

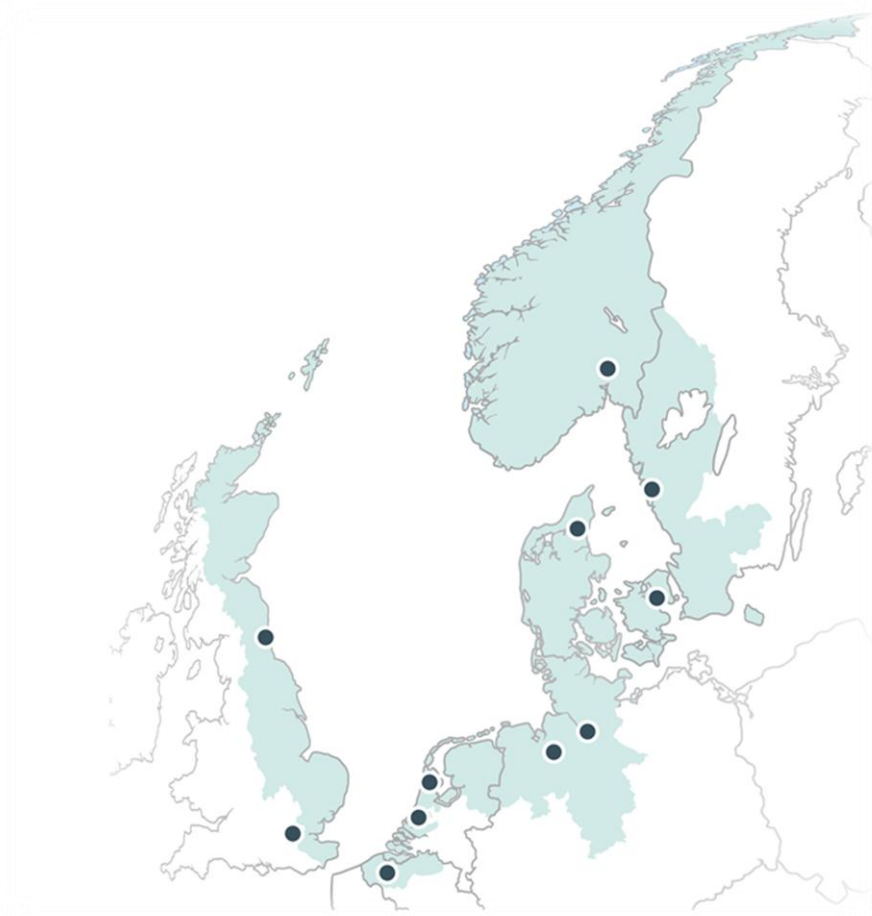


NORTH SEA REGION ELECTRIC MOBILITY NETWORK

e-mobility NSR

Electric mobility policies in the North Sea Region countries

Jan Jacob Trip, Joana Lima and Sjoerd Bakker
Delft University of Technology
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1 Introduction

1.1 E-Mobility NSR

Electric vehicles (EVs) are currently being discussed around the world, especially in Europe and North-American but also in emerging economies such as China and India, as a promising means to increase the energy-efficiency and sustainability of today's transport systems. To effectively promote and successfully diffuse EVs, it is crucial to identify the initiatives containing the most likely early adopters and to target development, marketing and policy measures towards these segments.

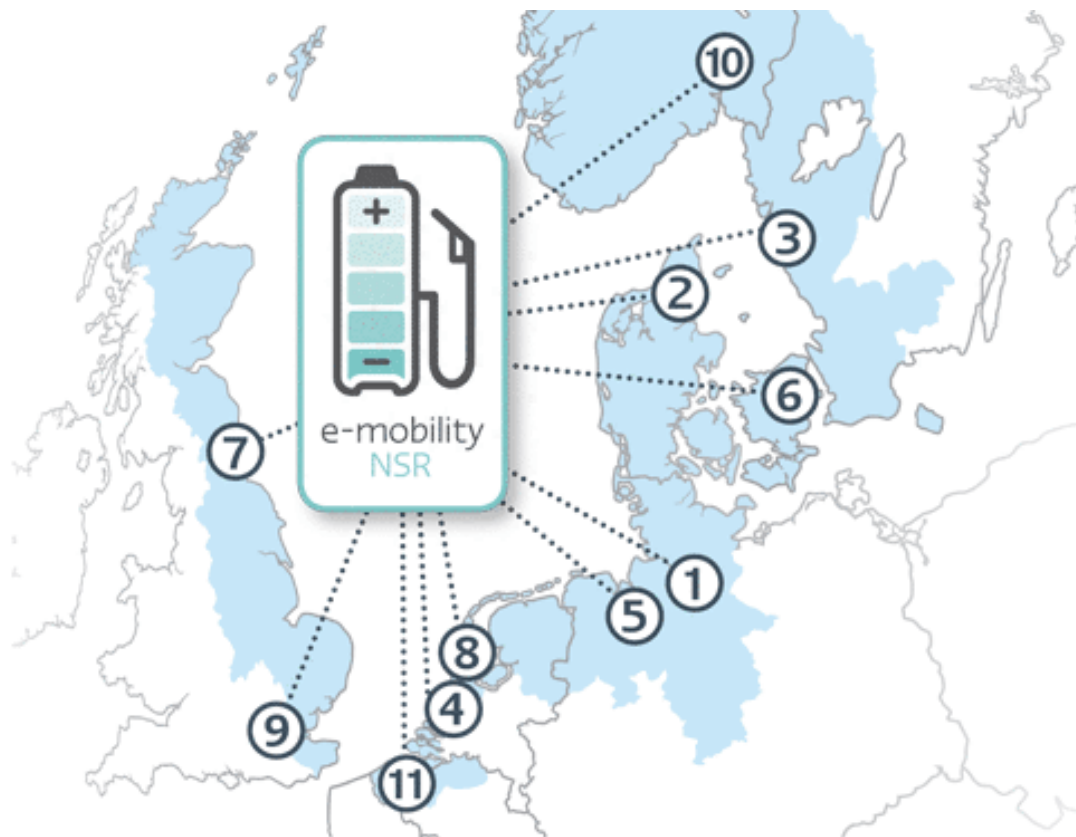
Electric mobility itself is by no means a new concept: EVs first appeared in the 19th century, when they seemed to prevail over petrol and steam cars for some time. However, the current concerns about environmental problems such as air pollution and climate change have given a new boost to the development of electric mobility. As a result, numerous initiatives to stimulate electric mobility are being supported by governments, companies, universities, and private individuals.

The project 'North Sea Region Electric Mobility Network' (*E-mobility NSR*) is one of several initiatives that aim to promote the coherent development of electric mobility in a broader region. E-mobility NSR aims to create favourable conditions to promote the common development of E-mobility and synchronize different initiatives in the North Sea Region (NSR), by fostering the diffusion of E-mobility and stimulating the use of public and private electric car transport as well as freight across that region. At present, several cities and regions in Europe and the North Sea Region are developing strategies and action plans to bring forth electric mobility. To achieve this objective, a range of different incentives are currently being developed throughout Europe to seize the potential of electric mobility, especially in terms of local and regional traffic. However, to date many of these activities are neither well synchronized nor aligned with one another, so that realization is actually confined to only a few cities or regions. As a result, many opportunities for further development and growth of this future key mobility sector remain unexploited.

The project is being undertaken in the framework of the EU funded Interreg IVB North Sea Region Programme and runs from October 2011 to September 2014. The project is a partnership of 11 organizations from all seven countries in the NSR (Figure 1):

- 1) Hamburg University of Applied Sciences (D, Lead Partner)
- 2) FDT - Association of Danish Transport and Logistics Centres, Aalborg (DK)
- 3) Lindholmen Science Park, Gothenburg (S)
- 4) Delft University of Technology (NL)
- 5) WFB - Bremen Economic Development Corporation (D)
- 6) Høje-Taastrup Municipality (DK)
- 7) Northumbria University, Newcastle (UK)
- 8) Province of North Holland (NL)
- 9) Cities Institute, London Metropolitan University (UK)
- 10) ZERO – Zero Emission Resource Organization (N)
- 11) Flanders Region, represented by TransEnergy (B)

Figure 1: The E-mobility NSR partnership.



1.2 Structure of the report

The structure of the current report is as follows. Chapter 2 will provide a concise background to the report, discussing scope and methodology. Chapter 3 then briefly discusses the state of art and the expected development of electric mobility. Chapter 4 discusses policy initiatives per country. Chapter 5 provides a brief comparative analysis of policies in NSR countries. Chapter 6, finally, presents some conclusions and final remarks. A more extensive overview of policy initiatives than discussed in Chapter 4 can be found in the Appendix.

2 Background

2.1 Aim

The E-mobility NSR project aims to integrate, coordinate and synchronize the different strategies and action plans of the participating regions into a common network. The current report provides a starting point for this - one of several, for that matter - by providing an overview of the main policy initiatives on e-mobility that are being implemented in the NSR countries and regions. To a limited extent it also draws a comparison between these countries and regions.

2.2 Scope

The current report is complemented by several other activities carried out within the E-Mobility NSR project. Most important to mention are:

- a companion report on EU policies will be compiled by Northumbria University, also within the context of Activity 3.3;
- an analysis of policies concerning standardisation of charging systems will be carried out within Activity 4.3;
- an analysis of e-mobility policies in freight transport is being carried out in WP7 of the project.

In order to avoid unnecessary overlap, the current report does not focus on these issues. Rather, it focuses on:

- policy initiatives such as strategies, action plans and financial and non-financial incentives (rather than 'single' activities such as limited research projects or study visits) aiming to stimulate and promote electric mobility;
- the national, regional and local level, the latter limited to E-Mobility NSR partner cities;
- passenger transport, or passenger and freight transport when combined.

2.3 Methodology

The analysis in this report was based on two types of desk research:

- web research: analysis of official websites from Institutions, companies, governments and other stakeholders, project websites, on-line press-releases, blogs etc.;
- literature study: analysis of books, documents, reports, research studies and scientific papers.

The web research has been considerably more extensive than the study of 'hard copy' literature, in order to gain an overview of policy initiatives as up-to-date as possible. Information was provided primarily by E-Mobility NSR project partners, mostly in the form of internet links to relevant sites or documents concerning policy initiatives in their respective cities, regions and countries. Beside the information provided by project partners, additional research was carried out where necessary. Again, this consisted of literature study and additional web research.

The above resulted in a large body of data on policy initiatives in NSR countries. This was structured by way of a number of relevant aspects such as scale, type of vehicles or infrastructure addressed and main actors involved (see Section 4.1). While a selection of most relevant policies is discussed more in detail in Chapter 4, the entire overview can be found in the Appendix. It must be noted, however, that also this more extensive overview is by no means exhaustive, considering the volatility of the electric mobility policy field.

3 Electric mobility

3.1 Main characteristics of electric mobility

The main characteristics that distinguish different types of electric mobility are the type of vehicles involved and the specific infrastructure used for charging.

Type of Vehicle

Electric vehicles, alternatively named 'plug-in vehicles', can be classified in three categories:

- *Battery Electric Vehicle* (EV or BEV): vehicles which are fully powered by electricity from batteries that can be recharged via a connection with the electricity grid. Batteries may be charged while in the vehicle, or may be removed to be charged outside the vehicle (see below).
- *Plug-in Hybrid Electric Vehicle* (PHEV): hybrid vehicles with a petrol or diesel engine and an electric motor, plus a stronger battery pack, which can be recharged via a common household electric socket. The petrol or diesel engine may drive the wheels, but may also serve as a generator to charge the batteries (range extender).
- *Hybrid Electric Vehicle* (HEV): vehicle combining a conventional petrol or diesel engine with an electric motor. The batteries that fuel the electric motor are recharged by regenerative braking or by converting energy from gasoline via the hybrid's internal combustion engine.

Infrastructure

Charging stations, also called 'EV charging station', 'electric recharging point' and 'EV supply equipment (EVSE)'. Usually connected within a network grid infrastructure based on electric energy, the EV Charging stations supply the energy for the recharging of 'plug-in vehicles'. Charging stations can be divided in three types:

- slow-charging stations, which are most common and able to recharge an EV in about six to eight hours.
- fast-charging stations, which do the same job considerably faster, allowing an EV to continue its trip within 1 hour or less. Frequently fast-charging is tend to have a detrimental effect on battery quality battery.
- swap stations, where batteries are taken out of the car and exchanged for fully charged batteries. The exhausted batteries are recharged outside the car. The Better Place system is the best known example so far. Battery swapping requires vehicles equipped with easily removable battery packages.

3.2 International arena

The increasing importance of electric mobility is expected to continue in the next decades. This is reflected in the goals announced in the Electric Vehicle Initiative (Figure 2). Nonetheless, the International Energy Agency indicates a growing awareness of the urgent need to turn political statements and analytical work into concrete action (IEA, 2011a/b; 2012).

Worldwide as well as within Europe, several organisations work to address the above challenge and stimulate electric driving. Most relevant here are:

- the *International Energy Agency (IEA)*¹, an autonomous international organization founded in 1974 in a response to the 1973 oil crisis. Established in the framework of the Organization for Economic Cooperation and Development (OECD), the IEA performs as a policy adviser mainly to its 28 state members but collaborates also with non-members countries (like China, India and Russia). Currently, the IEA is developing “a series of roadmaps for some of the most important technologies, needed for achieving a global energy-related CO₂ target in 2050 of 50% below current levels” (IEA, 2011a).
- The *Implementing Agreement for co-operation on Hybrid and Electric Vehicle Technologies and Programmes (IA-HEV)*² is an international membership group, collaborating within the IEA framework and coordinated by the CERT (Committee on Energy Research and Technology). Formed in 1993, the IA-HEV aims to “produce and disseminate balanced, objective information about electric, hybrid and fuel cell vehicles”. The IA-HEV has 17 member states, including all NSR countries except Norway.
- the *World Electric Vehicle Association (WEVA)*³ is an international organization launched in 1990, which aims to promote research, development and dissemination of electric vehicles. WEVA organizes the EVS world Electric Vehicle Symposia, the World Electric Vehicle (on-line) Journal and bestows the E-Visionary awards. WEVA consists of three regional organizations in the Americas, Europe and the Asia-Pacific respectively: the European Association for Battery, Hybrid and Fuel Cell Electric Vehicles (AVERE, see below), the Electric Drive Transportation Association (EDTA), and the Electric Vehicle Association of Asia Pacific (EVAAP).
- *AVERE*⁴, the European Association for Battery, Hybrid and Fuel Cell Electric Vehicles, founded in 1978 and based in Brussels, is a European network of users, NGO's, associations, interest groups, and others. Its main objective is to promote the use of all types of EVs by means of dissemination, networking, monitoring, participation in European and multilateral projects, lobbying, and research and development.
- the *Electric Vehicles Initiative (EVI)* from Clean Energy Ministerial (CEM)⁵ is a global forum to promote “policies and programs that advance clean energy technology, to share lessons learned and best practices, and to encourage the transition to a global clean energy economy”. The EVI is based on areas of common interest among participating governments and other stakeholders, aims a global cooperation on the development and deployment of electric vehicles. This initiative aims for the global implementation of twenty million EVs by the year 2020, including plug-in hybrid electric vehicles and fuel cell vehicles (Figure 2).
- the *European Green Cars Initiative*⁶ is one of the three Public Private Partnerships (PPP) of the European Economic Recovery Plan announced by the President of the European Commission on the 26th of November 2008. The objective of the initiative is to support R&D on technologies and infrastructures that are essential for achieving breakthroughs in the use of renewable and non-polluting energy sources, safety and traffic fluidity.

¹ <http://www.iea.org/topics/transport/electricvehiclesinitiative>.

² <http://www.ieahev.org>.

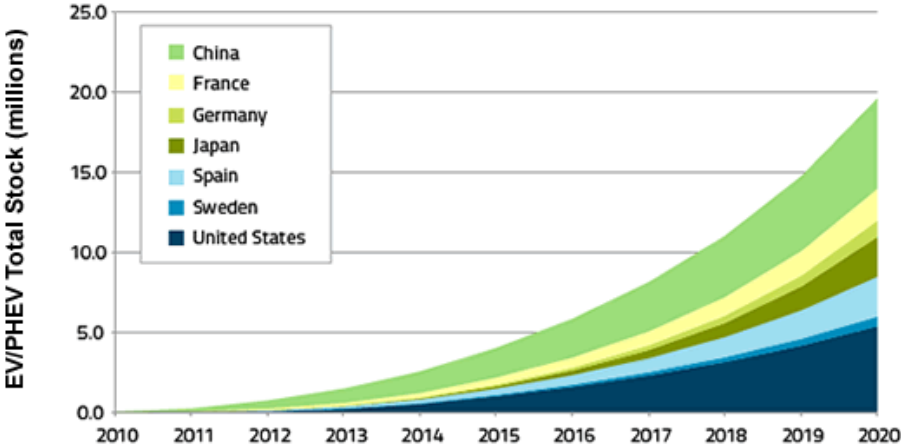
³ <http://wevaonline.net>.

