned for the use of the car. This will be a further limitation when charging infrastructure still is poorly developed.

Picture 1. Charging spots in Sweden. www.laddinfra.se

ANTAL LADDPUNKTER I SVERIGE 2016-01-01, PER UTTAGSTYP



www.laddinfra.se - Sveriges nationella databas för laddinfrastruktur

In Sweden there are currently approx. 506 public charging stations with 1800 charging spots and in the region of East Sweden there are about 40 public charging stations. Laddinfra.se is an open database, which is based on a proven concept by Norway and supported by several strong players in the Swedish E-mobility. It is a national database for the Swedish charging infrastructure. The database is designed to make it easy to use and charge electric vehicles in Sweden, and thus create more electric car enthusiasts.

In total more than 646 000 trips per day are carried out in the Region of East Sweden, which correspond to about 1.5 trips per capita and day. 54 percent of the trips are by car, about 8 percent by public transport and just over 36 percent by walking or cycling.

In 2030, Sweden shall have a fossil free fleet. The goal of the East Sweden Region is to have a fossil fuel-free vehicle fleet by 2025. Inserts for various fuel systems must be developed to achieve this goal. So far, the development of electric vehicles and infrastructure in the region is weak and most investments has been for developing biogas fuel for vehicles but there is a desire and willingness to increase the number of electric cars in most of the region's municipalities.

3 Internal aspects

Weaknesses

- Lack of funding for investing in E-vehicles and charging spot, and lack of knowledge in how to apply for funding.
- Too few charging posts in Sweden, both fast chargers and semi fast

Strengths

- The high efficiency of EV's, 85-90%. Electric vehicles can reduce fuel costs, greenhouse gases and other pollutants while decreasing the uncertainty about the availability of energy. Therefore, they are part of a global, industrial conversion where diversity innovations contribute to creating new advanced products - and in the process also create jobs, new businesses and new opportunities for economic growth.
- Clean electricity can be produced from solar and wind locally and there is already an established distribution system in place which even today can handle a large number of electric cars. This applies both in the world and in Sweden

4 External environment

Threats

- Lack of knowledge on several levels.
- Buying an E-vehicle is still much more expensive than a fossil car.
- Fear that Electrical companies and contractors for charging stations, will charge so high prices for charging so that the market stops
- A consensus must be reached that all fossil free fuels must be available in the future. The current situation in the region is a Competitive thinking between the different fossil free fuel types (biogas, HVO / RME, ethanol and electricity). Many people (especially in the large municipalities Norrköping and Linköping) still think that the biogas will have to take the greatest place (because the Region invested heavily in biogas), although it is still not profitable to establish biogas filling stations in smaller municipalities.

Opportunities

- Electric cars are quiet gives no noise
- The region is unique in that it has its own industries for the production of biogas and ethanol production and distribution of renewable vehicle fuels. A market for the charging stations (both fast charging along the highways and semi-fast charging stations inside the municipalities) and access to RME and HVO begins to take shape. A common understanding that all fuel must work together in the near future begins to emerge.

5 Market Potential

In Europe and Sweden most electric vehicles are offered by producers. Fast charging stations suppliers, offering AC and DC charging suitable for both standards: CHAdeMO and Combo 2 are available on the market.

Spring 2015 and especially March was a month of many records for the rechargeable vehicles in Sweden. The increase in stocks for the month landed on 699 vehicles, which is the highest increase ever in one month. For individual models both the Nissan Leaf and Tesla Model S showed record increases. The trend that plug-in hybrids is increasing more

than the pure electric cars is also temporarily broken. During March 2015 the increase of electric cars was 420 pieces and plug-in hybrids 279 pcs. One of the reasons can be Nissan who has pursued a very successful campaign with attractive leasing offers to individuals and businesses.

During 2015 there has been vivid discussions about fast charging and paying systems. The positive increase in e-vehicles has taken place despite the uncertainty of the future pricing of charging and the fact that the main question still is how to create a Swedish infrastructure for normal and semi fast charging. The forecast for 2015-12 is 15 000 cars. Since November 2015 national funding "Klimatklivet" for implementation of charging spots are available.

6 Risk analysis

- Lack of knowledge on several levels
- The uncertainty in the market due to the lack of long-term policy instruments
- Buying an E-vehicle is still much more expensive than a fossil car.
- Uncertainty how expensive it will be to recharge the electric car

7 Financial Analysis

The goal is that 6 municipalities and the region changes 2 of their cars to e-vehicles and that they all install 2 charging stations each.

7.1 Cost

- Investments in charging stations and E-vehicles: 14x5000€ (50.000kr per charging spot) = **70.000€**,
Cost for E-vehicle (Nissan Leaf, NV200 and Renault Zoe and Kango ~25 000€/car) -> 25000x14= **350 000€**
- 50 000€ Time invested in promoting and informing
- 7500€ for Pre study, and 60 000 € for the development of a regional strategy for reaching a fossil free vehicle fleet in 2025.

