

## **Deliverable 2.1**

# Visions and strategies of the demonstrations cities

**Prepared by:**

**Stine Helms, City of Copenhagen**  
**stineh@tmf.kk.dk**  
**Mette Brinch Clausen, City of Copenhagen**  
**metcla@tmf.kk.dk**

**Date: February 29<sup>th</sup>, 2012**

**Version: 6.1**

## Document Information

### Authors

	Name	Company
Key author	Stine Helms & Mette Brinch Clausen	City of Copenhagen
Further authors	Lene Grønning	Business Center Bornholm
	Margaret O'Mahony & Paul McDonald	Trinity College Dublin
	Simon Hayes & Victoria Plumed	Ajuntament de Barcelona
	Eduardo Poyato & Jaime Briaies Guerrero	Ayuntamiento de Málaga
	Jitka Andersson	Malmö stad
	Marco Contadini	Comune di Roma
	Gabriele Giustiniani	Università degli Studi di Roma La Sapienza
	Dominique Bertin	Electricité de France
	David Marc Hansen & Anders Pold	Better Place Denmark
	Alexander Kihm & Barbara Lenz	Sen Stadt

### Distribution

Dissimination level		
PU	Public	x
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

### Revision history

Version	Date	Author	Description
1.0	June 27 <sup>th</sup> 2011	Key authors and further authors	1 <sup>st</sup> draft
1.1	August 26 <sup>th</sup>	Key authors	Feedback on 1 <sup>st</sup> draft
2.0	October 1 <sup>st</sup> 2011	Key authors and further authors	2 <sup>nd</sup> draft
2.1	November 15 <sup>th</sup>	Key authors	Feedback on 2 <sup>nd</sup> draft
3.0	January 3 <sup>rd</sup> 2012	Key authors and further authors	3 <sup>rd</sup> draft
4.0	January 9 <sup>th</sup> 2012	Key authors	1 <sup>st</sup> draft of final report
4.1	January 13 <sup>th</sup> 2012	Key authors and further authors	1 <sup>st</sup> draft of final report including comments and changes
4.2	January 18 <sup>th</sup>	Jørgen S. Christensen, Danish Energy Association	1 <sup>st</sup> draft of final report including comments from external reviewer
5.0	January 30 <sup>th</sup> 2012	Key authors	2 <sup>nd</sup> draft of final report

5.1	January 31 <sup>st</sup> 2012	Key authors and further authors	2 <sup>nd</sup> draft of final report including comments and changes
6.0	February 10 <sup>th</sup> 2012	Key authors and further authors	Final report ready for submission to the project coordinator
6.1	February 29 <sup>th</sup> 2012	Key authors and further authors	Final report ready for submission approval

Status	
For Information	
Draft Version	
Final Version (Internal document)	x
Submission for Approval (deliverable)	
Final Version (deliverable, approved on)	

## Table of Contents

Table of Contents .....	4
1. Introduction .....	5
2. Executive Summary .....	6
3. Copenhagen .....	9
4. Bornholm	13
5. Ireland	15
6. Barcelona	19
7. Berlin	23
8. Malaga	26
9. Malmö	29
10. Rome	31
11. Strasbourg .....	35
12. Better Place Denmark .....	38

## 1. Introduction

The intention of this document is to present visions and strategies for the promotion of electric vehicles (EVs) in European cities. With dwindling fossil resources EVs become ever more important, especially with respect to climate change<sup>1</sup>. This document has been written by the companies and organizations listed below – they are all partners of the project Green eMotion<sup>2</sup> which is to enable the mass deployment of electromobility in Europe. We hope to inspire others who are considering to promoting the use of EVs.

The companies and organizations who has written this document receive funding from the European Union Seventh Framework Programme FP7/2007-13 under grant agreement no. 265499.



<sup>1</sup> EVs can be made close to CO<sub>2</sub>-free if they are fuelled by renewable energy.

<sup>2</sup> You can read more about the project at [www.greenemotion-project.eu](http://www.greenemotion-project.eu).



The cities all have a vision of reducing CO<sub>2</sub> emissions by promoting EVs.

## 2. Executive Summary

Due to climate change and the increasing scarcity and cost of energy resources European cities are trying hard to reduce CO<sub>2</sub> emissions. Road transport is responsible for a large share of CO<sub>2</sub> emissions and the number of vehicles is set to rise. Therefore it is vital that we adopt sustainable transport solutions – e.g. EVs. EVs not only have zero tail-pipe emissions while driving – significantly improving local air quality – they can also be made close to CO<sub>2</sub>-free depending on the primary energy source used.

The European cities represented in this paper all have a vision of reducing CO<sub>2</sub> emissions and pollution from road transport by promoting the use of EVs. Below you can read about the ambitious initiatives they will implement in order to achieve their visions. For an in depth descriptions of each city's vision and strategy please read the full report.

### **Initiative: Infrastructure for EVs**

In order to reach a large scale deployment of EVs the cities will cooperate with private operators to develop a charging infrastructure. Most people are expected to charge their EV at home. However, there will be a need for charging points on public land. Citizens living in apartment blocks without private parking facilities must have access to charging points. These charging points will also ensure people who normally charge their EV at home that they can charge it on public land if the need arises.

In Copenhagen, Berlin, Malmö and Rome charging infrastructure for EVs on public land will be paid for solely by private operators. In Copenhagen, private operators are even permitted to set up more charging points than actually needed.

In Copenhagen, Barcelona and Malaga parking spaces with charging facilities are reserved for EVs. The Cities expect that this will encourage citizens and commuters to replace their conventional car with an EV as it can be difficult to find a free parking space in the city centre. The City of Copenhagen

will work to get the necessary powers to demand that a number of parking spaces will be equipped with charging facilities and reserved for EVs when new parking facilities are built on private land.

The City of Strasbourg will pay for the siting of a number of charging points on public land. The City will promote installation of charging points inside parking lots close to the tram network in order to encourage the use of inter modality.

The City of Malaga will pay for the siting of a number of charging points on public land. Charging points on private land will be financed by private operators or projects. The majority of the charging points in Barcelona will be part-funded through a national program.

In Ireland, the country's largest energy provider the Electricity Supply Board (ESB) is to develop a nationwide infrastructure for Ireland. Fast chargers will be installed across Ireland's motorways to create "electric highways" between major urban centers. Numerous charging points will be installed at supermarkets, hotels and shopping centers etc. This large scale public network will supplement thousands of home charging points. ESB is also to develop an IT and communications systems to support the nationwide infrastructure for EVs.