⁴ <http://www.averre.org/www/index.php>

⁵ http://www.cleanenergyministerial.org/our_work/electric_vehicles.

⁶ <http://www.green-cars-initiative.eu/public>.

Figure 2: Projected stock of electric and plug-in hybrid electric vehicles by 2020 based on country goals announced in the Electric Vehicle Initiative (EVI).



Source: Clean Energy Ministerial (CEM) – Electric Vehicle Initiative, http://www.cleanenergyministerial.org/our_work/electric_vehicles/

4 E-Mobility policy initiatives per country

4.1 Introduction

Based on the desk research as described in Chapter 2, this chapter presents an overview of policy initiatives to stimulate electric mobility, arranged by country (from west to east). Table 1 presents some key data on the road transport in each country, indicating considerable difference in e.g. population density, number of vehicles and road network.

Table 1: Key data on road transport in NSR countries (2008).

	UK	B	NL	D	DK	N	S
area (km ²)	244,820	30,528	41,582	357,111	43,094	323,759	449,964
population (million)	61.6	10.8	16.5	82.0	5.5	4.8	9.1
no. passenger cars (million)	n.a.	5.4	7.5	41.3	2.1	2.2	4.2
no. vans/lorries (x 1000)	n.a.	711.9	1,259.0	2,523.0	531.4	523.4	480.0
no. busses (x 1000)	114.0	16.0	11.3	75.3	14.5	23.3	13.6
road network (km)	419,997	153,595	135,470	231,194	73,197	92,869	425,383
motorways (km)	3,673	1,763	2,582	12,594	1,111	239	1,684

Source: European Commission: EU energy and transport in figures - Statistical Pocketbook, 2010, http://ec.europa.eu/energy/publications/doc/2010_energy_transport_figures.pdf.

Factors that were taken into account during the desk research included spatial level (national, local, regional), objectives and strategies, policy measures involved, type of vehicle addressed (EVs, PHEV or HEV, type of infrastructure involved (charging stations or other technologies), and start and end dates. For each country two broad categories of policies are distinguished that are commonly part of E-mobility programmes or 'policy packages', namely:

1) Financial incentives, including

- reductions on 'vehicle taxes' for low-carbon cars, for instance on VAT (Value Added Tax), VED (Value Excise Duty, or 'road tax'), registration taxes or license fees;
- rebates or tax credits on vehicles (often augmented by subsidies from the national government);
- reduction of toll or congestion charges and parking fares;
- discounts on recharging equipment and installation;
- subsidies for R&D, ICT, forums, and other 'know-how' development.

2) Non-financial incentives, including

- regulation/legislation;
- dedicated and cheaper or free parking spaces in city centres;
- exclusive (or shared with bus) EV lanes;
- low emission zones (LEZ) – restricted areas for vehicles with low-carbon emissions;
- expedited permitting and installation of EV supply equipment (EVSE).

The next sections present a non-exhaustive overview of the most relevant policies and policy measures per country. A more detailed and extensive overview can be found in the tables in the Appendix.

4.2 United Kingdom

In the United Kingdom the main efforts towards promoting hybrid and electric vehicles are being carried out through the UK's Government, which expect to have 1,500,000 EVs on the road by 2030. The major initiative towards E-mobility, the *Plugged-in Places* (P-IP), is being carried out by the Office for Low Emission Vehicles (OLEV), a cross-government partnership that includes staff and personnel from the Department for Transport (DfT), the Department for Business, Innovation, and Skills (BIS), and also the Department of Energy and Climate Change (DECC).⁷ The P-IP programme aims to create a large charging infrastructure of more than 9,700 charging points in eight British regions, namely: London, Milton Keynes, the East of England, Northern Ireland, Central Scotland, Greater Manchester, the Midlands and the East of England. The programme started in December 2011 and will run until March 2013. It is part of the UK's government *Business Plan 2011–2015*,⁸ which outlines five structural reform transport priorities to deal with carbon and roadway congestion. The actions specified towards this end are to:

- develop a nationwide strategy to promote the installation of EV infrastructure, including a decision on whether to use an energy Regulated Asset Base and/or changes to planning/building regulations;
- support the Plugged-In Places pilots program to encourage the establishment of electric vehicle recharging infrastructure across the UK and inform the development of the electric vehicle infrastructure strategy;
- push for early European Union (EU) adoption of electric vehicle infrastructure standards;
- consolidate existing support mechanisms for low and ultra-low emission vehicle research and development;
- promote consumer uptake of ultra-low emission vehicles.

At local level, the *Electric Vehicle Delivery* Plan for London is a major initiative. The plan, supported by the Mayor of London and Transport for London, runs between 2009 and 2015, sets out a complete strategy to stimulate the market for electric vehicles in London based on three key themes:

- infrastructure - an extensive charging network across London. The target is to have 25,000 charge points by 2015;
- vehicles - the objective is to have 1,000 EVs in the Greater London Authority fleet by 2015;
- incentives, marketing & communication.

The UK Coalition Government is committed to put in place the necessary policies to facilitate the decarbonisation of the road transport sector.

⁷ <http://www.dft.gov.uk/topics/sustainable/olev/recharging-electric-vehicles/>

⁸ <https://www.sourcelondon.net/sites/default/files/Electric%20Vehicle%20Delivery%20Plan%20for%20London.pdf>

Financial incentives

The *Plug-In Car Grant*⁹ is a subsidy program for consumers created by the UK Government in 2011, which aim to enable the purchase of ultra-low carbon vehicles (EVs, PHEVs and HEVs). Under the program, qualifying ultra-low emission cars will receive a grant of 25% toward the cost of the vehicle up to a maximum of £5,000. There is a comparable Plug-In Van Grant as well.

The *Plugged-In Places* (P-IP) initiative – mentioned in the previous section - has created electric car hubs through installing charging points in six key British cities or regions. P-IP represents a major effort in establishing a charging infrastructure.

The *Bus Service Operators Grant* (BSOG)¹⁰ for community transport is a payment made to bus operators related to fuel consumption and offsets a high proportion (around 80%) of the duty paid on fuel consumed (about 1,000 per bus per year). The annual spend on BSOG is £436 million (2008/9). The Department for Transport has modified BSOG in April 2009 to provide greener buses through rewarding gains in fuel efficiency and the introduction of low carbon buses. A new call with a budget of £15 million (green bus fund) was launched in July 2010 by the UK's Department of Transport.

The *Community Challenge*¹¹ is a yearly initiative, launched by the Low Carbon Vehicle Partnership and Energy Saving Trust, designed to “stimulate local action towards lower carbon journeys”. The initiative offers prizes of up to £5,000 for community based projects promoting at least one of three categories: low carbon vehicles and fuels; smarter/ eco driving; reducing car use. Projects can deliver physical improvements, equipment or technological developments as well as providing information or setting up a scheme to promote sustainable transport.

Other national and local measures and respective financial incentives are illustrated in Table 2.

Table 2: Financial incentives applied in the UK.

	measures	incentives
national	VED (Vehicle Excise Duty)	Exemption (as tailpipe emission < 100 CO ₂ /km)
	Company Car Tax	Exemption for employees and employers (from income and national insurance contributions)
	Van Benefit Charge	Exemption for employees and employers (from income and national insurance contributions)
	Fuel Benefit Charge	Exemption
	Enhanced Capital allowances	100% first year allowance: for business
local	London congestion charge	100% discount
	Parking charges	Exemption or reduced charge for EVs (provided by local authorities)

Source: IA-HEV Portal, <http://www.ieahev.org/>.

⁹ <http://www.dft.gov.uk/topics/sustainable/olev/plug-in-car-grant>

¹⁰ <http://www.dft.gov.uk/publications/bus-service-operators-grant-bsog-for-community-transport/>

¹¹ <http://lowcvp.org.uk/assets/other/Community%20Challenge%20Brochure.pdf>

Figure 3: Example of the UK fuel Economy label.

The Fuel Economy Label Explained

The Fuel Economy Label illustrates to car buyers – at the point of sale – the running costs and fuel efficiency of new cars. Car showrooms are able to provide up to date environmental information using data from the Vehicle Certification Agency (VCA) database. Consumers are now able to make environmental decisions about their new purchases. **The label clearly shows that choosing a car with lower CO₂ emissions means lower running costs and lower tax.**

Thirteen VED bands

The figures on the coloured arrows (A-M) indicate the 13 ranges of emissions by g/km that correspond to levels of annual Vehicle Excise Duty (VED or Road Tax). Low carbon-emitting cars pay less tax. The lowest – Band A – pay no tax.

Make, model and engine details

The vehicle make, model, fuel type, engine capacity and transmission type are all listed. Together they determine the CO₂ emissions and running costs.

CO₂ emissions figure

The black arrow points to the vehicle's relevant band of CO₂ emissions on which Vehicle Excise Duty (VED or Road Tax) is based.

Running costs

Average yearly fuel costs are calculated and displayed together with the relevant level of Road Tax. Figures updated with recent prices.

Fuel consumption

Shows how efficient the car is in miles per gallon and litres per 100km in town, country and combined driving situations.

About 20% of carbon emissions in the UK are from road transport

Source: <http://www.dft.gov.uk/vca/fcb/point-of-sale-pos-so.asp>.

Non-financial incentives

*Fuel Economy label*¹²: the UK is one of the few EU countries having introduced a fuel economy label, developed by the Low Carbon Vehicle Partnership with support from the Retail Motor Industry Federation, the Society of Motor Manufacturers and Traders and the Government. This label is voluntary initiative for dealers and, helps car buyers easily assess the impact on climate change of

¹²<http://www.dft.gov.uk/vca/accessibility/description-of-the-new-car-environmental-label.asp>

different cars based on a coloured scale (from green for lowest CO₂ emissions, to red for highly polluting vehicles; see Figure 3). The colour-coded label is designed to provide information, for each new car, on

- fuel economy (fuel use per mile/km);
- fuel cost per 12,000 miles;
- carbon dioxide (CO₂) emissions per km;
- Vehicle Excise Duty (annual 'road tax').

*Low Emission Zone (LEZ)*¹³: Currently there are implemented in two cities (London and Norwich), and Oxford is planning a bus-related LEZ, to be implemented in 2014. LEZ are defined as “specific zoning schemas for vehicle usage to improve air quality”. The most polluting vehicles - that do not meet the LEZ emissions standards - are not allowed driving in the area and will need to pay a daily charge if used within the LEZ. To inform drivers that they are entering the LEZ, there are signs at the side of the road; there are no barriers or toll booths.

A *Nationwide advice service*¹⁴ was already in operation providing domestic energy efficiency advice from 48 advice centres in the UK. After receiving EU funded TREATISE training, three of the centres began also to provide cleaner transport advice, in particular by cross-selling transport advice to people that called for energy efficiency advice. The projects have been successful. To date more than 31,000 consumers have received cleaner transport advice and there are now plans to extend the consumer transport advice service nation-wide.

4.3 Belgium

Belgium is the European country with the highest number of cars per capita (Table 1, p.12) Approximately 500,000 new cars are registered (Statistics and Economic Information, 2008). More than half (57.4%) of the total passenger car fleet has been a diesel. The federal government plans to purchase and use electrically powered vehicles in order to stimulate the their implementation. In 2010 some steps were taken in electric mobility policy on the federal as well as the regional level.

On federal level, the *Belgian Platform on Electric Vehicles*¹⁵ was created to inform and bring together all relevant stakeholders from the e-mobility field. Between 2010 and 2011, the platform organized several events. As a result of this, in 2012, the federal authorities started work on the *National Master Plan* for the promotion of electric mobility in Belgium, in consultation with representatives of the regions, departments and sector organizations. The master plan describes the barriers to electric mobility and discusses 13 areas of action with ideas for different measures, varying from financial incentives (for garage owners who buy an EV for training purposes) to new business models. Other measures include the location of public charging infrastructure.

On regional level, the *Living Labs Electric Vehicles* was launched by the Flemish government in 2010 and will run until 2013. The program was established to facilitate and accelerate the innovation and adoption of EVs in the Flemish region through five experimental platforms (Volt-Air, Olympus, iMove, EV Reclab and EVA). The main goal is to “set up a structured real-life environment to allow representative end users to test innovations in their own living and work environment”.¹⁶

¹³ <http://www.lowemissionzones.eu/countries-mainmenu-147/united-kingdom-mainmenu-205>

¹⁴:http://www.nationwide.co.uk/home_energy_advice/energy_efficient_appliances/default.htm

¹⁵ http://economie.fgov.be/nl/consument/Energie/Duurzame_ontwikkeling/elektrische_voertuigen/belgian_platform_on_electric_vehicles/

¹⁶ <http://www.livinglab-ev.be/>

At the local level, the city of Ghent is involved in several initiatives that focus on air quality policy and the development of sustainable mobility: Local Air Quality Plan, STOP, European Civitas project, the 'Olympus' and the 'EVA' platforms (from the Living Labs EVs mentioned above). Beside these initiatives, the city of Ghent give incentives (through subsidies) to individuals, taxi and courier services, and also to car-sharing organizations to purchase EVs¹⁷. The *Local Air Quality Plan (2010-2015)*¹⁸ includes fifty measures to ensure a healthier air quality, including the support by the municipality of ecological vehicles, in particular EVs or alternative powered vehicles. The plan also includes the development of a network of charging stations.

Financial incentives

Since 2002 the Belgian regions (Flanders, the Brussels Capital and the Walloon Region) are responsible for the vehicle tax base, tax rates and exemptions. Currently, car taxes in the three regions are fully aligned. Additionally, there is an agreement between the three regions that this status will continue. The basis for the classic car tax is increased according to the CO₂ emissions. Special tax rules are in place to stimulate the business and residential markets to choose more environmentally friendly vehicles such as hybrid and electric vehicles. These are shown in Table 3.

Table 3: Financial incentives applied in Belgium.

measures	incentives
EV	<ul style="list-style-type: none"> • 120% deductibility of purchase cost of EV 100% of plug in hybrid with CO₂ < 60g/km (for companies under corporate tax system) • Residential market : 30% of the purchase price for EV, with a maximum of €9,190 (via taxes, not directly from invoice) Lowest tariff of vehicle registration tax for EV, 0 tariff for EV in Flanders • In Wallonia additional incentive for the purchase of EV via a bonus-maals system (up to €3,500)
PHEV	100% deductibility of purchase cost of PHEV with CO ₂ < 60g/km (For companies under corporate tax system)
Charging Infrastruct.	Additional deductibility of 13.5% on the investment of charging infrastructure (for companies under corporate tax system)

Source: IA-HEV Portal, <http://www.ieahev.org/>.

An *Ecology Premium*¹⁹ is intended to be a financial incentive for companies that achieve environmental investments in Flanders. Since 2006 the Flemish Government provides a budget to ecology premiums for the installation of particulate filters for trucks with Euro I, II or III engine. In 2010 the ecology premium system was extended to apply to new technologies as well. In the transport sector this includes e.g. fuel cell system to power transport, EEV engines for heavy vehicles, charging system for electric or hybrid vehicles, refuelling infrastructure for CNG and refuelling infrastructure for bio-ethanol.

¹⁷ <http://www.gent.be/eCache/THE/1/47/960.html>

¹⁸ <http://www.gent.be/eCache/THE/1/56/269.cmVjPTE1ODQwMg.html>

¹⁹ <http://www.agentschapondernemen.be/themas/our-services>

Non-financial incentives

Similar to UK's example, Belgium has introduced a *fuel economy label*.²⁰ This helps car buyers to assess the impact of different cars on climate change. It is based on a colour scale, ranging from green for the lowest CO₂ emissions to red for the most polluting vehicles.

*Ecoscore*²¹ entails a methodology developed to measure the environmental impact of vehicles. Results are collected in free accessible database with vehicle rates (ranking from 0-100 points with 0 points being the worst score). The initiative was developed by the Flemish Institute for technological research (VITO) and other partners, including the Vrije Universiteit Brussel.

4.4 The Netherlands

Electric mobility plays a key role in the strategic planning of the Dutch government. In 2011 2,000 new electric vehicles were registered in the Netherlands. Further growth is expected, with 20,000 new registrations in 2015, and a total of about 1 million EVs and a 20% market share in 2020.²²

The national *Action Plan for Electric Driving*²³ is the major initiative of the Dutch government, carried out by the Ministry of Economic Affairs, which was implemented between 2009 and 2011. The objective was to make the Netherlands an international laboratory for electric driving through the implementation of nine demonstration projects. During two years, EV technologies were tested in real-world transport, learning by doing, demonstrating the EV's possibilities and developing a business case.

