WP 5
Electric vehicles for low-impact mobility

Traditional Dutch sailing yacht equipped with electric drive, ideal for inland waterways with slow speeds. Boats can more easily carry the heavy batteries thereby making the range between recharging a less critical issue. Photo: www.SEFF.nu

Project Partners

Responsible Beneficiary:
- City of Gothenburg

Partners involved:
- City of Bremen and its local partners
- Province of Fryslân

Hybrid refuse truck in Gothenburg. Heavy duty vehicles are the worst polluters, and hybrid solutions offer a possibilty to drive silently and emission free in sensitive areas. Photo: Renova

Electric vehicles within sustainable mobility

Electric vehicles offer solutions to many problems associated with the transport sector. Electric propulsion reduces the emission of green-house gases. The silent and emission free electric motor brings new possibilities for improvement in quality of urban life, and the amount of energy needed for transport can be significantly reduced. The CARE-North sites have clear political goals with reference to electric vehicles.

The *City of Gothenburg* has a long-term commitment to clean vehicles, and a special action plan for electric vehicles was launched in 2011. The car industry is also backed up by national research programs.

The *City of Bremen* is a leader in sustainable mobility, notably its car-sharing scheme. The city is taking steps to try out electric vehicles, but without compromising other important forms of sustainable mobility such as public transport, cycling etc. The German government is supporting by defining a target of one million electric vehicles by 2020.

The *Province of Fryslân* is aiming to be independent of fossil fuels by 2020. Electric mobility is an important component that also reduces noise levels. A regional network of charging stations is envisaged.

Activities in CARE-North

The introduction of electric vehicles is in the phase of gaining first hand experiences and testing new technology. A limited number of vehicles and charging points have been taken into operation and assessed. Campaigns have also been launched in order to raise awareness.

City of Gothenburg

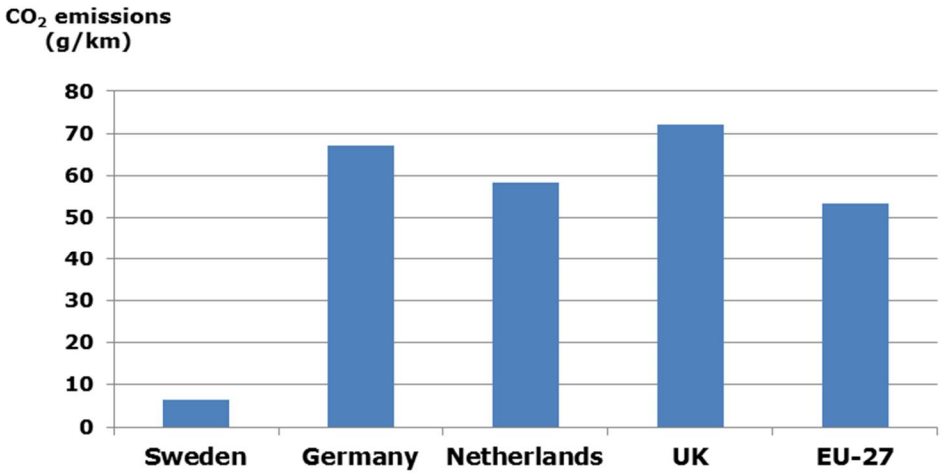
One of the first steps in the action plan was to launch an investigation on infrastructure development. One electric car was ear-marked for test-driving, and the purchase of 100 electric vehicles was started. Two important policy features are the emphasis on safety requirements, and the decision not to subsidise the electricity costs at public charging points. The city has been encouraging the use of clean vehicles through free parking for a number of years.

City of Bremen

There are two retrofitted electric cars that are tested in the municipal fleet. There is also an e-bike (Pedelec) test program with 20 bikes within a company based mobility management. Charging points are installed, preferably in parking garages. As an extra incentive, charging is free. As for heavy duty vehicles, two hybrid buses and one hybrid waste truck currently run on the streets of Bremen.

Province of Fryslân

An incentive program to expand the regional network of charging points has been set up. A company can receive a 500 € grant when installing a charging point on private grounds. To stimulate the uptake of electric vehicles, various promotion activities have been launched. An intending buyer can calculate the cost of ownership by using a specific web site. E-bikes however, do not need any support. They are selling themselves as the market is booming. E-boats are an interesting option that is promoted by the foundation SEFF.