Most Cities require all privately owned EVs to have equal access to charging points on public land.

### **Initiative: Financial Incentives**

Today, it is more expensive to purchase an EV than a conventional car. Therefore financial incentives are being used to stimulate the EV market.

In Denmark, EVs are exempt from a vehicle registration tax (VRT) which is from 105% to 180% of the dutiable value<sup>3</sup> on new cars. This means that the price gap between electric cars and conventional cars in Denmark is not as big as it is in many other countries. EVs are also exempt from tax on motor vehicles according to weight and from green taxes. In Ireland, vehicles with CO<sub>2</sub> emissions less than 75 grams per kilometer, e.g. EVs, are exempted from VRT which normally ranges from 14% to 36% of vehicle price. The City of Barcelona gives a 75% reduction on VRT to EVs.

In Ireland, a grant of EUR 5,000 is given to each of the first 1,000 motorists who buy a vehicle with CO<sub>2</sub> emissions of less than 75 grams per kilometer. Ireland's road tax system is also based on CO<sub>2</sub> emission levels, meaning that EVs fall into the lowest tax bracket. Furthermore, the first 2,000 private consumers who buy an EV will have a charging point installed for free at their homes by ESB eCars. In Sweden, a grant of EUR 4,285 is given to the first 5,000 citizens or companies who buy an EV in the period 2012-2014. The City of Barcelona plans to give a subvention of 15% of EV acquisition cost.

In Rome, EVs can access the limited traffic zone in central Rome for free. Other vehicles pay up to EUR 600 annually. The City of Barcelona plans to let EVs access restricted environmental zones in Barcelona. Toll reductions are also planned.

EVs can park free of charge on Bornholm<sup>4</sup>. The City of Barcelona allows free parking on-street at the parking spaces with charging points as long as the EV is recharging. Until December 2011, EVs could also park free of charge in Copenhagen in public payment zones. This practice has been stopped because the former Minister for Transport stated that the law does not give the City the necessary powers to exempt EVs from parking charges. The City will work to get the necessary powers to reduce

---

<sup>3</sup> VRT is calculated as 105% of the part of the dutiable value under EUR 10,000 and 180% on the part of the dutiable value exceeding EUR 10,000.

<sup>4</sup> A Danish island in the Baltic Sea.

parking charges for environmentally friendly cars in public payment zones. The City of Malmö and Rome Municipality are considering introducing free or reduced parking charges for EVs.

### **Initiative: EVs for the public**

The relatively high price of EVs stops many people from buying one. In Barcelona and Malaga, citizens and businesses do not have to buy an EV. In the period 2012-2013, they can rent one in Barcelona – not just electric cars but also electric mopeds and electric bikes. Charging points will be sited next to public transport in order to encourage the use of inter modality. In Malaga, citizens and businesses can rent an EV in the period 2012-2015. In Malmö, a number of households have the opportunity to test an EV for a three month period till the end of 2012.

### **Initiative: Municipality owned EVs**

To stimulate the market for sustainable transport solutions and to set a good example the City of Copenhagen, the City of Malmö and Rome Municipality will purchase EVs for their own fleet. From January 2011, all passenger cars bought by the City of Copenhagen will be either electric or hydrogen cars. By 2015 all passenger cars owned by the City of Malmö will be 'clean vehicles'<sup>5</sup> and at least 20% of new vehicles purchased by the Rome Municipality will be EVs.

### **Initiative: Green energy**

EVs can be fuelled by a wide variety of renewable energy sources, e.g. biomass, wind energy, solar energy and wave energy, thereby reducing oil dependency and CO<sub>2</sub> emissions. EV batteries also allow storage of surplus energy produced and enhance security of energy supply.

The City of Copenhagen and Ireland will continue to install wind farms so that EVs can be fuelled by wind energy. The Irish government aim to have one in every ten vehicles powered by renewable energy by 2020. The City of Malaga has installed photovoltaic systems on the roof of municipal buildings and it will now let private companies use its roofs for this purpose. Also Bornholm will produce renewable energy for the island's EVs.

### **Initiative: Research and Demonstration Projects**

Everybody is aware that they cannot successfully promote the use of EVs themselves. Therefore they are all engaged in several research and demonstration projects.

As the previous pages show the cities will all implement several initiatives in order to promote the use of EVs and reduce CO<sub>2</sub> emissions from car traffic. The individual city's choice of initiatives is affected by several factors, e.g. national legislation, national interests and national budget. The cities are all aware that they cannot handle the climate challenge by themselves. They have to join forces with the energy sector, EV manufacturers and research institutions and others across national borders.

In the last "chapter" you can read about Better Place Denmark's recommendations to cities who want to promote the use of EVs.

---

<sup>5</sup> E.g. EVs, hydrogen and bio gas vehicles.





From January 2011, all passenger cars bought by the City of Copenhagen will be either electric or hydrogen cars.

### 3. Copenhagen

#### Local background: The Copenhagen Climate Plan

In August 2009, the Copenhagen City Council passed the Copenhagen Climate Plan. The Climate Plan describes 50 ambitious environmental initiatives which are to help Copenhagen achieve the target of a 20% reduction in CO<sub>2</sub> emissions from 2005 to 2015<sup>6</sup>. The plan also presents the ambition of a carbon neutral city by 2025<sup>7</sup>. By implementing the Copenhagen Climate Plan's initiatives - and assisted by the expected developments - we expect to reduce Copenhagen's CO<sub>2</sub>-emissions from 2,500,000 tonnes CO<sub>2</sub> today (2005 figures) to about 1,150,000 tonnes in 2025.

To become completely carbon neutral we must also remove the same amount of CO<sub>2</sub> as we produce. We will need to compensate for the 1,150,000 ton of CO<sub>2</sub> in 2025 by for example, investing in still more windmills, using new technologies or planting forests which absorb CO<sub>2</sub>. This will lead to a green and environmentally friendly capital with cleaner air and less noise, and improved well-being and health for people living in the city as well as visitors.

#### Vision: Copenhagen carbon neutral by 2025

Our vision is to become CO<sub>2</sub> neutral by 2025. Carbon neutral means that on balance we don't contribute CO<sub>2</sub>. To meet this goal we must first and foremost reduce our CO<sub>2</sub> emissions.