Another policy that affects electric mobility is the *National Cooperation Programme Air Quality* (Nationaal Samenwerkingsprogramma Luchtkwaliteit, NSL).²⁴ Although the NSL has a rather broad scope, it also includes measure to stimulate clean mobility. Example are the aim to implement clean vehicles in the municipal fleet, or to include emission criteria in public procurement procedures for the purchase of cars by public authorities.

On the regional level, *HyMove*²⁵ is a project being developed the Arnhem-Nijmegen region (province of Gelderland). The project aims to stimulate the use and development of hydrogen in transportation, by bringing hydrogen to people's attention and developing a regional hydrogen infrastructure.

At local level, several cities are involved in the abovementioned Action Plan for Electric Driving, including Amsterdam, The Hague, Rotterdam and Utrecht. Each one of these four cities develops own policy initiatives within the framework of the Action Plan. For instance, *Amsterdam Elektrisch* sets out measures to stimulate electric mobility in the city between 2009 and 2040. The aim is to examine private transport, public transport and freight transport by residents, local companies and visitors. The main short-term objectives are "to create an initial infrastructure of vehicle charging points, and to raise the visibility of electric transport – and its users – on the streets", by introducing

²⁰ <http://www.cleanvehicle.eu/info-per-country-and-eu-policy/member-states/belgium/national-level/>

²¹ <http://www.ecoscore.be/en>

²² <http://www.cleanvehicle.eu/info-per-country-and-eu-policy/member-states/netherlands/national-level/>

²³ <http://www.agentschapnl.nl/en/node/110155>

²⁴ <http://www.infomil.nl/onderwerpen/klimaat-lucht/luchtkwaliteit/nsl/uitvoering/>

²⁵ <http://www.hymove.nl/>

200 charging stations and 200 EVs between 2009 and 2012. In the long-term, the city expects to have 200,000 EVs and PHEVs vehicles on the road.²⁶

To ensure the availability of EV facilities also on the regional level, the comparable *Metropoolregio Amsterdam Elektrisch* (MRA-E) was founded in 2011.²⁷ The project will run until 2013. Participants are 36 municipalities, the provinces of North-Holland and Flevoland, the Metropolitan Region of Amsterdam and Rijkswaterstaat (Ministry of Waterways and Public Works). In October 2012 the MRA-E consortium and the national government agreed on a *Green Deal*.²⁸ The Green Deal (2012-2014) contributes to existing policy objectives, such as the aim to implement hundreds of new charging points in the region in the next two years. Moreover, the Green Deal provides €300,000 of additional funding for MRA-E.

Another local project is *'s Hertogenbosch Electric Mobility*,²⁹ supported by the municipality and running from 2011 to 2020. The main objective is to achieve a minimum share of 10% of EVs, based on a regional objective of 200,000 EVs in the province of North Brabant.

Financial incentives

As shown in Table 4, Dutch national administration as well as some local and regional administrations offer various financial incentives to stimulate the purchase and driving of electric vehicles in the Netherlands.

In addition, the national government “supports efforts by market parties, social organizations, and local and regional authorities resulting in a much larger overall funding that multiplies the initial government investment”³⁰. The main activities of the national government itself in this respect are threefold:

- the establishment of a *Formula-E team* with a robust and authoritative chairperson (until March 2012 Prince Maurits) and members from all industries that are indispensable for the successful introduction and roll-out of electric driving. The team's primary task is to spur market development and remove obstacles;
- initiating a range of activities in the period from 2009 to 2011: (a) practical testing and demonstration projects, (b) purchase of EVs as a launching customer, (c) charging, energy, and other infrastructure, (d) research, development, and production of electric vehicles and/or components, (e) formation of consortiums and coalitions, and (f) implementing ancillary (mostly fiscal) policy;
- facilitate, coordinate, and phase the market introduction of EVs in line with the national Action Plan and other relevant studies.

Non-financial incentives

Communication programs are sponsored by the Dutch Government to promote the concept of ‘eco-driving’ for drivers of all vehicle types. The principles that underlie this fuel-efficient driving behaviour are incorporated in regular driving lessons. Fuel economy can be improved by 10 to 20%,

²⁶ <http://www.amsterdam.nl/parkeren-verkeer/amsterdam-elektrisch/amsterdam-electric/>

²⁷ <http://www.metropoolregioamsterdam.nl/20120509EV.html>

²⁸ <http://www.noord-holland.nl/web/Actueel/Nieuws/Artikel/Regio-Amsterdam-sluit-Green-Deal-over-elektrisch-rijden.htm>

²⁹ <http://www.s-hertogenbosch.nl/inwoner/milieu/luchtkwaliteit/maatregelen/>

³⁰ <http://www.ieahev.org/by-country/the-netherlands-policy-and-legislation/>

at low costs, mostly by behavioural measures. Eco-driving can play a role in extending the range of EVs as well (International Energy Agency, 2011).

*Low Emission Zones (LEZ)*³¹, ‘Milieuzones’ in Dutch, are being introduced as an effort to improve air quality in cities. Such environmental zones have been introduced in some of the largest urban areas in the Netherlands (e.g. Amsterdam, The Hague, Leiden, Rotterdam and Utrecht) in order to restrict the entry of vehicles not classified as ‘environmentally friendly’ (particularly old diesel cars and large trucks). Thus, there are specific entry rules for vehicles on the basis of their emission characteristics.

Table 4: Financial incentives applied in the Netherlands.

	measures	incentives
national	Registration tax	Relief for purchasing commercial EV and recharging posts; Substantial bonus/registration tax reduction for PHEVs (depending on the energy efficiency label of the car)
	Road taxes (VED)	Exemption for EVs and PHEVs
	Income Tax	Exemption for company car drivers
	National subsidies	National subsidy schemes for innovative pilots
regional	Province of Noord-Brabant subsidies	Grants subsidies for innovative projects covering electric driving and smart grids
local	Amsterdam, Leeuwarden and Rotterdam subsidies	Grant (additional) subsidies for either purchasing EVs and/or recharging posts

Source: IA-HEV Portal, <http://www.ieahev.org/>.

4.5 Germany

A recent survey shows that German car buyers have a strong interest in EVs. Of the potential target group for EVs, about 37% intends to purchase an EV within the coming years, while about 50% is ready to pay up to 4,000 EUR more for an EV compared to a petrol or diesel car.³²

The German Federal Government is pursuing a sustainable transport policy. This means that transport is to be made environment- and climate-friendly, socially responsible and, at the same time, economically efficient. Concerning the national level, the major programmes fostering E-Mobility are called *Modellregionen Elektromobilität*³³ (‘Model Regions Electric mobility’, 2009-2011). This programme incorporated eight German metropolitan regions (Figure 4) and was supported financially by the Federal Ministry of Transport, Building and Urban Development (BMVBS). The overall coordination lied with the National Organisation for Hydrogen and Fuel Cell Technology (NOW). The funding came from the Economic Stimulus package.³⁴ These model regions include two project partners of E-mobility NSR: Bremen-Oldenburg and Hamburg. These will be discussed here somewhat more in detail.

³¹ <http://www.lowemissionzones.eu/countries-mainmenu-147/netherlands-mainmenu-88>.

³² <http://www.cleanvehicle.eu/info-per-country-and-eu-policy/member-states/germany/national-level/>

³³ <http://www.bmvbs.de/SharedDocs/DE/Artikel/UI/modellregionen-elektromobilitaet.html>; see also BMBF (2012)

³⁴ Economic Stimulus package: implemented by the federal government, in January 2009, to reduce the impact of the global financial crisis.

In Bremen-Oldenburg, important players in the field of electric mobility are the Fraunhofer Institute for Manufacturing Technology and Applied Materials Research (IFAM), and the German Research Center for Artificial Intelligence investigated (DFKI). The main objective of the 'Model Region Bremen-Oldenburg' is "to connect to existing mobility options for low-emission inner-city and commuter traffic".³⁵ The most important means to achieve this is a Personal Mobility Centre (PMC), "which ensures the sustainable introduction of electric vehicles in the model region". The scope of the PMC ranges from the integration of electric mobility in the existing public transport (PT) to the role of fleet owners and car sharing programmes. Charging stations will be installed at relevant public locations, but also the PMC also addresses charging facilities on e.g. corporate campuses and in private households.

The 'Model Region Hamburg' focuses on "the use of renewable energies, non-discriminatory access to the charging infrastructure and the integration of charging stations in the urban environment".³⁶ The regional control centre of the project is the public company hySOLUTION. The main activities of this Model Region are based on multi-modal transport services in both public transport and individual transport. The concept brings together key stakeholders from the technology industry and EV users. Priorities are:

- the testing of diesel hybrid buses on lines;
- innovative energy storage systems for rail vehicles;
- the use of electric cars and charging infrastructure building;
- the use of electric vehicles in the traffic management.

The design of the charging infrastructure is based on the use of energy derived entirely from renewable sources.

In 2012 a successor programme was introduced, consisting of *Schaufenster Elektromobilität* ('Showcase of Electric Mobility').³⁷ The four *Schaufenster* projects are Lower Saxony, Berlin/Brandenburg, Baden-Württemberg and Bavaria/Saxony.

Financial incentives

The *National Development Plan for Electric Mobility (NEPE)*³⁸ was adopted by the German Federal Government in August 2009. It was developed jointly by four federal ministries and sets out a coordinated policy frame for the national instruments and funds that promote research and development, market preparation, and the market introduction of battery-powered vehicles in Germany. A concrete elaboration of the NEPE can be found in the 2011 government programme for e-mobility, the *Regierungsprogramm Elektromobilität*.³⁹

The *National Hydrogen and Fuel Cell Technology Innovation Programme (NIP)* is being promoted by the Clean Energy Partnership with the support of the Federal Ministry of Transport, Building and Urban Development. The programme "provides a common framework for a number of hydrogen and fuel cell research projects conducted by academic institutions and industry".⁴⁰ The public-private partnership (PPP) is scheduled to run for ten years.

³⁵ <http://www.bmvbs.de/SharedDocs/DE/Artikel/UI/modellregion-bremen-oldenburg.html?nn=36210>

³⁶ <http://www.bmvbs.de/SharedDocs/DE/Artikel/UI/modellregion-hamburg.html?nn=36210>

³⁷ <http://www.bmvbs.de/SharedDocs/DE/Pressemitteilungen/2012/055-schaufenster-emobilitaet.html>

³⁸ http://www.bmu.de/english/mobility/electric_mobility/doc/44847.php

³⁹ <http://www.bmu.de/verkehr/downloads/doc/47406.php>

⁴⁰ <http://www.bmvbs.de/cae/servlet/contentblob/35410/publicationFile/1107/national-hydrogen-and-fuel-cell-technology-innovation-programme.pdf>

Sustainable - and electric - mobility is also a strategic priority within the German *High Tech Strategy 2020*.⁴¹ This was first launched in 2006. It was renewed in 2010. The HTS aims to involve key stakeholders in order to stimulate innovativeness and competitiveness of the German economy. one of the explicit objectives it defines is to have a million electric vehicle in Germany by 2020.

Finally, in May 2012 the government proposed to extent the tax exemption for electric vehicles from five to ten years.⁴² This involves passenger as well as freight vehicles.

Figure 4: The eight German electric mobility regions.



Source: <http://www.bmvbs.de/SharedDocs/DE/Artikel/UI/modellregionen-elektromobilitaet.html>.

Non-financial incentives

Privileged parking in cities is the principal non-financial incentives. *Low Emission Zones* (LEZ), 'Umweltzone' in German, are also implemented in many German cities, including Bremen, but not in Hamburg⁴³

⁴¹ <http://www.hightech-strategie.de/en/350.php>

⁴² <http://www.spiegel.de/auto/aktuell/keine-kfz-steuer-fuer-elektroautos-zehn-jahre-lang-a-834800.html>

⁴³ <http://www.lowemissionzones.eu/countries-mainmenu-147/germany-mainmenu-61>

Another incentive are the car sharing initiatives which include elective vehicles, although not all focus exclusively on e-mobility. Examples are Car2Go, Flinkster, Cambio and for instance the E-Collection electric bike rental in Hamburg.⁴⁴

4.6 Denmark

The Danish population has relatively few cars – around 33% less per inhabitant compared with Sweden and Germany – mainly due to the high registration taxes on sales of new cars (survey of the EU funded Project ALTERMOTIVE). Moreover, a Nordic study from 2008 described that “new cars in Denmark and Norway since 1998 show a lower CO₂ emission compared to Sweden and Finland”.⁴⁵ However, the share of alternative fuels in passenger transport in Denmark is currently very low. Not very long time ago, from 2001 to 2006, “EVs were not considered a realistic possibility for future road transportation in Denmark”.⁴⁶ Nevertheless, the recent success of hybrid vehicles and the new concept of plug-in hybrid vehicles have changed public opinion. In March 2012 the Danish government announced a new energy strategy aiming for a higher share of renewable energy in the Danish energy system. It aims, in particular, for a 50% share of wind power in 2025, which would be a strong combination with the implementation of EVs (International Energy Agency, 2011). In the long term, the objective is to become independent from fossil fuels such as coal, oil, and natural gas.

The *EDISON* project (Electric vehicles in a Distributed and Integrated market using Sustainable energy an Open Networks) is one of the most important projects worldwide promoting electro mobility. Started in 2009 and ending in 2012, the project is partly financed by the Danish government and focuses on the cooperation of public and private research organizations, international companies (like Siemens and IBM) and local authorities to “create an intelligent infrastructure to fuel a large fleet of electro vehicles on electric energy created by wind parks”.⁴⁷ The developed technical solutions are real-life tested on the island of Bornholm.

Choose EV is another project at the national level, being developed by the company with the same name and running between 2012 and 2014. In June 2012 Choose EV changed its name into Clever. The objective is to “create a strong synergy between environmental concerns and mobility by promoting electric vehicles and ensuring that they are charged intelligently”.⁴⁸ This will be achieved through the implementation of charging points and by testing EVs by Danish citizens all over the country.

A third national program involves *Better Place*,⁴⁹ which runs between 2011 and 2012 and is carried out by the Better Place company, which specializes in battery swap systems. The goal is to develop and deploy EV services, systems and infrastructure (19 battery change stations and 20,000 charging stations). Better Place is also involved in the ambitious target of the Danish government to increase the number of EVs from 200 in 2010 up to 100.000 by 2012.

In August 2007, the *Danish Energy Agency*⁵⁰ published a report on alternative-fuels for the transportation sector. It concluded that “in the long term, EVs have the potential for both the highest

⁴⁴ <http://www.deutschland-elektrisieren.de/mobility/ebike-vermietung/>

⁴⁵ <http://www.cleanvehicle.eu/info-per-country-and-eu-policy/member-states/denmark/national-level/>

⁴⁶ <http://www.ieahev.org/by-country/denmark/>

⁴⁷ EDISON project: <http://www.edison-net.dk/>

⁴⁸ Choose EV: <http://www.chooseev.com/english/>

⁴⁹ Better Place: <http://danmark.betterplace.com/>

⁵⁰ Danish Energy Agency: <http://www.ens.dk/en-US/policy/danish-climate-and-energy-policy/Sider/danish-climate-and-energy-policy.aspx>

energy efficiency and important advantages for the local environment, such as no local emissions and a very low noise level”.⁵¹ In addition, in April 2010 the Danish Energy Agency released an *Electricity and EV report* on the interplay between EVs and the electricity system, in relation to transmission, distribution, and CO₂ reduction.⁵²

The *Danish EV promotion program*⁵³ began in February 2008 when almost all political parties in the Danish Parliament entered into a new Climate and Energy Agreement. As part of this agreement, the parties agreed to allocate 30 million DKK (€4 million) to promote demonstration programs for battery-powered EVs. The program is being administered by the abovementioned Danish Energy Agency.

The *Centre for Green Transport* was established by the Danish Transport Authority in April 2009 to “create the framework for a Danish centre in the field of sustainable transport and to manage these initiatives”.⁵⁴ Projects conducted by the Centre include a transport certification program for municipalities and companies, an energy-efficient driving campaign, and energy labelling of light commercial vehicles. DDK 200 million (€28 million) has been allocated specifically for “demonstration projects between 2010 and 2013 that promote environmentally aware and energy-efficient transport solutions, including test projects with alternative types of fuels, electric cars, electric buses, and electric trucks”.