CO_2 emissions from electric vehicles depends upon the electricity mix of the specific country. The diagram shows the emissions from a Volvo C30 Electric.
Source : IEA « CO2 emissions from fuel combustion Highlights (2011 edition) »

Senator Lohse in Bremen drives an electric car. Political engagement in electric vehicles is currently very strong. Photo: Michael Glotz Richter

Results in figures

City of Gothenburg

- 24 of a planned 100 electric vehicles in the municipal fleet
- 2 fast charge stations
- 84 charging points of which 5 on public land

City of Bremen

- 100+ electric vehicles of which 2 in municipal fleet
- 70 charging points
- 20 e-bikes in a company mobility scheme

Province of Fryslân

- 63 electric cars
- 450 electric boats
- 200+ charging points for cars and boats
- 6 electric buses

The market for e-bikes is booming. They offer a solution to commute by bike and have also become popular among companies and older people. Photo: Michael Glotz Richter

Results and future possibilities

User satisfaction with electric vehicles tends to increase over time. Range anxiety decreases, and the drivers appreciate the silent and quick response. All three sites report that test-driving is an effective way to make potential users more comfortable with the new technology.

As for electric cars, the first user groups are municipal service fleets, delivery companies and others with a predictable daily mileage of about 100 km. This allows for over-night charging to be sufficient. For a broader group of consumers, car sharing with electric cars is a very promising concept as was shown by *e-car4all* in Bremen.

Gathering several organisations in a common procurement is a way to reduce prices. It is important however, not to compromise vehicle safety requirements. Gothenburg has shown that environmental goals can be combined with a high degree of safety.

For most users, it is sufficient to recharge where the vehicle is parked overnight. Garage installations are preferable to street parking since it is cheaper and easier. Fast charging possibilities can be used to reduce range anxiety, but the cost is still considerably high.

Cooperation between stakeholders has taken place at all three sites and is instrumental in making things happen. One successful example is the Dutch *Drive4Electric* that has produced starting guides for cities and companies.

What are the costs?

General
Electric vehicles are more expensive to purchase, but cheaper to drive

Cars
An electric car costs about 20 000 € more than a corresponding conventional car

Bikes
Purchase price is 1100-1500 €

Charging stations
Fast charger: 100 000 €

Risks

- Cost and durability of batteries
- Subsidised electricity and parking may increase car use
- Technology may change quickly, new cars can become obsolete

Recommendations

Introducing electric vehicles is a crucial step in solving many of the problems associated with the transport system. Electric vehicles will not however, solve problems of congestion. A starting point for a new mobility culture could be the existing car sharing schemes. Adding electric vehicles to these schemes would enable a system that is not only clean, but also space saving and flexible.

Have realistic expectations

The transition to electric vehicles should be done carefully and should not raise expectations too high. Costs are high and the limited range of 100-150 km reduces the number of potential users. Plug-in hybrids offer a promising bridge from fossil fuels to electric mobility. When purchasing electric cars, it is important to consider safety aspects.

Recharge overnight

As for the recharging infra-structure, it is crucial to enable recharging where the vehicle is parked overnight. Charging points in garages and shopping malls can be expanded as the fleet grows. On-street parking however, is a sensitive subject since it can be considered to be an ineffective use of space which could otherwise be used for bus lanes or short- term parking.

Subsidising of parking and recharging is a powerful incentive for the use of electric vehicles but should be done in a way that does not discourage the use of cycling and public transport.

Try it out

Organise test-drives. Once people have tried electric cars they tend to have a more positive attitude towards them.

In brief

- Hundreds of electric vehicles have been tested at three sites.
- User response is positive, but the limited range and high cost for batteries is still an issue.
- Electric vehicles alone will not do the job, new mobility solutions are needed.
- Slow charge overnight is sufficient for most users.

The Province of Fryslân is aiming to be independent of fossil fuels by 2020. «Dwaande« is a Frisian word meaning « just do it! « . Photo: Community of Kollumerland.

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