#### Goal 2015: To reduce CO<sub>2</sub> emissions by 20% from 2005 to 2015

---

<sup>6</sup> You can download a printer friendly copy of 'Copenhagen Climate Plan' at [www.kk.dk/climate](http://www.kk.dk/climate). The annual booklet 'Copenhagen's Green Accounts' provides a brief overview over how far we have come in achieving our goals. You can download a printer friendly version of the booklet at [www.kk.dk/climate](http://www.kk.dk/climate)

<sup>7</sup> The Copenhagen City Council will pass a number of new environmental initiatives in 2012 which are to help Copenhagen to become CO<sub>2</sub> neutral by 2025.

We must reduce CO<sub>2</sub>-emissions by 20% by 2015. In order to achieve this goal green transport - e.g. EVs - play an important role.

As in many other cities, economic growth in Copenhagen has brought with it increased traffic congestion. If we do nothing car traffic is predicted to increase by 20-30 % in the next fifteen years due to a larger population. If we want to achieve our vision of being carbon neutral by 2025 we must take up the challenge caused by the increase in traffic. In order to reduce the amount of car traffic, we will focus on green transport and congestion charging as well as measures to promote public transport. At least one-third of all trips in the city are to be by bike, at least one-third are to be by public transport and no more than one-third are to be by car. In situations where cars are the most appropriate form of transport, the City will promote the use of electric and hydrogen vehicles.

You will find a description of our strategy on the following pages. The strategy includes several initiatives which the City will implement in order to promote the use of EVs and reduce CO<sub>2</sub> emissions from car traffic.

### **Initiative: Infrastructure for EVs in Copenhagen**

The City of Copenhagen wants to spearhead the phasing in of EVs as an alternative to vehicles running on petrol or diesel.

Most people are expected to charge their EV at home<sup>8</sup>. However, Copenhageners living in the inner metropolitan districts will not have the possibility of doing so as they live in apartment blocks without private parking facilities. There will also be a need for charging points on public land to ensure people who normally charge their EV at home can also charge it on public land if the need arises.

The City of Copenhagen is working with external partners to establish an infrastructure for EVs on public land. Permits to establish and run charging points are given by the City for a period of 10 years. All expenses must be covered by the operator, although the City of Copenhagen will pay for the marking out of the parking spaces as well as the signage. The City does require all EVs to have free and equal access to the charging points. To encourage Copenhageners to drive EVs external partners are permitted to set up more charging points than needed. The City will offer long-term concessions to ensure the full-scale roll-out of infrastructure on public land when EU standards have been agreed upon (e.g. for plugs). The harmonization of standards is very important for the mass rollout of EVs and the City will support the standardization efforts.

In the autumn of 2009, the first charging points were set up. A fast charging station opened in April 2011. Copenhageners and visitors can see a map with the locations of the charging points and the charging station on public land on the City's website<sup>9</sup>. 44 charging points will have been set up by February 2012.

Parking spaces with charging facilities are reserved for EVs on public land. Since it is difficult to find a free parking space in Copenhagen the City expects that reserved parking spaces will encourage Copenhageners and commuters to use an EV. So far the Copenhagen City Council has decided that 500 parking spaces on public roads can be reserved for EVs. If the need for parking spaces exceeds 500, the City Council will decide what is to be done on the basis of recommendations of the Technical and Environmental Committee.

---

<sup>8</sup> According to DTU Transport 75 % of all car owners in Denmark can charge at home today.

<sup>9</sup> The map is found here: [www.kk.dk/CityOfCopenhagen](http://www.kk.dk/CityOfCopenhagen) > Already resident in Copenhagen > City & Traffic > Parking > Electric Cars.

The City is making a plan together with DONG Energy<sup>10</sup> for the infrastructure for EVs on public land in Copenhagen. The plan will be completed in 2012. The City will ask the Danish government to allocate funding for a national infrastructure for EVs. Without national co-financing it is likely that the siting of charging points on public land country-wide will be patchy and that the charging points will not be intelligent.

The City is working together with other Danish municipalities, as well as Swedish municipalities in the Oresund Region, in order to develop a common strategy for infrastructure for EVs.

### **Initiative: Municipal EVs and hydrogen cars**

From January 2011, all passenger cars bought by the City will be either electric or hydrogen cars. 34 new electrical and 6 hydrogen cars have been put into service by December 2011. Before 2015, 85% of the City's passenger cars will run on electricity or hydrogen. This amounts to about 600 new cars. The total reduction in CO<sub>2</sub> emission will be approximately 1,000 ton annually. Petrol and diesel powered cars will be replaced with EVs and hydrogen cars when they need to be replaced anyhow.

### **Initiative: Green energy**

22% of Denmark's total electrical consumption is produced from wind turbines, the highest rate in the world<sup>11</sup>. Based on the Copenhagen Climate Plan, a city owned utility company plans to build more than 100 new wind turbines before 2025. It will give Copenhagengers, businesses and the City of Copenhagen the opportunity to buy green electricity for their EVs. By storing surplus electricity in electrical car batteries we will be able to store far greater amounts of renewable energy. This will help us to secure a flexible national energy system.

### **Initiative: Incentives and legislation**

Since 1984, electric cars have been exempt from a vehicle registration tax (VRT) which is from 105% to 180% of the dutiable value<sup>12</sup> on new cars. This means that the price gap between electric cars and conventional cars is not as big as in many other countries. The exemption will last till 2015 unless the Danish Parliament decides otherwise. Electric cars are also exempt from tax on motor vehicles according to weight and from green taxes. The Danish Parliament hopes these exemptions will encourage Danes to replace their petrol or diesel powered cars by an EV. The City of Copenhagen will work for an exemption of the registration fee.

EVs could park free of charge in Copenhagen in the pay and display zone until December 1<sup>st</sup> 2011. This practice has been stopped because the former Minister for Transport has stated that the law does not give the City the necessary powers to exempt EVs from parking charges. The City of Copenhagen thinks that it is a step backward. The City will therefore ask the new Minister of Transport for the necessary powers to reduce parking charges for environmentally friendly cars in public payment zones.

The City will also work to get the necessary power to demand that a number of parking spaces must be equipped with charging facilities and reserved for EVs when new parking facilities are built on

---

<sup>10</sup> DONG Energy is one of the leading energy groups in Northern Europe. DONG Energy's business is based on procuring, producing, distributing and trading in energy and related products in Northern Europe.

<sup>11</sup> Based on 2005 figures.