Financial incentives

Battery-powered EVs and fuel cell vehicles are exempted from the registration tax and annual tax until the end of 2015. EVs are also exempted from the current Danish registration tax for passenger cars, which is very high (180%) and is based on the value of the car. Currently, there are no special tax rules for PHEVs.

Non-financial incentives

Free parking in cities is the principal non-financial incentive, mainly supported by the municipalities. *Low Emission Zones*, ‘Miljøzone’ in Danish, were introduced in 2010 in Denmark. Currently, there are five urban areas with LEZ, Aalborg, Aarhus, Copenhagen, Frederiksberg and Odense.⁵⁵

4.7 Norway

Norway is one of the countries that encouraged a change in the vehicle technology in recent years. At the end of 2010, Norway had perhaps the best recharging infrastructure in the world, and was the European front runner in terms of the relative number of EVs, which increased from 3,292 in April 2011 to 6,311 in March 2012, a 91% increase in less than a year (figures from Grønn Bil).⁵⁶ Major automakers are launching rechargeable cars, and look at Norway as an attractive early market”. In 2007 the Norwegian government of Norway banned the use of the phrases clean, green, and

⁵¹ <http://www.ieahev.org/by-country/denmark-policy-and-legislation/>

⁵² Electricity and EV report: [http://www.ea-](http://www.ea-energianalyse.dk/reports/926_edison_introducing_electric_vehicles_into_the_current_electricity_markets.pdf)

[energianalyse.dk/reports/926_edison_introducing_electric_vehicles_into_the_current_electricity_markets.pdf](http://www.ea-energianalyse.dk/reports/926_edison_introducing_electric_vehicles_into_the_current_electricity_markets.pdf)

⁵³ http://www.ieahev.org/assets/1/7/2009_annual_report.pdf (page 160)

⁵⁴ <http://www.centerforgrontransport.dk/DA/Groen-Transport.aspx>

⁵⁵ <http://www.lowemissionzones.eu/countries-mainmenu-147/denmark-mainmenu-221/arhus>

⁵⁶ <http://www.gronnbil.no/elbiluniverset/kart.php#zoom=4&tr=72.14173187862764,56.444476074218755&bl=55.70293210778397,-30.567242675781245&m=1®=0>

environmentally friendly from all car ads and commercials” and thus “cars generally cannot do anything good for the environment except less damage than others”.⁵⁷

The *Green Highway*⁵⁸ is a collaboration project between Norway and Sweden, which aims to create a fossil fuel free transport corridor across Mid-Scandinavia by 2020. The project concentrates on the regions Sundsvall-Östersund and Trondheim.

At national level, the *Zero Emission Resource Organization (ZERO)*⁵⁹ is involved since 2002 in activities to reduce the emission of greenhouse gasses. During 2011 and 2012, this Norwegian environmental organization implemented a project that supported three charging stations for hydrogen vehicles (HEVs). ZERO also organized two pilot projects: the “Zero Rally 2012” – an annual rally for zero or low emissions cars (EVs, HEVs and PHEVs) that in 2012 will take place at the Green Highway, and “Driving the Impossible: Hydrogen cars unsupported from Oslo to Monaco”, a successful long-distance drive of 2,260 kilometres with an HEV.

The project *Grønn Bil* (‘Green Car’) was set up by the association of Norwegian energy companies (Energy Norway, Nova Tran, Regional Authorities and ZERO) to “facilitate the introduction of 200,000 EVs and PHEVs on Norwegian roads by 2020”.⁶⁰ By the end of 2010, the project was “slightly ahead of schedule”. It had achieved a visible presence in public spaces and had assisted nearly 40 municipalities assisted and other businesses with the transition to rechargeable cars.

At regional level, the *Electric Mobility Norway (EMN)* project is being developed in the Kongsberg-Drammen-Oslo region. It is led by Kongsberg Innovation with the support of Trans-Nova and Buskerud County Council. The main objective is the “establishment of an innovation and knowledge arena in that region, essential to develop new solutions in close interaction with a population that is a world leader in the use of electric vehicles, as well as with public transport operators to address widespread communications challenges”.⁶¹

Financial incentives

Norway has a long experience with environmental taxation.⁶² Taxes have been introduced to reduce environmentally harmful emissions to air and water, and to reduce the amount of waste generated. Taxation had in fact an environmental impact long before taxes were established as an instrument of environmental policy. Since the early 1990s tax instruments have played an important role in providing incentives for cleaner production and consumption patterns, even though regulation has remained the main policy instrument to prevent environmental damage. The budget for 2010 provided the government with suggestions for changes that make it more profitable to buy cars with low CO₂ emissions (EVs and others).⁶¹ These are summarized in Table 5. In short, the Norwegian government has established a comprehensive fiscal incentive scheme to stimulate the purchase and use of EVs. This gives large reduction in the vehicle’s total cost, i.e. no VAT, no import duty, and reduced annual vehicle tax (390 NOK).

⁵⁷ <http://www.cleanvehicle.eu/info-per-country-and-eu-policy/member-states/norway/national-level/>

⁵⁸ <http://www.greenhighway.nu/index.php/greenhighwayenglish>

⁵⁹ <http://www.zero.no/>

⁶⁰ <http://gronnbil.no/>

⁶¹ <http://www.k-i.no/electric-mobility-norway/cms/19>

⁶² <http://www.cleanvehicle.eu/info-per-country-and-eu-policy/member-states/norway/national-level/>

Non-financial incentives

The Norwegian government has also established a comprehensive ‘non-fiscal incentive’ schema for EVs. This entails in particular:

- free access to public areas;
- free parking in public car parks;
- free use of toll roads;
- permission to drive in bus lanes and LEZ;
- free use of domestic ferries.

Table 5: Financial incentives applied in Norway.

measures	incentives
CO ₂ ‘tax’ (calculated on basis of vehicle type and CO ₂ emissions)	Vehicle Annual tax is environmental differentiated, i.e., Increasing of rates in the CO ₂ component by 100K) - exemption for low-carbon vehicles. Registration tax: calculated according to weight, motor power and CO ₂ emissions (rates increased by 190k). The vehicles are classified by groups per CO ₂ ‘tax’ (group A have the highest fees) and receive tax calculated as a percentage of this fee: Group A: 100% (Passenger cars, vans class 1, coaches (< 17 seats)); Group B: 22% (class 2 vans/trucks (total weight< 7,501 kg)); Group C: 22% (camping cars); Group H: 40% taxis; Group J: 40% buses (< 17 seating places). Incentives to purchase ‘low carbon vehicles’, since EVs are exempted of CO ₂ ‘tax’
National subsidies	<ul style="list-style-type: none"> • For individuals: to purchase EV or HEVs class N1 and M1 (30,000 NOK); • For Companies: to purchase EVs – the funding is 50% of vehicle’s price; up to 50% are given to companies • To purchase/exchange a new/old more powerful battery system (for systems higher as 70Wt/kg 1.7 NOK per Wt) • For EV recharging stations - of about 100 million NOK (about 11.9 million EUR). New recharging stations are planned on public parking places.
VED (Vehicle Excise Duty, or ‘road tax’)	Tax-free allowance given for this tax (calculated as NOK/km) i.e. for trips to/from working places and for business trips is considerable higher for EVs. Reduction for companies: 75% for EV and 50% for HEVs
VAT (Value Added Tax)	<ul style="list-style-type: none"> • Reduced tax for leasing of EVs; • Full exemption for purchasing battery systems (i.e. for the replacement).
Fuel Tax	Municipalities have fees in limited geographical areas; National Gov. applies 25% VAT on fuel prices

Source: IA-HEV Portal, <http://www.ieahev.org/>.

Low Emission Zones, ‘Lavutslippssone’ in Norwegian, have been implemented recently. The Norwegian Public Roads Administration has created a bill and a proposal for a Low Emission Zone scheme, which differs from most other LEZ schemes in that it is “independent of vehicle technology, but strictly connected to the weight classes and the emission standard described as Euro classes”.⁶³ As cities in Norway today have tolling systems based on automatic number plate recognition (ANPR)

⁶³ Low Emission Zone (NO): <http://www.lowemissionzones.eu/countries-mainmenu-147/norway-mainmenu-197> and <http://www.nordicroads.com/website/index.asp?pageID=369>

and an elective electronic unit on board of the vehicles (OBU), the LEZ scheme will be based on this charging system. Meanwhile, the Norwegian LEZ scheme will claim OBU and prepayment. At the moment of this research, there were three cities (Bergen, Oslo and Trondheim) wishing to implement an LEZ, but operation was still uncertain. Another incentive entails the introduction of new emission regulation on the municipal level in 2011, which is in favour of electro vehicles.⁶⁴

4.8 Sweden

Since 2005 there has been a significant increase in the sales of alternatively fuelled vehicles in Sweden. In January 2011, there were 362,000 'eco-cars' in Sweden, an increase from 279,000 at the start of 2010.⁶⁵ During the year 2011, the sales share of private cars that are considered eco vehicles continued its increase from 38% to 40%. This might be an indication of the Swedish public's great interest in climate change, but economic reasons such as high oil prices and financial incentives (for instance vehicle tax reductions or subsidies to purchase) might also play a part. Indeed, according to Clean Vehicle, "this can be partly explained by the introduction of significant financial incentives such as exemption from congestion charges in Stockholm".⁶⁶

At the transnational level, the *Green Highway* is a collaboration project between Norway and Sweden, already discussed in the previous section. Besides the Green Highway, charging infrastructure is available in many places, such as Stockholm, Malmö, Gothenburg etc. (see Figure 5).

At the national level the major programme is *FFI - Strategic Vehicle Research and Innovation*⁶⁷. This is managed by Vinnova (Swedish Agency for Innovation Systems), the Swedish Energy Agency (Energimyndigheten) and the National Road Administration (Trafikverket) and automotive Industry. The FFI was set to run between 2009 and 2012 and aims to support innovation and R&D on climate, environment and safety. The FFI comprises five collaboration programs: Sustainable Production Technology, Vehicle Development, Transport Efficiency, Vehicle and Traffic Safety, and Energy and Environment.

Another national project is *'Driven by the Wind'*⁶⁸, a project which started in the beginning of 2008 with the ambition to support and enhance the introduction of electrical cars driven by electricity provided by wind power and, therefore, to build an environmental friendly car stock in combination with the development of wind power and the car industry in Sweden.

At the local level, in the city of Gothenburg two relevant initiatives were implemented. The *Hyper Bus*⁶⁹ project, which began on September 1 and will run until 2014, is a partnership between the City of Gothenburg Traffic and Transport Authority, Göteborg Energi, Volvo and Västtrafik. The project can be divided into four sub-areas: demonstration of plug-in technology for hybrid buses, rapid-charge stations, tests in real city environments on existing bus routes, and the publication of results and experiences from the project.

⁶⁴ Norway – 'Regulation': <http://www.cleanvehicle.eu/info-per-country-and-eu-policy/member-states/norway/national-level/>

⁶⁵ <http://www.ieahev.org/by-country/sweden-on-the-road-and-deployments/>

⁶⁶ <http://www.cleanvehicle.eu/info-per-country-and-eu-policy/member-states/sweden/national-level/>

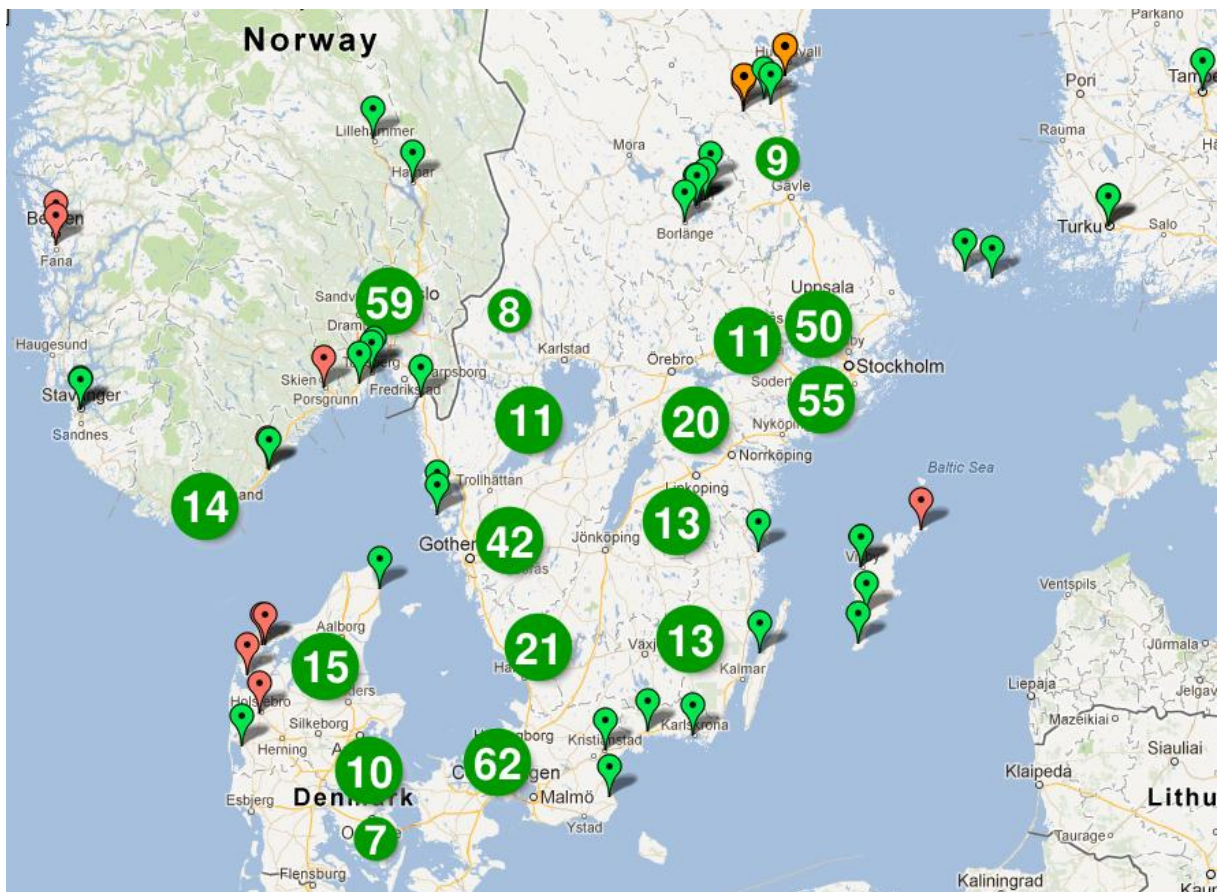
⁶⁷ <http://www.vinnova.se/en/ffi/>

⁶⁸ <http://www.powercircle.org/en/display/Projects/Driven-by-the-wind.aspx>

⁶⁹ <http://www.hyperbus.se/engelskwebbplats/hyperbus/abouthyperbus.4.7f30c2451341eef1dc180002873.html>

The second project in Gothenburg is 'Move About'⁷⁰. This project started in 2008, having the support of TSS - Test Site Sweden, THINK and Lindholmen Science Park. The project drives both open and closed car sharing services, for individuals and businesses. The business model is designed in such a way that key elements can be implemented in several cities in the world, i.e. independent of the specific local context of Gothenburg.

Figure 5: Charging infrastructure in southern Sweden and Norway, and Denmark. Numbers in circles represent larger concentrations of charging points.



Source: <http://www.uppladdning.nu/Map.aspx>.

Financial incentives

Over the past decade, Sweden has implemented policies that reduce certain taxes and fees on 'eco-cars', including hybrids, plug-in hybrids and electric vehicles. Currently, the national government is considering additional measures to further encourage the uptake of these vehicles, such as the ones listed in Table 6.

Non-financial incentives

The *Ordinance regarding official purchase and leasing of clean vehicles* (SFS 2004:1364), introduced on 1 January 2005, states that at least 50% of the passenger vehicles purchased or leased by government authorities during a calendar year must be clean vehicles. During the next years this

⁷⁰ <http://www.moveabout.se/om>

minimum requirement was increased gradually to 75% in 2006, 85% in 2007 and 100% in 2009. No information could be found on whether objective was actually achieved.

The *Obligation to supply renewable fuel* obliges fuel stations that sell more than a certain volume of fuel to offer pumps with renewable fuels. This law is applied in five stages and came into force on 1 April 2006. It was estimated that by 2010, 70 percent of all refuelling stations in Sweden, and one hundred percent in Stockholm, would be required to offer alternative fuel.