7.2 Income

NA

7.3 Feasibility assessment

Electric vehicles contribute to a large extent to reduction of CO₂ emissions in the transport sector and elimination of climate change. Therefore, the purchase of e-vehicles is a political question, not a decision based on feasibility calculation. At the moment due to its innovative technologies electric vehicles are still expensive when comparing purchase price (approx.10 000 EUR more than a conventional car).

Electric vehicles might become feasible if they would be produced in greater quantities and price would drop to the prices similar to conventional cars.

The current low price of oil and the current policy of not allowing economic promotion of renewable fuels in relation to the oil lock the market to remain in fossil track because it is least complicated and most profitable. Although based on the current low electricity prices in

Sweden and lower service- and repair costs on electric vehicles than for fossil cars, an electric car can over time be cheaper to own than a car with a fuel engine.

7.4 Sensitivity analysis

There must be more incitement to jumpstart the electric car market. Customers choose petrol and diesel cars as long as they are a cheaper alternative. Higher CO₂ tax on fossil fuels and subsidies for electric cars is a must as well as long-term policy framework so that the market knows what it should relate to.

Another aspect that requires a fair analysis is how various new technologies such as electric cars with batteries and maybe new materials affect the environment and the climate in a life cycle analysis which takes into account production, use, disposal and recycling. It is not accurate to compare different cars' environmental impact by simply studying emissions from the exhaust pipe. Sustainable decisions require transparency throughout the chain which is hard today since manufacturers of electric vehicles and plug-in hybrids generally do not provide data on emissions associated with the manufacture of the batteries on their websites.

7.5 Social benefits and Public support

Social benefits achieved include clean air, quiet traffic, mitigation of climate change. By implementing a complete charging infrastructure in the region and thereby providing the opportunity for residents to use electric vehicles in the region. A national funding program for investments in charging infrastructure is currently available and runs until 2018th

8 Implementation roadmap

Activities \ Period	2014		2015		2016		2017
	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half
Work group meetings every month. preparation of event E-Road-East, road show and test periods							
Implementation of event E-Road-East							
Implementation of Road Show and Test periods							
National Funding program available for installation of charging stations. Assistance in preparation of applications.							
Planning and preparation of regional strategy for charging infrastructure							
Implementations of regional charging infrastructure strategy in cooperation with middle part regions of Sweden.							

Preparation of application for Project about Implementation of Fossil free Vehicle fleet.							
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9 Conclusion

Electric vehicles contribute to a large extent to reduction of CO₂ emissions in the transport sector and elimination of climate change. The current low price of oil and the current policy of not allowing economic promotion of renewable fuels in relation to the oil lock the market to remain in fossil track because it is the least complicated and most profitable way. Although, based on the current low electricity prices in Sweden and lower service- and repair costs on electric vehicles than for fossil cars, an electric car can over time be cheaper to own than a car with a fuel engine. There must be more incitement to jumpstart the electric car market. Customers choose petrol and diesel cars as long as they are a cheaper alternative. Higher CO₂ tax on fossil fuels and subsidies for electric cars is a must as well as long-term policy framework so that the market knows what it should relate to.

The municipality's role as a pioneer in the development is important. A municipality ensures that its customers, through tax money, have available housing, facilities and infrastructure, culture, education, health care, service, social security, clean environment, etc. The benefits and the value chain of a municipality or Region could be described as follows: A municipality's goal is that their "customers" (residents, businesses, tourists, politicians and others) are satisfied with the service in the municipality and wants to stay there. Most municipalities want to act as good examples and promote themselves with striking municipal slogans as attractive. A well functioning infrastructure for e-vehicles and a secondary market for e-vehicles is an important area where municipalities can be a good example, and thus also contributing to clean air, quiet traffic, lowering of CO₂ emissions etc. So, yes it is a very good idea for municipalities to invest in E-vehicles and infrastructure for charging them! Considering also that Sweden has decided to have a fossil free vehicle fleet in 2030 and that the Region of Östergötland intends to reach this goal in 2025, and that electric cars are a fossil-free technology that will be part of this solution, makes this project a good idea.

Finally, an important aspect that requires a fair analysis is how various new technologies such as electric cars with batteries and maybe new materials affect the environment and the climate in a life cycle analysis which takes into account production, use, disposal and recycling. It is not accurate to compare different cars' environmental impact by simply studying emissions from the exhaust pipe. Sustainable decisions require transparency throughout the chain which is hard today since manufacturers of electric vehicles and plug-in hybrids generally do not provide data on emissions associated with the manufacture of the batteries on their websites. To create a sustainable future, it is necessary to focus on saving and reusing finite resources and to reduce the number of cars per capita and encouraging more use of public transports.