<sup>12</sup> VRT is calculated as 105% of the part of the dutiable value under EUR 10,000 and 180% on the part of the dutiable value exceeding EUR 10,000.

private land. The City foresees that this will provide impetus for Copenhageners and businesses to use an EV.

### **Initiative: Joint initiatives**

In Copenhagen, we cannot handle the climate challenge by ourselves. Over 70% of the world's CO<sub>2</sub> emissions come from cities. The City of Copenhagen is looking for joint initiatives from municipalities, the business world and the citizens as well as close cooperation across international borders. We have a large number of initiatives in motion. On a regional level the City is engaged in the Climate Strategy for the Capital City Region. The vision is to become the region in Denmark, by 2025, which is not only the best prepared region for climate change but also the most energy efficient region. On a European level, the City is partner of five projects aimed at establishing a European infrastructure for EVs<sup>13</sup>. On a global level, the City is actively engaged in the Clinton Climate Initiative and C40 facilitated network on EVs<sup>14</sup>.

---

<sup>13</sup> Besides the Green eMotion project the City of Copenhagen is also partner of 'E-mission in the Oresund Region', 'Next Move', 'Hydrogen Transport in European Cities' and 'Greening European Transport Infrastructure for Electric Vehicles' which all receive funding from the EU.

<sup>14</sup> C40 is a group of large cities committed to tackling climate change.



Bornholm is set to become a 100% carbon-neutral island based on sustainable and renewable energy by 2025.

## 4. Bornholm

### Local background: New ways to attract more businesses

In 2006, the Growth Forum Bornholm and the Regional Municipality decided to improve the number of businesses, as well as the number of full time jobs available on Bornholm. As the island was living primarily off tourism during the summer months, it was considered necessary to find new ways to attract more businesses, and decrease the level of unemployment during the winter periods. It was clear that businesses and citizens were moving toward larger cities.

For better management control Business Center Bornholm was created. A collective and extended vision and strategy for the island was established based on a strong municipality energy vision.

### Vision and Goals: Bright Green Island

Bornholm is set to become a 100% carbon-neutral island based on sustainable and renewable energy by 2025. The goal is communicated in a vision called Bright Green Island. The strategy, to achieve the 2025 goal, predicts the island as an appealing green island founded on 100% sustainable and renewable energy – a society that will be ecologically and ethically accountable in all its engagements, and include economy, value, knowledge and technology-management.

One of the steps in the green and sustainable 2025 strategy, is that the island will be a global leader and heavily involved in the global discussion on environment change and renewables. The approach is to do “branding by doing” and is specified by a number of priority areas and actions, such as to communicate the message internationally, while simultaneously implement an energy strategy to become an environmental and carbon-neutral society.

For a society to become carbon neutral demands a radical transformation and ambitious targets. Bright Green Island has already made enormous changes and is ahead of schedule.

In 2012, 65% of Bornholm’s power supply will be generated by wind power. This will lower the import

of power from 50% to 40% in total.

The vision is realistic because it combines one of the most ambitious energy strategies in Europe with a strong public-private partnership as well as the involvement of citizens via projects and campaigns. Also large-scale national and international research projects are heavily involved in the Bright Green Island strategy. Not least, it also involves the development and implementation of energy-efficient solutions, and a business plan, which ensures that the transformation will be economically viable.

The Bright Green Islands energy strategy goal is that over 40% of the petrol and diesel consumed for passenger transport should be replaced by transport in electrically powered vehicles before 2025, which will eliminate over 14,000 ton of carbon emissions.

### **Initiative: More Electrical Cars**

With more than 12 action points in the islands energy strategy, many projects have already been initiated. One of the 12 points is the focus on implementing more EV's, as well as creating the right infrastructure to the island.

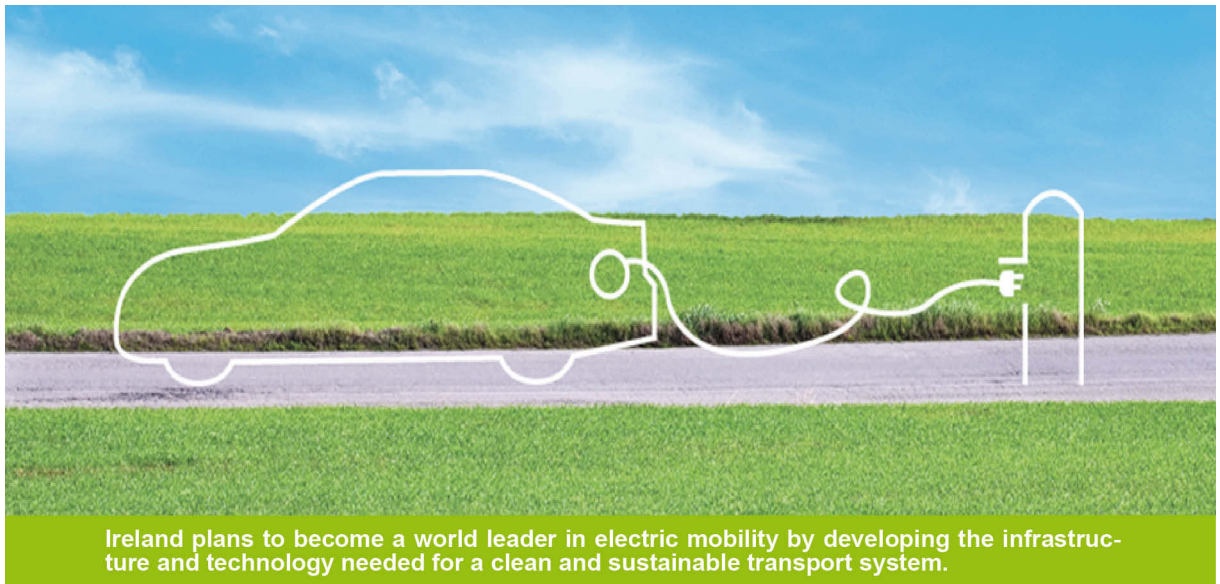
The development of electrically powered passenger cars is occurring in leaps and bounds, and a multiple number of models are available and more are expected to be launched in the years ahead. A further development in terms of batteries and other technology will continue to occur, and give the electric cars the comfort and capacity required for becoming an even better alternative to cars powered by petrol or diesel.

In view of the relatively short distance on Bornholm, electric cars are expected to become an attractive alternative for people who drive on a daily basis - as soon as the cars' purchase price and operating costs are competitive.