A *Low Emission Zone*, 'Miljözon' in Swedish, has been implemented in six cities in Sweden: Gothenburg, Helsingborg, Lund, Malmö, Mölndal and Stockholm.⁷¹

Table 6: Financial incentives applied in Sweden.

measures	incentives
Vehicle tax	5-years tax exemption for EV and HEVs from annual vehicle registration tax.
subsidies for refuelling stations supplying renewable fuel	Since 2006, all large refuelling stations have been obliged to provide at least one renewable fuel. The majority of fuel stations have chosen to supply ethanol E85. This measure aims to stimulate the establishment of biogas fuel stations.
clean vehicle premium	Between 2007 and 2009, the government introduced a rebate of 10,000 SEK to encourage individuals to purchase low-CO ₂ cars and alternatively fuelled cars. The rebate was available if car was kept for at least six months. A new clean vehicle premium of 40,000 SEK has been introduced for vehicles emitting less than 50 g CO ₂ per km.
congestion- tax	A congestion-charging scheme applied in central Stockholm since the summer of 2007. A fee is charged during times of traffic congestion. PHEVs and EVs are exempt.
company car assessment value	Employees using clean vehicles have rebates on the 'company car assessment value', varying according to vehicle type: 20% for E85; 40% for EV, HEV, natural gas and biogas.
parking fees	Reduced parking fees for 'eco-cars' in cities, supported by local authorities.

Source: IA-HEV Portal, <http://www.ieahev.org/>.

⁷¹ <http://www.lowemissionzones.eu/countries-mainmenu-147/sweden-mainmenu-248>

5 Comparison of e-mobility policies

It is now possible to make a comparison of the two types of 'E-mobility policies' (financial and non-financial incentives) between the seven countries.

Table 7 presents a concise, non-exhaustive overview according to a number of characteristics:

- *level*: policy initiatives on various levels of governance (local, regional, national etc.) have been taken into account. The table mentions the level which is prevalent, i.e. the level on which most relevant policy development takes place;
- *policies*: the most relevant policies, financial and non-financial incentives adopted;
- *stakeholders*: main actors involved in e-mobility Initiatives (e.g. national or local governments);
- *type of vehicle*: types of electric vehicles (EV, PHEV or HEV) mainly addressed by the abovementioned policies;
- *infrastructure*: the most common type of charging station (slow or fast charging), whether as isolated initiatives or a part of a smart grid.

Level

Most prevalent programmes in most countries are at national level. This may be explained by the role of governments in transport policies and the implementation of National Plans (e.g., 'Modellregionen Elektromobilität' in Germany). Notable exceptions to this are Belgium and the Netherlands. Belgium is a country composed of three regions, each with a strong regional government and a relatively weak national government. Hence the regional level is dominant. The prevalence of the local level in the Netherlands cannot be explained by its administrative division, but by the role of several municipalities - most of all the cities of Amsterdam, Rotterdam, The Hague and Utrecht - in the 'National Action Plan for Electric Driving'.

Policies

The policies most commonly adopted by NSR countries entail financial incentives (taxes or subsidies). All seven countries are supporting e-mobility initiatives by, on the one hand, charging taxes to drivers of pollute vehicles, and on the other hand; on the other hand, providing subsidies or funding to individuals, companies or R&D projects for the purchase or use of clean vehicles.

Taxing is applied to the drivers of 'dirty' vehicles to make them 'internalize the (negative) externalities', i.e. to make them aware of and reprimand for the negative impacts (especially environmental) associated with the car use. This is the so-called 'Pigouvian tax' - a tax applied to a market activity that generates externalities, in order to correct the undesired market outcome. It can be applied when the costs of negative externalities (emissions, noise, unsafety etc.) are not compensated for by the benefits, i.e. the costs for the individual are less than the costs for society as a whole. The product thus may be considered 'too cheap' which may lead to overconsumption. Pigouvian taxing may be applied to compensate for this and cover the costs of negative externalities.

Table 7: Main characteristics of e-mobility policy initiatives.

CHARACTERISTICS	United Kingdom	Belgium	Netherlands	Germany	Denmark	Norway	Sweden
level (prevalent)	national/local	regional	local	national/regional	national	national	national
policies (financial and non-financial incentives)	Exemption on taxes for employees; Reduced or free parking charge for EVs; 'Fuel Economy' Label; LEZ (in 2 cities)	Special tax rules for EVs and HEVs (private and companies) - to purchase and on VAT; Reduction on charging infrastructures.; 'Fuel Economy' Label; 'Ecoscore'	0% taxes for leasing EV and PHEVs; special tax rules for EV and HEVs (total exemption of the registration fee and road taxes) – for individuals and companies; LEZ (in 14 cities)	Tax deductions to purchase and circulate(exemption in first 5 years); insurance deductions; bank loans; EV lanes; privileged parking in cities; LEZ (in several cities, including Bremen and excluding Hamburg)	Exemption on taxes for EVs - purchase and register (until 2015); free parking in cities; LEZ (in 5 cities)	exemption from all non-recurring vehicle fees, including sales tax, annual road tax, parking fees and toll payments for EVs. Electric paying & controlling system; new local law on CO ₂ ; no LEZ, but EVs can use BUS lanes	reduce certain taxes and fees on HEVs, PHEVs and EVs; incentives to purchase and leasing; incentives for drivers; hybrid and EVs are exempt from the Stockholm congestion charge; Reduced parking charges; LEZ (in 6 cities)
main stakeholders	Dep. for Transport, Dep. of Business, Innovation & Skills, OLEV Transport for London, Mayor of London, Newcastle City Council, Hertfordshire County Council, One North East (until 2012), Technology Strategy Board, Low Carbon Network Fund	Federal Government (FPS Economy, S.M.E.s, Self-employment and Energy), Flanders Government, VITO, IWT, Flanders Drive	National Government, Municipalities (Amsterdam, Rotterdam, Utrecht), provinces (North Holland)	Federal Government Universities, German Association of Electric Mobility, car and automotive industries	Danish Government, Danish Energy Agency, Choose EV/Clever, Better Place	National and local government, Transnova, ZERO, Move About	Local government, Sweden Energy Agency, Vinnova, car and automotive industries
type of vehicle	EV, HEV, PHEV	EV, HEV	EV,HEV, Hydrogen	EV,HEV	EV	EV,HEV, PHEV	EV,HEV
infrastructure	charging stations; fast-charging stations	charging points, smart grid	charging stations	charging stations	charging stations; fast-charging stations	charging stations; fast-charging stations*	charging stations; * Green Highway, main cities

(*) 'Green Highway' – 94 charging stations with 240 charging points.

Besides ‘punishing’ the drivers of ‘dirty’ cars, government may also decide to provide subsidies or funding to the drivers of ‘clean’ vehicles, since they contribute to the social benefit and reduce negative externalities. In this case, those who receive the benefit do not pay for it and the market may under-supply the product. Since electric mobility is still in an early stage of implementation, this is not yet the case.

In general, all seven countries have a similar approach to financial incentives. However, there are small variations in the type and amount of taxes applied, as well in the subsidies. For instance, in the Netherlands and in Norway EVs benefit from a full exemption of taxes, while other countries only apply tax reductions or special tax conditions (e.g. Sweden). In addition, several governments for instance provide subsidies and funding to R&D projects aiming to stimulate the introduction and implementation of electric mobility, or premiums and other financial advantages for EVs and other clean vehicles.

The most commonly applied non-financial incentive is the Low Emission Zone (LEZ). LEZs can be found, in various forms, in six of the seven NSR countries. The exception is Belgium. The Flanders region is thinking about the implementation of LEZs to decrease emissions, because “Belgium is not meeting EU air quality goals, action is necessary and urgent”. The EU Commission decided to refer Belgium to the EU Court of Justice when it fails to meet the requirements set by the Air Quality Directive (2008/50/EG). Research is being conducted to simulate the implementation of LEZs in Belgium and to assess their impact in the country.⁷² Another common non-financial policy measure is the reduction or exemption of parking fees in cities for electric vehicles.

Stakeholders

Stimulating and promoting electric mobility involves a diversity of policy fields, such as transportation, spatial planning, environmental policy and finance (taxation). Furthermore, different types of policy-making take place on various scale levels. This is reflected in the stakeholders involved in the policy initiatives discussed here. The main actors involved in e-mobility initiatives are national or local governments. This is no surprise considering their important roles in the field of transportation. Nevertheless a variety of other stakeholders may be involved, including provinces and other regional authorities, private companies (e.g. Better Place), knowledge institutions and branch organisation. As Table 7 shows, not the same policy level is prevalent in each country. National and local policies prevail, however, except for Belgium, where much policy-making capacity has been located at the regional level (i.e., in case of the NSR, Flanders).

Type of vehicle

The last two characteristics of e-mobility Initiatives considered here are the ‘type of vehicle’ and ‘infrastructure’ addressed. Table 8 provides a more detailed overview of this. With regard to the type of vehicle involved, it shows the development of the number of vehicles per year and vehicle type.

Policies in the NSR countries address all types of EVs, with the exception of Denmark. In this country, policy is aimed exclusively on (pure) electric vehicles. Moreover, the number of EVs is still quite limited (only 360 EVs and 300 for testing) compared to other NSR countries. The first EVs are from 2004 and only in 2011 300 EVs were introduced, which are being used exclusively for testing. The Danish government itself seems to have been reticent with respect to electric mobility, preferring to wait for a wider acceptance before making large investments. However, the company Better Place is planning to introduce 100,000 EVs within the next two years.

⁷² http://www.mettrans.org/nuf/2011/documents/Papers/Maes_paper.pdf

Most hybrid vehicles are found in the UK, the Netherlands and Germany. This type of vehicle is easier to implement than non-hybrid EVs, since they are less dependent on a dedicated charging infrastructure and resemble ‘normal’ petrol or diesel cars more than EVs do, most importantly in range. This makes them an acceptable option for a much broader target group. Norway counts most EVs per capita (3,392 in 2011). Although Sweden has the highest amount of ‘eco-cars’, these figures are hardly comparable because no distinction is made between EVs and other ‘clean’ vehicles.

Germany and the Netherlands are the most ambitious countries in terms of the intended growth of the EV fleet, with an objective of 1 million EVs in 2020 and 2025 respectively. This may sound too ambitious, especially for the Netherlands, since the country is still far removed from this target - and significantly lagging behind Germany in this respect - and lacks the resources Germany has, not the least a large car manufacturing sector. Nevertheless, the example of Sweden (from 3,292 to 6,311 EVs only in one year) shows that a strong growth, although on a much smaller scale, is possible.

Table 8: Comparison of ‘vehicle type’ and ‘infrastructure’ between NSR countries.

	Vehicle type	Infrastructure (charging Stations)
United Kingdom	2015: 100,000 EV (London)	2011: 1,300 and 80 hybrid 2012: 47 (Plugging into EV) 2013: 1,000 (Charge your Car) + 9,700 (Plugged-in Places) 2015: 26,300 (Source London and EV Delivery Plan) 2020: 8,500 (Making Connection)
Belgium	2011: 1,460 EV; 174 Hybrid; including 80 Hydrogen Buses 2015: 10,000 Hybrid+EV	2011: 13 + charging points in parking spaces near 34 railway stations (Plug and Ride) 2012: 71 (EVA) + 600 (BE.eV) 2014: Smart grid (200 to 1,000 houses) (LINEAR) + 300 (iMove) 2015: 10 (City of Ghent)
Netherlands	2011: 34,063 Hybrid; 2,142 EVs 2015: 20,000 EV 2020: 200,000 EV 2025: 1 million EV	2011: 300 (in Utrecht); 15 (Zen Car) 2012: 200 (A’dam) + 1500 (E-LAAD) 2014: 300 to 1000 (Utrecht) + 1,250 (R’dam) + 10,000 (E-LAAD)
Germany	2011: 37,256 HEV, 5,613 EVs 2020: 1 million EVs	2011: 1,935 (896 for EVs; 2 Hydrogen)
Denmark	2011: 360 + 300 testing cars 2020: 200,000 EVs	2011: 850, including 150 fast charging points (Choose EV/Clever) + 800 (Better Place) 2020: 150 fast-charge + 700 semi-public (Choose EV/Clever) + 20,000 (Better Place) + 19 battery change (Better Place)
Norway	2011: 3,292 EVs; 67 hybrid 2012: 6,311 EVs 2020: 300,000 EVs	2010: 2011: 2,666 EV; 6 biodiesel; 100 LGP CS; 9 Hydrogen fuel stations; (Oslo has 179 CS and 50 free parking & charging) 2012: 3,049, including 43 fast charging (Salto Power) 2013: 700+179 (Oslo) +50 free park & plug 2020: (Green Highway*); 2030: 400 (Oslo)
Sweden	2011: 362,000 eco-cars 2015: 6,000 EVs 2020: 600,000 eco-cars	2010: 1,400 (including, 2 HEV and 90 gas) 2020: (Green Highway*)

*) ‘Green Highway’ – 94 charging stations with 240 charging points.

Infrastructure

All NRS countries are investing in charging infrastructure. This is an important measure to increase e-mobility. Belgium has the least charging stations, around 700 charging stations in 2012. In contrast, Norway is again on the top with around 5,700 charging stations in 2012. The other NSR countries each had around 2,000 stations in the same year. The only countries that specify the type of charging stations are Denmark and Norway.

Some countries choose to install 'isolated' charging points in various places such as at companies or in parking spaces; for example Belgium installed several park & charging points near 34 train stations. Other countries aim to build an entire network, the 'smart grid'; an example is the 'Green Highway' between Norway and Sweden.

This network option has the advantage of providing EV drivers with multiple charging point, which probably also makes it easier to attract new users of electric mobility. Stand-alone charging points are often initiated by companies or e.g. municipalities, who own their own fleet of EVs. Nevertheless, these stand-alone projects are relevant as well, particularly in the current stage of development in which most e-mobility projects are in a preliminary phase, and it is important to have sufficient testing and demonstration projects.

Regarding further investments in charging infrastructure, the United Kingdom and Denmark are the countries planning a high number of charging stations (33,500 and 20,000 respectively), followed by the Netherlands (10,000). Belgium has proposed a smart grid to cover 200 up to 1,000 houses, but no further investments are being mentioned. Norway mention a future need of 10,000 charging points, but does not state an explicit policy aim. Despite this, Norway so far is the country with the best results in terms of numbers of EVs and recharging infrastructure, and has a balanced set of policies focusing on both. In comparison, Denmark and Belgium are somewhat lagging behind, but particularly in Denmark this will be compensated for by planned investments.

6 Final remarks

The overview of policy initiatives presented in the current report cannot be exhaustive, if only because of the topical and volatile nature of the policy field of electric mobility. Nonetheless, the preceding chapters indicate that all seven countries within the North Sea Region - the UK, Belgium, Netherlands, Germany, Denmark, Norway and Sweden - have embraced electric mobility and are undertaking considerable efforts to stimulate and promote the concept.

To effectively implement electric mobility, it seems important that policies adopt a comprehensive approach, including various types of vehicles and charging modes. This implies involving various groups of stakeholders such as policy-makers, the automotive industry, the energy sector, knowledge institutions, fleet owners and, last but certainly not least, EV drivers. The interests of the latter group are of particular importance if electric mobility is to become a success. This is partly a matter of facilitating the provision of charging infrastructure, but in relation to this there is a psychological factor involved when it comes to overcoming 'range anxiety' - the fear of many EV drivers to become stranded with empty batteries, particularly in remote or inconvenient places such as motorways. Providing a network of charging facilities and real-time data about their location and availability is essential to ease range anxiety.

The above is much more the case for 'purely' electric vehicles than for hybrid cars with range extenders, which can rely on the present network of fuel stations, or even for fuel cell (hydrogen) cars, which have a larger range than battery-powered EVs. It is likely, therefore, that these vehicle types will be more easily accepted by the market, and are attractive to a much broader group of potential users, at least until improved battery technology becomes available which would enable longer ranges and shorter charging times. Depending on market and technological development, 'pure' electric vehicles may to a large extent be confined to niche markets such as urban or inner city transportation, or fleet owners such as municipalities and firms who operate in a limited area and can operate their own charging facilities.

Many current policies seem to focus on electric vehicles rather than fuel cell cars. Nevertheless, this has been different in the recent past, and the fuel cell car is likely to gain attention again once production models enter the consumer market. A question that arises is whether policies should be technology-specific - focusing on the technology of battery-power vehicles - or technology-neutral - focusing on 'neutral' criteria such as CO₂ emission. This question is most relevant regarding incentives such as subsidies, tax exemption or free parking, but it may be asked as well with respect to the role of public authorities in for instance the provision of charging or refuelling infrastructure.