Bornholm has already been the test island for many Electrical Vehicles, and a global EV manufacturer have established the European sales office "Greenabout" on the island.

The company "Bright Green Innovation", in partnership with governmental institutions, are implementing the infrastructure together with local businesses on the island. The local power plant Østkraft A/S has the overall responsibility for the EV infrastructure in Bornholm in close corporation with the municipality

Also projects have been initiated, that will provide the EV's with green and more sustainable power in the future. Free parking has been provided for the EV's, and being a large green tourist destination, EV testing has been available for tourists in the last few years.



## 5. Ireland

### Local background: ESB eCars

Ireland is uniquely placed to become a model for electric vehicle integration. Our size and location combine to provide almost ideal circumstances for the nationwide use of a clean, efficient transport network powered by renewable sources. As an island state with closely spaced urban centres the country is geographically ideal for the widespread use of electric transport. Ireland also has tremendous potential to generate large amounts of electricity from renewable sources, particularly wind power. The Irish government are committed to the idea of realising this potential and developing our considerable opportunity to meet much of the country's energy requirements by installing on-shore wind farms. These plans are intrinsically linked with a wider commitment to reduce greenhouse gas emissions substantially in the coming decade and move to more sustainable methods of energy generation and transport. The Irish government have committed to producing 10% of all road transport energy from renewable sources by 2020. Adoption and integration of the electric car is a cornerstone of this initiative.

The government aim to have one in every ten vehicles powered by electricity by the year 2020. The goal of 10% integration will mean the conversion of almost a quarter of a million cars by the end of the decade. This will require a major change in the way we think about personal mobility and transport systems. The electric vehicle has the potential to vastly change the way we travel by promoting a cleaner, cheaper and more efficient way to drive.

### Vision: A Green Transport System

"A sustainable transport system will be delivered for Ireland. The way we travel and transport goods will be transformed for the benefit of communities, the environment and the economy." Department of Communications, Energy and Natural Resources - Vision for 2020.

Ireland is committed to bringing about changes in policy and practice that will ensure a greener future in the energy and transport sectors. The targets laid out by the country's major stakeholders in these

areas demonstrate the dedication to building a cleaner and more efficient national transport system. This commitment will be achieved by significant investment in public transport and in alternative methods of transport, most notably the use of EVs.

### **Goal: Reduction of CO<sub>2</sub> Emissions**

Urban transport networks will also be optimised for energy efficiency and environmental protection. The Dublin City transport system has experienced unprecedented growth over the past twenty years. Such growth must be carefully managed to ensure sustainability, a task which the city council have undertaken with the publication of Dublin's Sustainable Energy Action Plan. This plan outlines measures to help the city achieve close to a 30% reduction in CO<sub>2</sub> emissions by 2020 through the use of smarter energy management and the promotion of cleaner transport including widespread integration of EVs.

The use of EVs is intrinsically linked to smarter and cleaner energy generation and usage. As the state's largest energy provider, the ESB have a central role to play in the electrification of Ireland's road transport fleet. The integration of e-mobility into Ireland's personal and commercial travel patterns is central to the company's operating strategy. This strategy includes clear targets for the reduction of greenhouse gas emissions and adoption of generation technologies. The specific targets are:

- 30% reduction in CO<sub>2</sub> emissions by 2012
- 50% reduction in CO<sub>2</sub> emissions by 2020
- Net carbon neutral by 2035

These ambitious goals are indicative of the company's, and the country's, commitment to ensuring the energy and transport sectors are on sound, sustainable footing for the future. The key partners in Ireland's electro-mobility initiatives are well on the way to making this vision a reality.

### **Initiative: Electric Vehicle Infrastructure**

The ESB are endeavoring to develop a nationwide infrastructure capable of fully supporting the number of EVs planned for Irish roads. To achieve this there are over 400 charge points installed around the country, with over 1000 more planned for 2012. Every town in Ireland with a population of greater than 1,500 people will have a minimum of one charge point. Fast chargers will be installed across the nation's motorways to create "electric highways" between major urban centers. This large scale public network will supplement thousands of home charge points, offering a range of charging options to reassure drivers and provide enormous motoring flexibility.

Ireland's large urban areas will receive numerous public charging points at areas of convenience for motorists. Supermarkets, hotels and shopping centers will be equipped with charging facilities enabling drivers to easily utilize charge points in areas of potentially high demand. Charge points will be distributed in such a way as to serve the greatest number of people in the most efficient manner. The Dublin city area will initially have 500 on-street charge points, the city of Cork will receive 135 and at least 45 chargers will be available in smaller cities around the country.

### **Initiative: Smart System Management**

ESB eCars is developing the IT and communications systems to support the nationwide infrastructure. The system is designed to provide the most user-friendly and universally accessible solution using up to date technologies and will become fully operational in mid 2012. An online account will enable eCar drivers to access public charge points. Charge point access card will allow drivers to log into secure



accounts, choose the electricity supplier per transaction and prepay €10 or €15 using your debit or credit card. The driver can then charge at any public charge point, using their swipe access card. Users can also check the balance, top up at any time and find the best tariff currently on offer. The technology will be accessible through a range of mobile applications allowing drivers to manage their payments and charging events on the move, from topping up, to reserving a charge point and even receiving notification when charging is complete. The IT infrastructure will provide an open, competitive system whereby customers can change energy supplier at any time with no penalty and with unprecedented ease of use.

### **Initiative: Financial Incentives**

The Irish government are providing a number of financial incentives in order to promote the adoption of EVs throughout the country. The most significant of these is a €5000 grant towards the purchase of any vehicle with CO<sub>2</sub> emissions of less than 75g per km. There is a budget of €5m allocated for this fund, allowing the first 1000 EV adopters to avail of the scheme. Additionally, this category of vehicle is exempt from vehicle registration tax (VRT) which normally ranges from 14% to 36% of vehicle price. Ireland's road tax system is also based on CO<sub>2</sub> emission levels, meaning that EVs fall into the lowest tax bracket.

The ESB have also initiated an incentive scheme aimed at stimulating the uptake of EVs in Ireland. Under this initiative the first 2000 citizens to buy an EV will have a home charge point installed free of charge, providing easy and cheap access to clean energy. These schemes are aimed at putting in place the foundations for a greener transport system with the ultimate goal of reducing emission levels of the country's transport sector.

### **Initiative: Renewable Power and Clean Energy**

The smart generation and consumption of energy can optimise our electricity grid and relieve our dependence on fossil fuels. Wind power generation is seen as the long term solution to Ireland's energy concerns. The planned on-shore capacity for the country will be more than capable of meeting the charging demands of the planned EV fleet. The Irish government aims to produce 42% of all energy generated in the country from renewable sources by 2020. This is the most ambitious renewable energy targets in Europe. By 2012 Ireland will have an onshore wind energy capacity of 3000MW, well in excess of the envisaged 2000MW night time charging load expected from large scale EV integration. Not only will there be enough clean energy to meet demand, but the efficiency of Ireland's electricity grid will be greatly increased by ensuring that energy is used when and where it is needed.

### **Initiative: Ongoing Research and Partnerships**

Ireland's major partners in electromobility are committed to the ongoing improvement of the country's transport and energy sectors by developing new and better methods of managing transport infrastructure and power generation. Participation in several European wide research programs are a key part of this development process. These projects include ENEVATE, MERGE and most notably Green eMotion.

The Irish partners of Green eMotion; Codema, Cork City Council, the ESB and Trinity College Dublin will strive to ensure that the benefits of EV integration are analysed, understood and promoted throughout the region.



Through collaboration with other European partners and sharing of experiences Ireland aims to become a model for electric vehicle integration and lead the way in the development of cleaner more efficient transport networks.



Electric Scooters are already becoming visible on the streets of Barcelona.

## 6. Barcelona

### Local background: Sustainable Mobility Policy

The City of Barcelona aims to increase the total number of trips city-wide whilst containing the kilometers travelled by vehicles. This implies promoting the trips by non-motorised means (on foot and by bicycle), incorporating new strategies for improving public transport and the distribution of goods, increasing vehicle occupancy and using more sustainable vehicles. The incorporation of the electric vehicle, increasing the mode share in the case of electric bikes, or substituting vehicles with motors driven by fossil fuels (particularly in the case of electric scooters), are essential measures in order to meet the objectives of sustainable mobility.

### Vision: Barcelona globally-recognised centre for electromobility

By developing public private partnerships Barcelona aims to become a globally-recognised centre for electromobility.

### Goals: Charging infrastructure and EVs

By 2015 8,000 charging points will have been deployed in Barcelona. Electric PTWs<sup>15</sup> are expected to recharge on-street and most other EVs off-street. The City will help promote EVs produced within Catalonia.

By 2025 the City's electro-mobility initiatives will have been expanded and further developed both at City and Metropolitan level, and they will have contributed to compliance with air quality standards. The electric vehicle, especially electric scooters, will be a real alternative for mobility within

---

<sup>15</sup> PTW: Powered Two-Wheeler

Barcelona<sup>16</sup>. Short-term incentives will have evolved into real business models, with a generalised presence of Recharging Managers.

### **Strategy: The Live Initiative**

The City's strategy for EVs is built upon private-public partnerships led by Barcelona Municipality through the LIVE<sup>17</sup> Initiative in cooperation with private entities such as ENDESA, SIEMENS and SEAT. From the outset, the LIVE Initiative has worked along three lines that recognize that EVs and charging points are necessary - but not in themselves sufficient conditions - to exploit the essential concept of electro-mobility as a sustainable mobility future. The three lines are: 1. EVs Market, 2. Infrastructure and 3. Communication, Policies & Integrated Actions.

Table 1 indicates how the third aspect of the LIVE Initiative is being realized. This overall strategy is applicable for both the *shorter* (up to 2015) and *longer-term* (up to 2025) goals set out in the previous section.

- Identification, Incubation, Coordination and Planning of initiatives to develop electro- mobility.
- Define and coordinate the Strategic Plan for the deployment of EV.
- Centre of attention for citizens and companies (centralised communication point).
- Communicate, Promote, Develop Benchmarking and Gather Knowledge.
- Promote local participation in Consortiums of European projects and events.
- Facilitate economic and industrial transformation

### **Initiative: Charging Infrastructure and a Network Operational Centre**

Barcelona Municipality has an interest in ensuring that citizens can take-up mobility services based around EVs within the frame of its overall sustainable mobility policy. This implies that it collaborates with OEMs, Energy utilities, IT providers and municipal parking and energy agencies so as to develop a coherent recharging infrastructure that covers multi-household buildings (private garages), public off-street car parks and freight consolidation centres.

Charging points are being deployed on- and off-street in both private and public premises. The majority of the infrastructure to be implemented by 2015 is part-funded through the project Movele which Barcelona is partner of<sup>18</sup>. The deployment so far includes more than 200 public charging points in the City and a fast-charge station.

---

<sup>16</sup> Today Barcelona has the highest concentration of PTWs in Europe - almost 300,000. LIVE identifies eScooters as a market segment for early EV uptake, and as an opportunity to accelerate industrial transformation. In 2011 there was at least 150 electric PTWs in Barcelona.

<sup>17</sup> LIVE is the platform that coordinates Logistics for Implementing Vehicles based on Electric propulsion in Barcelona city.

<sup>18</sup> Movele 2009-2012 is a national program led by IDAE for promoting electric vehicle deployment and recharging infrastructure. Subsidies of 2,000€/plug for On-Street is given and 1,000€/plug for Off-Street. Energy is delivered for free from On-Street stations until the end of 2012.

Barcelona has an open policy toward infrastructure implementation - with a view to generating knowledge of what different technologies can achieve and at what cost. Various Recharging infrastructure technologies are being implemented, AC for normal and semi-fast Charge and DC for Fast Charge. In the case of AC the infrastructure is based on Type combined with a Shucko type mode 1 for the first stage of implementation due to important penetration of PTWs. Interoperability is undergoing, ENDESA is operating 135 Charging Points and MOBEC POINT- IBERDROLA is managing 12 around the city.

In the period up to 2012 it is important to establish a Municipal Control Centre (Network Operational Centre – NOC) to coordinate the various infrastructures offers such that users can be provided with clear information about what infrastructure is available for their type of vehicle and the specific conditions (point availability, price, etc.). The Municipality has invested - and invests in - charging infrastructure and participates in demonstrations of standards in order to provide this coordination - but the level of coordination that is achieved will depend upon the brokerage of participations from the private sector.

In the *longer-term* (2015 -2025), private EV owners tariffs and statutory revisions (multi-dwelling buildings) are envisaged that will encourage charging at home. Charging will be operated using private-led business models where the administration will play a regulatory role, and with infrastructure concentrated off-street (in private and public car parks and in spaces dedicated to charging – “electrolineras” or “electric filling stations”).