In view of the above reflections the project E-Mobility NSR proves its relevance. It has adopted the abovementioned comprehensive approach. It focuses on EVs as well as charging infrastructure, and it does so on a higher level of aggregation than was customary so far. The latter may contribute to the prevention of range anxiety also among EV drivers that do not confine themselves to urban areas. Moreover, by the implementation of electric mobility information centres in various cities the project strongly focuses on the users of EVs. Nevertheless, the questions of which markets and target groups EV would be competitive in, and the dilemma of technology-specific versus technology-neutral policies deserve lasting attention.

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Other

Additional information has been provided by e-mail and face-to-face contact by the project partners of the E-mobility NSR project.

Appendix

The next pages present an overview of policy initiatives per country. These table provided the basis for the description of policy initiatives in Chapter 4 and 5.

UNITED KINGDOM

CHARACTERISTICS										
INITIATIVE	Program/ Project	Pilot projects	Spatial Level	Stakeholders	Description (Objectives/ Strategies)	Policies	Type of vehicles	Infrastructure	Start/ End date	website
	Charge your car		national	Elektromotive; One North East	Charging Network (standard and quick charging points) across North East England; One North East is responsible for promoting the charging network and all hosts of charging points will be promoted through an interactive map of the infrastructure available to all electric vehicle owners. All charging points will be promoted through an online journey planner through the Charge your Car public website. There will also be an opportunity to be involved in publicity for the project as it progresses		EV	1000 charging points on streets, in car parks, at retail parks and in workplaces	2010 - March 2013	http://www.leadthecharge.org.uk/charge-your-car http://www.elektromotive.co.m/html/index.php
	SWITCH EV		regional and national	Support: Technology Strategy Board and One North East; Partners: Nissan, Smiths Electric Vehicles, Liberty Electric Cars, Avid Vehicles, Simon Bailes Limited and Newcastle University	Switch EV brings together a consortium of vehicle manufacturers, data collection experts and project managers. The project is running in conjunction with regional and national developments across the electric vehicle industry such as the development of recharging infrastructure, and is working closely with associated industry bodies such as breakdown service and insurance providers, supply chain industries and educational institutions to ensure the North East is leading the way in electric vehicle provision.		EV (44 vehicles)		Sept. 2010	http://vehicledtrial.switchev.co.uk/
	ENEVATE		national	Future Transport Systems	focused on five key areas: Electric Vehicle, Technology, Sustainable Energy Supply Infrastructure, Market Drivers and e-Mobility Concepts, Pilots, Enabling / Innovation Accelerator. Within the UK, the ENEVATE Tool Kit is being integrated with work undertaken by IET Standards, part of the Institute of Engineering and Technology (IET). IET Standards has developed a Code of Practice on Electric Vehicle Charging Infrastructure Installation and Successfully Implementing a Plug-in Electric Vehicle Infrastructure - A Technical Roadmap for Local Authorities and their Strategic Partners. These two publications provide definitive technical information and strategic guidance to the market whilst the ENEVATE Tool Kit provides first hand practical process and project management information.					http://www.futuretransportssystem.co.uk/diskache/266-enevate-project-introduction-may-2012.pdf
	Plugged-in Places Programme		national	funded Government initiative led by the Office of Low Emission Vehicles (OLEV)	The scheme offers match-funding to consortia of businesses and public sector partners to support the installation of electric vehicle recharging infrastructure in lead places across the UK. Data derived from the programme about how drivers use and recharge their electric vehicles will provide the necessary evidence base to shape the design of a national system of recharging infrastructure. The Government is supporting eight Plugged-in Places: East of England, Greater Manchester, London, Midlands, Milton Keynes, North East, Northern Ireland, Scotland Charging points are also being installed by councils across the UK and by private sector providers.			Charging points (more than 9,700)	2011-2013	http://www.dft.gov.uk/topics/sustainable/olev/recharging-electric-vehicles/

SASMI (Skills Academy for Sustainable Manufacturing and Innovation)		regional	SASMI, Nissan	SASMI is a world class centre to train workers for green industry in the North East. The sustainable centre, based at Nissan's Washington plant, will prepare the region's workforce in the skills they need to work in the low carbon industries of the future.					http://www.gateshead.ac.uk/facilities/sasmi/
	Test EV, HEV			Research and development Vehicle testing Skills enhancement through a range of training programmes Consultancy			EV and HEV		http://www.gateshead.ac.uk/courses/employers/low-carbon-vehicles/
STUDY "Electric Vehicles: charged with potential"			The Royal Academy of Engineering				EV and PHEV		http://www.raeng.org.uk/news/publications/list/reports/Electric_Vehicles.pdf
Making the Connection The Plug-in Vehicle Infrastructure Strategy		National - UK (Scotland, Northern Ireland, Wales)	UK Government - Department for Transport - Office for Low Emission Vehicles	Framework for the development of recharging infrastructure to support plug-in vehicles owners and industry in the UK. 8 pilot-projects; funds and tax regime; R&D			plug-in vehicles (PHEV, E-REV and BEV)	8500 chargepoints	2015-2020 http://assets.dft.gov.uk/publications/making-the-connection-the-plug-in-vehicle-infrastructure-strategy/plug-in-vehicle-infrastructure-strategy.pdf
Source London		local (London)		Charge point network. The publicly accessible charge points are located at supermarkets, on the street, London Underground car parks and car parks all over London. Customers can register with Source London, pay an annual fee and receive a card in the post which will unlock any of the Source London charge points to charge the vehicle at no additional cost (parking charges may apply).				charging points (1300)	2011-2015 https://www.sourcelondon.net/source-london

EV Delivery Plan	local (London)	<p>Mayor of London, London Development Agency, MPA, LFEPA, Transport for London</p> <p>The EV Delivery Plan sets out a comprehensive strategy to stimulate the market for electric vehicles in London: The strategy is grouped around three key themes [like pins of a plug] A) Infrastructure B) Vehicles C) Incentives, marketing & communications</p>	<ul style="list-style-type: none"> • Incentives, marketing & communications—increase and communicate customer benefits; • Guarantee the Congestion Charge discount—worth up to £1,700 a year. • Working with the boroughs to develop simplified range of parking incentives. • Encouraging uptake of electric vehicles in car clubs. • Working with the boroughs to develop a London-wide membership scheme for EV users—giving access to the charge point network and the congestion charging discount. 	EVs (1000)	<p>charging points (25,000), including: 500 on-street, 2,000 in off-street public car parks, station car parks; 22,500 will be provided in partnership with businesses - to be located in employers' car parks and retail/leisure</p>	2009-2015	https://www.sourcelondon.net/sites/default/files/Electric%20Vehicle%20Delivery%20Plan%20for%20London.pdf
Low Carbon Vehicles Innovation Platform	<p>UJCV</p> <p>IDP</p>	<p>Managed by the Technology Strategy Board (TSB), a non-departmental entity of the UK Government</p>	<p>Support low carbon vehicle technology development by public-private R&D collaborations.</p> <p>The Ultra Low Carbon Vehicle (ULCV) Demonstrator has more than 300 vehicles on UK roads with tailpipe emissions below 50 g CO2/km as well as 201 all-electric and low-carbon vans in 21 fleets being trialled</p> <p>The Integrated Delivery Programme (IDP) is a key program in which government has provided £120 million in funds (matched by industry) to support low carbon vehicle technology development by public-private R&D collaborations</p>	EVs (300) + 201 vans	Financial Incentives	2007-2011	http://www.innovateuk.org/ourstrategy/innovationplatforms/lowcarbonvehicles.aspx http://www.innovateuk.org/assets/pdf/press-releases/ulcv_reportaug11.pdf http://www.innovateuk.org/ourstrategy/innovationplatforms/lowcarbonvehicles/integrateddeliveryprogramme.aspx
UK Sourcing Roadmap	national	<p>Co-chaired by Vince Cable, Secretary of State for Business, Innovation and Skills (BIS), and Richard Parry-Jones, former CTO of Ford Motor Company</p>	<p>Automotive Council UK was formed in 2009 to promote UK manufacturers, strengthen the supply chain, and position the UK as a leader in low carbon automotive technologies</p> <p>In March 2011, issued a report, Growing the Automotive Supply Chain: The Road Forward, identifying growth opportunities for the UK automotive supply chain, which were then put into a "UK sourcing roadmap"</p> <p>UK suppliers are expected to improve their positioning as it develops strength in low carbon powertrain architectures</p>			2010-2015	http://www.automotivecouncil.co.uk/wp-content/uploads/2010/12/Paper-SC141210_01-Sourcing-Roadmap.pdf http://www-innovation.ifs.cam.ac.uk/publications/downloads/lowcarbon_sourcing_report.pdf

Roadmap to a Green Economy		national	BIS, the Department of Energy and Climate Change (DECC) and the Department for Environment, Food and Rural Affairs (Defra)	OLEV staff are working closely with the BIS Automotive Unit to develop the case study demonstrating what industry and government are doing to enable the automotive sector to be a key element of a future green economy	Supporting low carbon transport infrastructure and facilitating the development and manufacture of ultra low emission vehicles and recharging infrastructure; incentivise environmentally-friendly products (e.g. Vehicle Excise Duty)			2011	http://www.businesslink.gov.uk/Horizontal_Services_files/Enabling_the_transition_to_a_Green_Economy_Main_D.pdf
Plugging into Evs		local (Newcastle)	City Council of Newcastle, Technical Services, Charge your Car	Newcastle City Council and Charge your Car are working towards an electric future and have installed 47 charging points across Newcastle		charging points (47)		2010-2012	http://www.newcastle.gov.uk/wwwfileroot/legacy/regen/plantrans/TechnicalServicesEVInfrastructure.pdf

BELGIUM

CHARACTERISTICS										
INITIATIVE	Program/ Project	Pilot projects	Spatial Level	Stakeholders	Description (Objectives, strategies)	Policies	Type of vehicles	Infrastructure	Start/ End date	Website
	National Master Plan for the promotion of electric mobility in Belgium		national	Federal Government (FPS Economy, S.M.E.s, Self-employment and Energy)	The master plan describes the benefits and barriers to electric mobility. Discusses 13 areas of action with ideas for different measures, namely: from financial incentives for the purchase of an EV on training for garage owners to new business models. Many measures are more technical in nature, but does illustrate the need for coordination, for example around the location of public charging infrastructure. The master list of proposals to individuals, companies and (local) governments to support the purchase of electric cars.	financial incentives: when buying an electric vehicle and training for garage owners and financing of new business models around electric mobility. There are also physical stimulus plans such as the installation of public charging infrastructure and proposals to individuals, companies and (local) governments to support the purchase of electric cars. The financial support by the Belgian government is necessary because the relatively high purchase price, the limited range and lack of charging infrastructure are the main obstacles for the breakthrough of electric vehicles in Belgium. In 2009, the Belgian government has a scheme that allows buyers of electric cars were eligible for additional tax refunds. This is the result of a bill from the House Committee Finance recently adopted.			2012	http://www.bondbetrieefmilieu.be/page.php/30/618/13577
	Be.eV: Belgian Platform on Electric Vehicles		national	Federal Government (FPS Economy, S.M.E.s, Self-employment and Energy)	inform and bring together all relevant stakeholders from the electric mobility value chain. The platform has been preparing Belgium's master plan for electric mobility and a national roadmap.				2011	http://economie.fgov.be/nl/consument/energie/Duurzame_ontwikkeling/elektrische_voertuigen/belgia_n_platform_on_electric_vehicles/
	Living Labs Electric Vehicles		Regional (Flemish Region)	Flemish Government, IWT Agency for Innovation by Science and Technology, 5 platforms (Volt-Air, Olypums, iMove, EV Reclab and EVA) + more than 70 companies	facilitate and accelerate the innovation and adoption of electric vehicles in the Flemish region. The call was launched in late 2010 with the aim of setting up a structured real-life environment in which innovations can be tested by representative end users in their own living and working environment. Five different platforms were approved in 2011 with a total funding of € 16.25 million. More than 70 companies, organizations, and research partners are working together. The Living Labs Electric Vehicles will run for 3 years and are expected to give an extra boost to develop, test, and implement new products and services on e-mobility.				2010-2013	http://www.livinglab-ev.be/

LINEAR: Local Intelligent Networks and Energy Active Regions	LINEAR pilot study consists of 3 phases - residential, district and regional level	Regional	Support: Flemish Govern.; 20Partners: Flemish Industry and research institutes (K.U. Leuven, VITO, FIT KIC InnoEnergy); Synergie with IWT call for "Living Labs"	Smart energy supply in Flanders; Fieldtest where "demand side management" will be demonstrated on a residential and district level	Evs	smart grid (200 to 1000 houses)	2009-2014	http://www.linear-smartgrid.be/
Local Air Quality Plan		Local (city of Ghent)	City of Ghent	Fifty measures, including the promotion of ecological vehicles, to ensure a healthier air in Ghent. The plan contains specific measures for the transport, households and industry. In addition, measures are proposed in terms of spatial planning.	Evs	charging points (10)	2010-2015	http://www.gent.be/eCache/THE/1/567269.cmy/PTE1000wVb.html
SPARC: Smart Plug-in Automobile Renewable Charging Services		Local (city of Bruges)	IBBT (Interdisciplinary Institute for Broadband Technology) + Partners (Acreo AB, Deutsche Telekom, Ericsson, VITO nv, Sony, Interparking, Athlon Car Lease, Restore, Stad Brugge, K.U.Leuven ESAT-ELECTA, Europese Commissie, european center for information and communication technologies); Synergie with IWT call for "Living Labs"	Focus on charging infrastructure on parking spots and the business models needed behind it; demonstration of the proof-of-concept at a parking in the city of Bruges		Charging points	2011-2012	http://www.fp7-sparc.eu/
ESTO: "Energy Storage"		regional (Flanders)	VITO and Flanders automotive R&D (Flanders' DRIVE, Emrol, PEC, PsiControl, Punch Powertrain, VUB, Triphase, Unicore, VDLJonckheere)	Focus on Li-batteries for passenger cars and buses, so more component level research project. The battery pack consists of lithium cells connected in parallel or in series and linked to an intelligent battery management system WP1: Cell selection criteria •WP2: Cell testing and selecting •WP3: Battery pack system architecture •WP4: Simulation model development •WP5: Development of a universal battery pack •WP6: System and integration test	hybrid diesel-electric city buses		Jan.2009-Jan.2011	http://www.flandersdrive.be/energy-storage

<p>Trans2House: "Transition pathways to efficient (electrified) transport for households"</p>		national	<p>VITO, Vrije Universiteit Brussel (VUB), ABEA</p>	<p>Objective: Investigate how to develop driving forces and shift the social, cultural, technological, economic and political barriers to household energy consumption reduction. The aim is to assess the transition towards Evs and PHEV for Belgium and its regions</p>		<p>EVs and PHEVs</p> <p>2009-2012</p> <p>http://www.vub.ac.be/infovoor/onderzoekers/research/projects.php?project_code=DWTRC295&team_code=MOBI</p>
<p>EVCTY: Intelligent Energy Efficient Buildings and Cities</p>		transnational (BeNeLux)	<p>VITO, KIC InnoEnergy, CITCEA, ETSEI</p>	<p>EVCTY will set up a guideline for cities and all stakeholders involved in the roll-out of electric vehicles and supporting infrastructure. This guideline will describe the market roles and business opportunities for new products/services in this new mobility and, partly regulated, energy market.</p>	Evs	<p>2011-2013</p> <p>http://www.kic-innoenergy.com/innovation-projects.html</p>
<p>Plug and Ride (Pilot Project Siemens-NMBS "E-Car and train: an obvious marriage")</p>		national	<p>SNCB-Holding / NMBS-Holding and Siemens Belgium: support of the Directorate General for Energy of the Economics Ministry</p>	<p>Test project electrical cars – Combination E-car – train – car sharing – Tested on an economic, sociological, ecological and technological level – 'First urban mile' • 3 cars in Ghent and Liège • Test drivers selected in a competition – 'Last urban mile' • 2 cars in Brussels from Siemens – Focus on: • user experience combination E-car and public transport • user experience smart grid and renewable energy</p>	Evs	<p>March - June 2011</p> <p>http://wn.com/Siemens_E-car</p>
<p>iMOVE</p>		regional (Flanders)	<p>Led by UMICORE, a Belgian company specialized in metals and advanced materials, it has the distinction of not understanding the automaker and brings together 19 companies and research institutes interested in the field of electric vehicles including the energy company SPE-EDF LUMINUS which holds 63.5% stake.</p>	<p>For 3 years, individuals and professionals will test 175 electric vehicles on 300 kiosks installed throughout Flanders. Three goals drive this process: validate technological advances (new battery and vehicle technology); observe behaviors and practices (mobility behavior), and develop the use of renewable energy as part of optimal management of the electrical system (smart grids).</p>	Evs (175) Charging stations (300)	<p>June 2011-2014</p> <p>http://www.imovevlab.eu/index_en.php</p>

ZenCar		regional	ZEN CAR and the Regional Investment Company of Brussels (BIRS)	Car sharing . A self-service electrical division makes available to individuals, businesses and Administration 29 electric vehicles (2 places - Tazzari Zero) and 15 charging stations. Reservations can be made online or by phone 7 days 7, 24 hours, and parking areas are reserved for them and are free. Registration costs 40 euros, the monthly subscription is EUR 6 hours of use and cost 7€	EVs (29)	charging stations (15)	March 2011 http://www.zencar.eu/en/index.dfm
EVA (Electric Vehicles in Action)		regional (Flanders)	Researchers (VUB, IBBT, Gent Univ.), companies (Eandis, Federauto, Telenet, Blue Corner, 4IS), automomakers and authorities in Flanders	EVA support for innovative projects through: > Research for new insights and knowledge > The development of new products and services to add value and to create employment > The government initiatives to encourage electric cars. Main goal: to take away the primary concern of Flemish motorists with regards to driving an electric car, which is being stranded somewhere with an empty battery, and no way to recharge their vehicle.	EV	charging stations (71) with 220 charging points	http://www.elektrischevoertuigeninactie.be/
CED : "Continuous Electric Drive"		regional (Flanders)	led by Flander's Drive. Partners: Volvo, Van Hool, Bombardier	Development of a Scandinavian Home charging systems and methods that do not require cables or plugs. The energy is transferred in wireless mode to the car battery through a charging plate inserted into the road surface, underground, for example, in the driveway where you park your car.	EV		2011 http://www.volvocars.com/fr-be/top/about/news-events/pages/default.aspx?itemid=91
Inductive Charging		regional (Flanders)		The project examines the feasibility, efficiency and practical applicability of inductive charging for EVs, focussing both on stationary applications for cars (parked charging) and dynamic applications for buses (charging while driving). Next to the integration of this technology in vehicles and infrastructure, it also examines the communication interface between both. Aims to acquire a better understanding of aspects such as safety, social acceptance and standardisation and regulation.		charging ICT	April 2010 - June 2012 http://www.flandersdrive.be/inductive-charging

THE NETHERLANDS

INITIATIVE		CHARACTERISTICS							
Program/ Project	Pilot projects	Spatial Level	Stakeholders	Description (Objectives, strategies)	Policies	Type of vehicles	Infrastructure	Start/ End date	Website
National Action Plan for Electric Driving		national		Central objective: make the NL a guide and international laboratory for electric driving in 2009-2011.		Evs (2009-2011, laboratories, <100 to <1000 vehicles; 2012-2015, Scale-up, 15.000 to 20.000; 2015-2020, roll-out, 200.000; >2020, mature market, 1 million)		2009-2020	http://www.agentschap.nl/nl/en/node/110155
	9 demonstrations projects	Local and Regional (A'dam, Schiphol airport, Arnhem-Nijmegen area, Utrecht, R'dam, Den Haag, island of Texel)	Central government (The Netherlands (NL) Agency, from Ministry of Economic Affairs, Agriculture, and Innovation); local and regional authorities; companies	Objectives: testing the technologies of the vehicles in real-world transport, learning by doing, demonstration of the EV possibilities, business case development		Evs and PHEVs (total:231)	charging points	2010-2012	
	10 R&D projects			Development of navigation equipment and specific technology for EV and PHEVs				2010	
HyMove		Regional (Arnhem-Nijmegen region)	Province of Gelderland, Municipality of Arnhem, Arnhem-Nijmegen Urban Region, HyGear B.V., NedStack E-Traction Europe, Yebé van Steijn BV, Connexxion, HAN Automotive Expertise Centre	The project aims to stimulate the use and development of hydrogen in transport. This is done by bringing hydrogen to people's attention and developing an hydrogen infrastructure in the Arnhem region.		Hydrogen Buses and cars		2009-2011	http://www.hymove.nl/
Hydrogen regio Flanders-South-Netherlands		Transnational - Regional (Flanders and South-Holland)	Belgium and the Netherlands (coordination: WaterstofNet vzw.; Partners: WaterstofNet (coordinator), BOM (NL), SPK (B), VSWB (B), IMEC (B), Hogeschool Zuyd (NL), Hogeschool Zeeland (NL), University Gent (B), Karel de Grote Hogeschool (B), Powerlink (B), ECN (NL), Solvay (B), Katholieke Hogeschool Limburg (B))	The aim of the project is to develop the region of Flanders-Southern Netherlands as a knowledge intensive region in the field of hydrogen applications, making use of sustainably produced hydrogen. The project will realise the following activities: <ul style="list-style-type: none"> the development of hydrogen infrastructure – two “re-locatable” hydrogen fuel stations the demonstration of early-market applications relevant for the region (logistics, maritime, public transport) An interactive educational program 		Hydrogen	Hydrogen fuel stations	2009-2012	http://www.waterstofin.nl.eu/english.html

"Amsterdam Elektrisch" (Action Plan for Electric Mobility Amsterdam)	Local (Amsterdam)	Municipality of Amsterdam	This plan sets out measures for electric mobility in Amsterdam. It examines private transport, public transport and goods transport by residents, local companies and visitors. The main short-term objectives are to create an initial infrastructure of vehicle charging points, and to raise the visibility of electric transport – and its users – on the streets	EVs and PHEVs Amsterdam <ul style="list-style-type: none"> • 2009-2012: 200 EV in Amsterdam • 2012-2015: 10,000 vehicles, equivalent to 5% emission-free transport • 2015-2020: 40,000 vehicles, or 20% emission-free transport • 2020-2040: 200,000 vehicles, or 100% emission-free transport. 	2009-2012: 200 charging stations in Amsterdam	2009-2040	http://www.amsterdam.nl/parkeren-verkeer/amsterdam-elektrisch/amsterdam-electric/
Metropoolregio Amsterdam Elektrisch	regional	36 municipalities, provinces of North-Holland and Flevoland, Metropolitan Region of Amsterdam, Ministry of Waterways and Public Works	Regional action plan to facilitate electric mobility also outside the city of Amsterdam. Supported the national government via the Green Deal agreement.		250 charging points, 3-5 fast charging stations	2011-2013	http://www.metropoolregioamsterdam.nl/20120509EV.html
s Hertogenbosch Electric Mobility	Local (s Hertogenbosch)	Municipality of s Hertogenbosch	Objectives: minimum of 10% of Evs, based on a regional objective of 200,000 Evs in Noord-Brabant Province; The s-Hertogenbosch has two electric cars and two electric scooters in use Essent and Enexis use of electric cars and scooters Greenwheels put two electric cars in part	EVs and PHEVs (already existing: express bus, 2 passenger cars and 2 scooters)	Charging stations (already existing: 11)	2011-2020	http://www.s-hertogenbosch.nl/mwv/milieu/luhtkwaliteit/maatregelen/ http://www.brabant.nl/dossiers/dossiers-op-thema/verkeer-en-vervoer/openbaar-vervoer/bussen.aspx
Paaiskwartier Electric	Local (s Hertogenbosch)	Municipality of s Hertogenbosch; Brabant Water, Tribal Internet Solutions, de Rechtspraak, Ricoh NL, Prolease, Mobility Mix; monitoring by students from HAS Den Bosch, Avans and King William I College	Mission: to provide a sound business case can be found by combining electric drive with auto parts for use by businesses and institutions in the palace quarter.	EVs			http://www.elektrischeautosdelen.nl/het-declauto-project/onze-missie

"Stroomstoot" (Electric pulse)	Local (R'dam)	Municipality of Rotterdam	This plan sets out measures for electric mobility in Rotterdam. It examines private transport and public transport.	EVs and PHEVs • 2009-2014: minimum of 1000 EV • 2025: minimum 200,000 vehicles; or 100% emission-free transport.	• 2009-2014: 1250 charging stations (1000 for non-municipal use)	2009-2025	http://www.rotterdamclimateinitiative.nl/nl/50_minder_co2/themas_duurzame_mobiliteit_algemeen?doelen_id=1 3
"Rotterdam Elektrisch"	Local (R'dam)	Municipality of Rotterdam; HNR EV Centrum; RET; Formula E-team;	The municipality of Rotterdam supports various initiatives. So go there more hybrid and electric drive garbage trucks and drive all the RET with four all-electric hybrid buses and a bus. Also driving several electric scooters around the city. Examples: Scooter 2.0: a free week-long electric scooting; E-bike, try it yourself from your company; RET emission-free driving with e-bus; Electric garbage truck: waste fuel!	EVs (bikes, scooters and cars)		2009-2025	http://www.rotterdam.nl/rotterdamelektrisch/glecten http://www.electrifican.tastic.nl/
ALU (Action Plan on Quality Air Utrecht) - "Utrecht Elektrisch"	Local (Utrecht)	Municipality of Utrecht	The plan has been launched to meet air quality targets by 2015, through: clean buses, clean city distribution, electrification of the municipal car fleet and mobility management of freight transport. GOAL: reduce traffic by 30% in inner city (2030)	EVs and PHEVs • 2009-2011: minimum of 200 EV and 5 municipal EVs • 2025: minimum 5,000 vehicles and 60 municipal EVs	• 2009-2011: minimum of 300 charging stations; • 2014: 300-1000 charging stations	2009-2015	http://www.utrecht.nl/images/Secretarie/Communicatie/BestuursOrganisatie/raad/Read%20Actieplan%20Luchtkwaliteit.pdf http://www.utrecht.nl/smartsite.dws?id=34504 4
EV CITY: Intelligent Energy Efficient Buildings and Cities	transnational (BeNeLux)	VITO, KIC InnoEnergy, CITCEA, ETSEI	EV CITY will set up a guideline for cities and all stakeholders involved in the roll-out of electric vehicles and supporting infrastructure. This guideline will describe the market roles and business opportunities for new products/services in this new mobility and, partly regulated, energy market.	EVs		2011-2013	http://www.kic-innoenergy.com/innovation-projects.html
E-LAAD	national	E-lead Foundation ("E-lead") was a consortium initiated in 2010 by the cooperating regional electricity grid operators of the Netherlands	The objective is to establish 10,000 charging points in total for public spaces comprising 2,000 charging spots requested by municipalities (one charging point per 10,000 inhabitants) and 8,000 charging spots requested by EV drivers (through a dealer organization). E-lead assists communities with local action plans for electromobility using other Dutch mobility plans as examples. They reflect the policy and activities to make electric mobility accepted and welcomed into the streets of communities wishing to participate in the new EV era.	EV Charging Stations (2012: 1500; 2020: 10,000 charging stations)		2010-?	http://www.e-lead.nl/

GERMANY

INITIATIVE		CHARACTERISTICS							
Program/ Project	Pilot projects	Spatial Level	Stakeholders	Description (Objectives, strategies)	Policies	Type of vehicles	Infrastructure	Start/ End date	Website
Modellregionen Elektromobilität	8 electric mobility model regions: 1.Hamburg, 2.Bremen / Oldenburg 3.Rhine-Ruhr (Aachen and Münster) 4.Rhine-Main 5.Saxony (Dresden and Leipzig, with emphasis) 6.Stuttgart, 7.Munich, 8.Berlin-Potsdam	national (8 metropolitan regions)	Federal Ministry of Transport, Building and Urban Development (BMVBS); National Organisation for Hydrogen and Fuel Cell Technology (NOW); Academia and Industry	8 selected regions in Germany, among them the Metropolitan Region of Hamburg as well as Bremen-Oldenburg, have been provided with funding to foster sustainable mobility		Electric and other clean modes (hydrogen, fuel cell)		2009-2011	http://www.bmvbs.de/S_hareDocs/DE/Artikel/UJ/modellregionen_elektromobilitaet.html
Schaufenster Elektromobilität		Several regions (still waiting result of application)	Federal Ministry of Transport, Building and Urban Development (BMVBS)	large-scale regional demonstration and pilot projects, in which electric vehicles is collected and made visible internationally. For this purpose, the federal government provides funds to the tune of 180 million €.		EV (2020: 1 mill)		April 2012 -	http://www.bmvbs.de/S_hareDocs/DE/Artikel/UJ/foerde/bekanntmachung-schaufenster_elektromobilitaet.html
Interreg 4A's eMOTION		transnational (Germany and Denmark)	Lead partner: Udviklingsråd Jutland (URS) Project partners: University of Southern, Mads Clausen Institute, Sønderborg (SDU-MCI), University of Southern, Institute of Technology and Innovation - Odense (SDU-TI) Fachhochschule Flensburg (FH-FU) University of Applied Sciences Kiel (FH Kiel), Christian-Albrechts University in Kiel (CAU)	The vision of eMotion, is that the region of Schleswig-KERN and Syddanmark the distribution of rugged, reliable and energy-efficient components and systems being developed within selected niche markets to become a leading supplier of electric mobility industry			electro mobility – development and deployment of technologies enabling sustainable electric mobility	01.10.2011 - 30.09.2014	http://www.interreg4a.dg/wm356022

<p>Green eMotion</p>		<p>european level</p>	<p>43 partners from all over Europe, including: industries, municipalities, EV manufacturers, R&D institutions, universities and utilities companies</p>	<p>connect ongoing regional and national electromobility initiatives leveraging on the results and comparing the different technology approaches to ensure the best solutions prevail for the European market. A virtual marketplace will be created to enable the different actors to interact and to allow for new high value transportation services as well as EV-user convenience in billing (EU Clearing House).</p>	<p>Urban electromobility concepts, policies and regulations The introduction of electromobility is as complex as it is challenging. It relies on a strong, long-term vision and the dedication of municipalities and local electricity providers. WP2 will assess the different concepts for a rollout from a municipality planning and policy perspective. The key features which are necessary for a successful mass roll out of electric cars in Europe will be determined.</p>	<p>EV</p>	<p>Electromobility services / ICT solutions offering a multitude of basic and advanced services to the driver. The integration of these services will allow the usability for the end user without regional limitations (e.g. with roaming or recharging location services) and will enable the realization of economies of scale for advanced service offerings like fleet management.</p>	<p>2008-2012</p>	<p>http://www.greenemotion-project.eu/</p>
<p>Interreg IVB's ENEVATE - European Network of Electric Vehicles and Transferring Expertise</p>		<p>transnational</p>	<p>14 partners from 6 countries of North-west Europe</p>	<p>ENEVATE aims to facilitate and to support an accelerated and well informed introduction of electric mobility in Northwest Europe through structured transnational cooperation between public authorities and business representatives</p>	<p>Enevale aims to catalyse the successful development and implementation of EV through transnational cooperation to provide valuable insight and recommendations into the opportunities and challenges all regions will have to meet on both a practical and regional policy level through the introduction of EV.</p>	<p>EV</p>	<p>energy infrastructure</p>	<p>2010-2012</p>	<p>http://www.enevate.eu/about/partners?edition=EN</p>
<p>Forum Elektromobilität</p>		<p>national</p>	<p>German Association of Electric Mobility</p>	<p>The Association pursues the following objectives in detail: Advancement of alternative propulsion technologies and concepts for quick market entry; Creating a lead market for electric vehicles in Germany; Clustering of relevant expertise in the field of electric vehicles; Support for the development of system competence for the German economy in the area of EVs; Promotion of national communication of all relevant actors in German politics, economy and science; Build and deploy a strategic marketing platform</p>	<p>The focus is the development paths are available for the following areas: Vehicle Concepts Power generation, distribution and implementation Energy storage technology and technical system integration</p>			<p>2010-2012</p>	<p>http://www.forum-elektromobilitaet.de/</p>

BATSEN	national	Univ. Hamburg: Six industrial partners from the automotive, battery and supply industry Funded by Industry and the Ministry of Education and Research	Goal: Wireless sensor network for monitoring each cell of a vehicle battery Cost, availability and operational safety of the battery	batteries	http://www.web.etch.haw-hamburg.de/yamit3/BATSEN_518.0.html
DRIVE-E	national	Universities	<p>research projects. The program currently consists of two modules:</p> <p>DRIVE-e-academy The program offers students of all German universities, which are free to participate in the annual Drive-e-Academy may apply, the possibility of an exclusive insight into the practice of electric vehicles win.</p> <p>DRIVE-E study price With DRIVE-E study price draw BMBF and the Fraunhofer-Gesellschaft excellent, innovative student work from the electrical mobility. Applications are invited from graduates and students of colleges, universities and other higher education institutions with their academic work - from the project until the master or diploma thesis</p>		http://www.drive-e.org/
several projects		German Association of Electric Mobility			http://www.bem-ev.de