### **Initiative: Web Portal, Communication & Awareness**

The communication of recharging infrastructure complying to different standards, with different tariffs and service conditions needs to be clearly communicated to potential users. A web-based “map” of recharging points has been developed, and is a key element of the LIVE strategy. This forms part of a portal that communicates service concepts and helps registering users’ interests, thereby facilitating the priority ranking of options for charging infrastructure deployment, and user/actor participation. The web portal<sup>19</sup> already operates as a tool for identifying users’ frequently-asked questions.

The web portal explains recent legislative changes and incentives that simplify the installation of points in multi-household garages. Collaboration aims to ensure that points deployed in other municipalities are integrated. It also forms part of a wider activity of communication and awareness-raising that includes evaluation exercises, the organisation of work-groups, conferences, specific events, etc.

### **Initiative: Incubator of Electric Mobility projects: Financial Incentives**

In the *short-medium term* (up to 2015), the City will implement the following incentives to promote the use of EVs:

- On-street paid parking free for EVs.
- Ordinance for new off-street parking construction (2% of parking places with plug-in stations).
- 75% reduction in vehicle registration tax.
- Subvention of 15% of electric vehicle acquisition cost.
- Toll reductions.
- Incentives promoting Park & Ride.
- Preferential Access to restricted zones (Green Zone).

---

<sup>19</sup> [www.livebarcelona.cat](http://www.livebarcelona.cat) or <http://w41.bcn.cat/web/guest>

- Use of BUS/HOV (High Occupancy Vehicle) lanes.
- Territorial integration & standardisation (Signing, led by public authorities).

These incentives form one part of what Barcelona offers to companies that wish to develop electro-mobility projects. Barcelona offers itself as a “test bed” or incubator for collaborations that develop new business models and new patterns of mobility consumption. Studies of the longer- term market activity and the development of business plans also form part Barcelona’s promotion of a sustainable EV mobility.



Electric smart cars used at the Brandenburg Gate in the project "e-mobility Berlin" by Daimler and RWE with funding from the national government

## 7. Berlin

### **Local background:** Action Plan for Electromobility Berlin 2020

In March 2011, the Mayor of Berlin signed the Action Plan for Electromobility Berlin 2020 together with the President of the Confederation of Employers and Business Associations of Berlin and Brandenburg and the President of the Technical University of Berlin. The plan describes 6 concrete action areas. These areas are:

- Local Development & Marketing
- Application & Deployment Programs
- Technologies & Systems
- Research & Development
- New products & Services
- Qualification

For each of them, working groups will be established with stakeholders from business, science, policymakers and administration. The working groups will define operative goals for the respective action area, develop a roadmap and milestones to reach these goals, set up work packages and measures to fulfill the roadmap and actively guide and monitor the implementation.

With this plan, Berlin wants to create local value added by bundling, empowering and internationally promoting the local R&D community and by becoming the international showroom for German electric mobility as well as to accelerate the build-up of a buffer for the fluctuating wind energy largely growing in the surrounding regions of Brandenburg.

### **Vision: To be a showcase for electromobility**

Berlin will be the showcase for an innovative location to develop integrated electric mobility without inducing a modal shift towards individual motorized traffic. Being the "battery for Brandenburg", we will

demonstrate the intelligent local use of vast renewable resources in the surrounding region. This will be reached without cost-intensive or privilege-creating direct subsidies for owners or public-owned infrastructure but with smart legislative conditions and coordination. New research, development or production facilities will be established but also existing ones will benefit from their early contribution to the transformation towards sustainable mobility.

### **Goal: To raise the number of EVs to 3,000 until 2015**

Berlin has very clear goals for electric mobility. From 2011 to 2014, the number of electric cars used in car sharing services should be raised from 30 to 100, the number of total shared electric vehicles (including e.g. bikes) should reach more than 1,000 and the number of users more than 10,000. The total number of electric passenger cars is aimed to reach 3,000 in 2015.

The goal for charging point diffusion is roughly 3,500 stations in 2015. While the focus will first be on mass diffusion of home and especially work charging with low voltage and intelligent grid control, in the long run a large number of public charging points especially for shared EVs will be installed.

### **Initiative: Intermodal transport**

One very central aspect of the Action Plan for Electromobility Berlin 2020 is to avoid stimulating the usage of private vehicles instead of public transport. Consequently, the advantages of EVs should be used in approaches which are combined with public transport. Berlin currently focuses on developing the billing by offering one single ticket for a multimodal chain (or even the monthly access to all modes) within the project beMobility<sup>20</sup>. Additionally, exclusive parking spaces for EV car sharing will preferentially be granted by the Senate in proximity to public transport stations in the city centre of Berlin in the beginning of 2011.

### **Initiative: Infrastructure for EVs**

According to legislation standards in Berlin, no infrastructure will be directly built or held by the administration of the municipality but only dedicated operators (these operators will nevertheless include public bodies providing charging spots for their employees). However, to ensure a meaningful diffusion of sufficient recharging infrastructure the installations will be streamlined and stimulated by the administration through setting standards, easing regulatory processes and possibly funding them.

Berlin currently has already 250 charging points, most of them providing combined slow and fast charging modes. The goals for diffusion are roughly 350 in 2015, 500 in 2020 and 800 in 2025. These numbers do not include community-exclusive charging points for condominiums (see below). Based on first evaluation projects in Berlin, the demand for faster recharge is not at the centre of the requirements. Hence the focus will be on mass diffusion of home or work charging with low voltage and intelligent grid control instead of maximum throughput.

Alongside with the German and European initiatives for barrier-free roaming, Berlin aims to ensure accessibility for all drivers to all charging spots in public areas. Currently this goal is already mostly being met within the demonstration projects where various different operators grant access to every user regardless of his affiliation.

---

<sup>20</sup> Large-scale project investigating the integration of EV sharing into existing public transport and bike sharing infrastructure in Berlin, see <http://www.bemobility.de> (German).



All energy used to recharge the vehicles should be green - the surrounding area of Brandenburg currently already delivers more than enough wind and solar energy to fulfil that need.

### **Initiative: Berlin as a part of European projects**

Berlin recognizes its special role as a research capital with currently little automobile production facilities and therefore focuses on researching and demonstrating innovative ways to integrate EVs instead of aiming at short-term skyrocketing of private EV ownership. Many European projects (e.g. CityLog, Green eMotion, FUSION, SMARTFUSION, CONSUL) as well as national (e.g. e-Logistik, EMKEP, e-mobility, e-IKT, Green eMobility, 4-S) and regional ones (e.g. beMobility, eSolCar) are already set up and enable the testing of EVs in various applications and environments.