DENMARK

INITIATIVE		CHARACTERISTICS							
Program/ Project	Pilot projects	Spatial level	Stakeholders	Description (Objectives, strategies)	Policies	Type of vehicles	Infrastructure	Start/ End date	website
Choose EV		national	ChooseEV; owned by the energy companies SE and SEAS-NVE.	create a strong synergy between environmental concerns and mobility by promoting electric vehicles and ensuring that they are charged intelligently.		EV	150 quick charging stations and 700 semipublic and public EV charge stations.	2012-2014	http://www.choosev.com/englis/h/
	Test-an-EV.	national		Test 2,400 Danish citizens all over the country		EV		2012	http://testenebil.choosev.com/foerside/
EDISON project		national	Partners that include IBM, Siemens, DTU/Risø, DONG Energy, Eurisco, Østkraft, and Dansk Energi	The project will develop system solutions and technologies for EVs and PHEVs with the following objectives : Enable a sustainable, economic, and reliable energy system with substantial fluctuating renewable energy. Provide a technical platform for Danish demonstrations of EVs with emphasis on power system integration. Export globally applicable Danish expertise in distributed energy resources and operation of energy systems with high wind power penetration.				2009-2011	http://www.edison-net.dk/
Test scheme for Electric Vehicles		national	Danish Energy Agency. Partners: two regional authorities, six municipalities, five private enterprises, two organisations/associations and one knowledge institution (two projects).	17 projects that include a total of 44 electric vehicles, including cars, vans, minibuses, and lorries.		Evs (44)		2008-2012	http://www.ens.dk/EN-US/CLIMATEANDCO2/TRANSPORT/2/Sider/testscheme.aspx
Project Better Place		national	Better Place, Renault, 40 Municipalities	Better Place has installed a total of 228 charging stations (456 charging socket) in public locations and 135 charging stations (264 charging plug) at 83 company locations. In addition, the charging stations, put up by private members.		100.000 (Better Place, DONG)	Charging stations (800); Goal is 20.000 from 2014	2011-2012; 2014-	http://danmark.betterplace.com/
eMOTION (Interreg 4A's)		transnational (Germany and Denmark)	Lead partner: UdviklingsRåd Jutland (URS); Project partners: University of Southern, Mads Clausen Institute, Sønderborg (SDU-MCI), University of Southern, Institute of Technology and Innovation - Odense (SDU-ITI) Fachhochschule Flensburg (FH-FL) University of Applied Sciences Kiel (FH Kiel), Christian-Albrechts University in Kiel (CAU)	The vision of eMotion, is that the region of Schleswig-KERN and Syddanmark the Entwicklung, manufacture and distribution of rugged, reliable and energy-efficient components and systems being developed within selected niche markets to become a leading supplier of electric mobility industry			electro mobility – development and deployment of technologies enabling sustainable electric mobility	2011 - 30.09.2012	http://www.interreg4a.de/Awm356022

NORWAY

CHARACTERISTICS									
INITIATIVE	Program/ project	Spatial Level	Stakeholders	Description (Objectives, strategies)	Policies	Type of vehicles	Infrastructure	Start/ End date	Website
	Oslo Green Capital	local	Municipality of Oslo	Sustainability measures are being taken by Oslo with a great effort in promoting eco-friendly mobility. The most remarkable success is the significant role of E-Mobility and the city tolling system. By 2030 Oslo wants to reduce its emissions to 50% of 1990 levels.	Tolling system		400 charging points	2011-2030	http://www.regjeringen.no/en/sub/framtidensbyer/the-participating-cities-oslo/support-for-electric-cars.html?id=573600
	Electric Mobility Norway	regional (Kongsberg – Drammen – Oslo region)	project is led by Kongsberg Innovation , and is supported by Trans-Nova and Buskerud County Council. Cooperation constellation of EMN, Kongsberg Automotive, Kongsberg Gruppen, Ettek, EB, Vardar, Devotek, Infratek, SINTEF, Norpart, ITS Norway, green contacts, Q-Free, Move About and Buskerud University College.	The main objective is to enhance and accelerate the processes that EMN one of the world's most desirable locations for development and commercialization of electric vehicle based transport solutions. EMN's vision is to be a cluster that creates attractive and taking international positions for forward-looking electric car-based transport solutions.					http://www.k-i.no/electric-mobility-norway/cms/19
	Saito Power	national and local	Transnova and CHAdeMO Transnova and Municipalities	Transnova's funds can complement funds from other governmental funding programmes, for instance The Research Council of Norway and Innovation Norway. Transnova's area of focus will be in between that of these programmes, concentrating on, testing, standardising, pilot projects and demonstration projects. Funding from Transnova is therefore most relevant for projects in a phase close to market introduction.			40 fast chargers 3000 charging points	2012	http://www.transnova.no/english
	NOBILE	national	Mobile is designed Transnova of Norwegian Electric Vehicle Association in cooperation with ladestasjon.no	database for mobile phone with charging points network			charging points	since 2009	www.ladestasjon.no
	ZERO	national	Transnova ; Partners: Mitsubishi, Think, Nissan, Eidsiva Energy, Miljøbil Grenland, SINTEF, NTE, Trondheim, AKB Lightning, Topline Norway	fast charging project			3 first fast chargers	2010-2011	http://www.zero.no/
	ZERO Rally 2012	national	ZERO and the Norwegian Automobile Sport Federation	how off cars on the climate. Teams must prove their eco-friendly cars are well manoeuvrable, have the fuel-efficient, rapid acceleration and much more, says event manager Ina Bjørnå.		hydrogen, biofuels, EVS and HEVs .		7th to 9th June 2011	http://www.transnova.no/prospect/zero-emission-rally-2011
	Move About	transnational (Oslo, Gothenburg and Copenhagen)	Move About	Move About is part of a sustainable urban mobility movement that complements public transportation, bike share programs and other initiatives to provide an alternative to private vehicle ownership.		Evs (60) - car sharing		2008-2009	http://www.moveabout.net/en/

<p>Green Highway (EL6 Göteborg - Oslo)</p>	<p>transnational (Norway and Sweden)</p>	<p>Sundsvall and Östersund in Sweden and Trondheim in Norway</p>	<p>A fossil-free transport corridor across Mid-Scandinavia by 2020; GOALS: Construction of the world's longest main road system; Construction of quick-charging stations; Establishment of a filling infrastructure for biofuels: biogas, biodiesel (RME) and bioethanol; Promotion of the use of EVs; Performance of a large test program for EVs, including long-term performance testing in the winter climate in Östersund; Development of a prototype electric snow scooter; Development of internet-based communication systems through which travellers can plan routes using public transport, including details of the carbon footprint for the different routes. Development of a meeting planner that provides optimal meeting locations to minimize time, costs and emissions. Publication of a complete 'Buyers Guide for Electric and Plug-in Hybrid Cars', which is updated annually. Establishment of a taxi project with electric vehicles in Trondheim.</p>	<p>Evs (taxi EV)</p>	<p>charge infrastructure along the road E6 between Göteborg and Oslo), in a total of 447km. Charging stations (94) and charging points (240)</p>	<p>2010-2020</p>	<p>http://www.greenghighway.nu/index.php/greenghighwayeng/ish</p>
<p>Grønn Bil ("Green Car")</p>	<p>national</p>	<p>set up by the association of Norwegian energy companies (Energy Norway, Nova Tran, Regional Authorities and ZERO)</p>	<p>Objective: Facilitate the introduction of 200,000 electric vehicles and plug-in hybrid electric vehicle on Norwegian roads by 2020</p>	<p>Evs (200,000)</p>	<p>2020</p>	<p>http://gronnbil.no/</p>	

SWEDEN

INITIATIVE		CHARACTERISTICS							
Program/ Project	Pilot projects	Spatial level	Stakeholders	Description (Objectives, strategies)	Policies	Type of vehicles	Infrastructure	Start/ End date	Website
FFI - Strategic Vehicle Research and Innovation		national	Managed by Vinnova (Swedish Agency for Innovation Systems), the Swedish Energy Agency (Energimyndigheten), and the National Road Administration (Vägverket); Industry: Volvo AB, Volvo Cars AB, Scania CV AB, Saab Automobile AB and FKG (Fordonskomponentgruppen)	It comprises five subprogrammes: Sustainable Production Technology, Vehicle Development, Transport Efficiency, Vehicle and Traffic Safety, and Energy and Environment. FFI will contribute to the following main goals: Reducing the environmental impact of transport, Reducing the number killed and injured in traffic and Strengthening international competitiveness.		Evs		2009-2025	http://www.vinnova.se/en/ffi/
"Driven by the wind"		national	Power Circle	The purpose with this project is to support and enhance the introduction of electrical cars driven by wind and with this goal accomplish an environmental friendly car stock in combination with development of wind power and car industry in Sweden.		Evs (1000)		2008-2010	http://www.powercircle.org/en/display/Projects/Driven-by-the-wind.aspx
SEMI: Swedish Electro Mobility Initiative		national	Power Circle, Energy Agency, IVA (Royal Swedish Academy of Engineering Sciences)	Based on the Energy Authority's input to the Ministry of Industry, "Current knowledge concerning the market for electric vehicles and plug-in hybrids (CAMEL); ER2009: 20", where the administration is proposing a national program for electric cars and plug-in hybrids, Power Circle, together with partners will conduct feasibility studies for some specific projects within a such proposed program. Specifically referred to pre-study project on: * Concentrated test environment * Distributed demo environment * Electric vehicles in cold climates		Evs and Hybrid (600.000)		2010-2020	http://www.powercircle.org/en/display/Projects/swedish-electric-mobility-initiative.aspx
BeliVe - Business model innovation for Electric Vehicles		national	Viktorina Institute, Energy Agency and Ericsson AB	In addition to developing new business models for electric cars, the plan is also to demonstrate how this might work in practice. Our work is therefore to develop an information and communication system which includes payment solutions that support the new business models.		Evs		2011-2014	https://www.viktorina.se/node/860Z

<p>Energy-efficient Road Vehicles</p>		<p>national</p>	<p>Swedish Energy Agency (Energimyndigheten), Volvo, Vinnova</p>	<p>Several research projects dealing with batteries, fuel cells, and other vehicle components that use electricity as a means of improving energy efficiency. The programme is a continuation of a previous program and now concentrates on hybrid vehicles, especially their drive systems, battery technology, diesel reformers for fuel cells, and the architecture of hybrid systems.</p>	<p>Vision and goals: national and international efforts in the area reaching technology that makes it possible to achieve radical energy efficiency and fossil-fuel independent light and heavy vehicles; build up expertise in the automotive sector strategic areas by supporting targeted research at Swedish universities; To strengthen these areas of expertise can be crucial to Sweden in the future be assigned to new or retain existing development and production units in the largely foreign-owned Swedish automotive industry.</p>	<p>EV, HEV</p>	<p>2010-2030</p>	<p>http://energimyndigheten.se/Forskning/Transportforskning/Energiefrek-tiva-vaerfordon/</p>
<p>SEVS – Safe, Electric and Hybrid novel Vehicles</p>	<p>national</p>	<p>Swedish Hybrid Vehicle Centre (SHC), Partners: Sweden's automotive industry, leading universities and government agencies</p>	<p>The project is divided into two subprojects; 1a Scenario Definition and 1b Vehicle Architecture. During this autumn the project is focusing on the Scenario planning process, with the aim at describing the sustainable mobility solutions for goods and people by 2030+. We have during our workshops identified Key Driver for Change that will shape the future. With these key drivers as a basis we have invited speakers representing different Society perspectives, e.g. City Planning, Energy supply, Life style, Environment, Political and legislation, Transport and logistics.</p>	<p>EV, HEV</p>	<p>2009-2030</p>	<p>http://www.chalmers.se/SAFE/EN/news/events/sevs-8211-safe-electric</p>		
<p>RekKEVide</p>	<p>national</p>	<p>Project owner: Green Net Finland (FI) Partners: Technical Research Centre of Finland (FI), Test Site Sweden (TSS-SE), City of Stockholm (SE), The Institute of Transport Economics (NO), Icelandic New Energy (IS)</p>	<p>Produce realistic performance figures for EVs attributed to Nordic driving and weather conditions Agree what kind of additional testing is done for EV's apart from the regulatory test (ECER No. 101)</p>	<p>EV</p>	<p>2011-2013</p>	<p>http://www.energyandtransport.net/</p>		
<p>InMotion</p>	<p>local</p>	<p>Municipality of Göteborg</p>	<p>The Municipality currently have a number of EVs in their fleet (they operate the city's vehicle fleet) and cooperate with the national program Test Site Sweden regarding follow up of experiences as well as data collection.</p>	<p>Evs</p>	<p>2010-2020</p>	<p>http://www.vartgotaborg.se/prod/sk/vartgotaborsf/trafik/hardare_regler_for_miljobilar_i_goteborgs_stad</p>		

Fast Charging	charging pilot project	regional (Västra Götaland)	TSS - Test Site Sweden, CHAdeMo- Partners: Göteborg Energi (charger installation), ABB (charger supplier), Turning Point (charger supplier)	This project will deploy two CHAdeMO fast charge stations (one manufactured by ABB and one by DBT) in the Gothenburg area and perform tests with EVs. The purpose is to establish a test environment that is open for organizations that has a need of testing EV fast charging.		Charging stations	2011	http://www.testsitesweden.com/projects/fast-charging
ELVIS: Electric Vehicle Intelligent Infra Structure"		national	The Viktoria institute, Göteborg Energi, Ericsson, Volvo, InMotion	Stimulate the market introduction of Evs by making them easier to own and use, enabled by an intelligent infrastructure, supported by information and communication technology (ICT).	EV		2008-2009	https://www.viktoria.se/files/elvis_content_summary_v6.pdf
MOBILE		local (Stockholm)	Cooperation TSS - Test Site Sweden and ANL- Argonne National Laboratory. Swedish Energy Agency, the City of Stockholm and FORTUM company	The programmatic objective was to promote PHEV technology by developing a common understanding of the key issues/barriers and sharing or jointly developing 'best-practice' methodologies and tools to support PHEV development. ANL also supported the MOBILE – project (run by Fortum and the City of Stockholm) with data collection systems.	PHEV		2008-2009	http://www.testsitesweden.com/environment/electric-vehicle-fleets/phev-conversions
The Swedish EV Procurement		national	Vattenfall, Eva Sunnerstedt, Stockholms stad, TSS- Test Site Sweden, SKL Kommentus, Swedish Energy Agency, Automakers (Renault, Citroën, Saab, Chrevolet)	National procurement resulting in frame work agreements regarding electric vehicles (pure electrical vehicles and plug-in hybrids) from six different suppliers.	Evs (250 per year)	Charging points	2011-2030	http://www.elbisupplyhandling.se/en/
Move About		local (Gothenburg)	Move About, TSS - Test Site Sweden, THING, Lindholmen Science Park	Move About drives both open and closed car sharing services, for individuals and businesses. The business model is designed so that key elements can be implemented in several cities in the world.	Evs		2008-	http://www.moveabout.se/om
Hyper Bus		local (Gothenburg)		Gothenburg will be the test venue for a new hybrid bus with plug-in technology. Buses and charging stations will be tested in regular traffic in true city conditions. Project Hyper Bus – which was just awarded an EU grant of SEK 14 million as part of budget totaling SEK 28 million – began operating on September 1, 2011 and will run until 2014.	HEV		2011-2014	http://www.hyperbus.se/engelskwebblats/hypebus/about/hyperbus.4.7f30c2451341eef1dc180002873.html

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<p>ELVIRE</p>	<p>transnational (6 european countries)</p>	<p>11 partners: Renault, Volkswagen, Continental, SAP, ENDESA, CEA- LIST, Better Place, Erasmus University College, ATB Bremen, Lindholmen Science Park Aktiebolag, ERPC</p>	<p>The project's purpose is to develop an effective system which is able to neutralize the driver's "range anxiety", i.e. the fear to break down due to the vehicle's power range limitation. In order to ease and optimize energy management of Electric Vehicles (EV) and to cope with the sparse distribution of electrical supply points during the ramp-up phase, innovative Information and Communications Technologies and service concepts will be developed.</p>			<p>2010-2012</p>	<p>http://www.elvire.eu/</p>

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

Contact Authors

Delft University of Technology, OTB Research Institute for the Built Environment
Jan Jacob Trip
Jaffalaan 9
P.O. Box 5030
2600 GA Delft
the Netherlands

+31(0)15-278 3005

j.j.trip@tudelft.nl

Contact Lead Partner:

Hamburg University of Applied Sciences
Research and Transfer Centre “Applications of Life Sciences”
Prof. Walter Leal
Lohbrügger Kirchstraße 65
21033 Hamburg
Germany

+49-40-42875-6313

e-mobility@ls.haw-hamburg.de