The City of Malaga will promote the use of EVs in order to reduce air pollution.

## 8. Malaga

### Local background: Málaga Sustainable Energy Action Plan

After the Mayor of Málaga signed the Covenant of Mayors - an initiative of the European Commission - in 2010, the City of Malaga has made a Sustainable Energy Action Plan and a Sustainable Mobility Plan. Both plans are expected to be approved in 2012.

The Sustainable Energy Action Plan marks the roadmap to achieve the target set by the Covenant of Mayors: reducing CO<sub>2</sub> emissions at least 20% by the year 2020, including the methodology to be followed during its implementation. Among the actions that involve the development and deployment of EVs are some such as: the renovation of the municipal fleet with EVs, the introduction of buses powered by electricity, the publication of a guide to sustainable mobility, the promotion of a supply network of charging points, the creation of an ordinance to give priority to EVs and conducting awareness campaigns and specialized sessions.

The Municipal Sustainable Mobility Plan is a set of actions aimed at the implementation of more sustainable forms of travel (walking, cycling and public transport) within a city. It also seeks to promote access to the city center as well as basic services by public transport and not conventionally powered vehicles.

### Vision: To deploy EVs

The City of Malaga's vision is to deploy EVs in the city in order to reduce air pollution.

### **Goal: To reduce CO<sub>2</sub> emissions by 20% from 2008 to 2020**

Analyzing 2008, it was observed that the transport sector has produced almost 40% of total greenhouse gasses (GHGs) emitted in the city (1,317,810<sup>21</sup> tonnes of CO<sub>2</sub>). The City of Malaga wants to reduce its CO<sub>2</sub>-emissions by 20 % in 2020 compared to 2008. This equals a reduction of approximately 263,562 tonnes of CO<sub>2</sub>. The transport sector is responsible for almost 40% of greenhouse gasses in Málaga and the City will like to promote the use of EVs.

### **Initiative: European and international projects**

The City of Málaga is participating in different European projects, such as e-Mobility Accelerator<sup>22</sup>, Smartcity Málaga<sup>23</sup> and ZeM2All<sup>24</sup> in close cooperation with ENDESA.

ZeM2All is aligned with the Smartcity Málaga Project, and will demonstrate smart community-related technologies, aiming to prepare for the large-scale introduction of renewable energy as well as the dissemination of next-generation EVs. This demonstration project will focus on the establishment of a new infrastructure including EV management systems, EV charging facilities as well as the introduction of a platform to collaborate with the Smartcity Málaga Project. Smartcity Málaga Project will integrate information from energy management systems, from renewable energy and the existing power infrastructure, thereby improving the efficiency of Malaga's grid management system.

Through the ZeM2All Project, citizens and private and public companies will have the opportunity to rent one of 200 EVs. 200 charging point will be installed in 2012 for standard charging and 16 stations for fast charging. These points will be distributed throughout the city, covering areas accessible to users.

### **Initiative: Infrastructure for EVs**

Charging points will be located close to different land uses, as follows: Single family homes, multi-family housing, offices, medical centers, lodging, commercial, industrial-type and institutional zones. The ones in public spaces, on-street and public parking will have to be intelligent and their use open to everybody. Retail, industrial, restaurants, and recreation, entertainment and cultural uses require a small amount of charging points because typical EVs owners are unlikely to desire to charge at these locations for different reasons such as not spending enough time at the location to achieve a reasonable charge. The assignment of charging points in new land developments depending on the use is now under study by the municipality. It will be completed in the first quarter of 2012.

Charging points on private land will be financed by private operators or projects. The City of Málaga will set up some public land as a 'public service'. The City reserves parking places with slow charging

---

<sup>21</sup> Previous data of the emissions inventory of the city for 2008.

<sup>22</sup> The overall aim of e-Mobility Accelerator is to define a common strategy and policy recommendations to accelerate successful market implementation of electric vehicles in the participating regions in Europe. The duration of the project is 2010 and 2011.

<sup>23</sup> The main objective of the Smartcity Málaga Project is to test key factors in "Smart Energy", as an optimal integration of renewable energies into the power grid. The ultimate goal is to demonstrate that with the development of these technologies, it is possible to achieve energy savings of 20%. The budget of the project is thirty million euros and the duration is from 2008 to 2012.

<sup>24</sup> The Japanese government, headed by NEDO (New Energy and Industrial Technology Development Organization of Japan), and some private companies (Mitsubishi Corporation, Mitsubishi Heavy Industries, Hitachi, Endesa, Telefónica and Sadiel) assume the financing of the project. The estimated budget is 62 million euros. The project will last four years (2011-2015).

points. Currently, forms of payment charging for the users are being studied, and they will be at low cost or free.

Málaga City Council currently has a bus, 5 porters and 16 motorcycles with electric motors. Also, there are three electric cars owned by private companies involved with the City on various projects. 275 units are expected for 2015, property of citizens and public administrations.

Beyond 2015, an exponential growth of all different kinds of EVs is expected: Passenger cars, scooters, motorbikes, taxis, buses and private and public companies fleets. To prepare the City for this mass expansion the adaptation of the electric grids, their management and a decentralized energy generation will be very important.

### **Initiative: Promotion and incentives**

To make it attractive for citizens to buy EVs, it is planned to combine public transport and EVs. Public transport contributes to accessibility, quality of life, social participation and sustainability, so the link with EVs will multiply benefits.

Municipal technicians are studying the technical and legal factors in order to introduce the ordinances of the city the use of EVs in bus lanes and restricted traffic zones for other vehicles. Moreover, setting charging points near public transport stations will be a priority.

In addition, the City is hosting the development of a car sharing experience in The Andalusia Technology Park (intermodality train + EV) that will propose some conclusions for a successful rollout.

The City of Malaga has introduced financial incentives as the reduction of local taxes. These incentives and actions will be in use before the market rollout of EVs in Málaga is set up, and preconditions and user acceptance are established.

### **Initiative: Green energy**

The City has been investing in renewable energy for the last five years, mainly installing photovoltaic systems on municipal buildings. The amount of this installations will be increased, not investing public funds, but giving private companies the opportunity to use the roofs of municipal buildings for this purpose. So users will have the chance to obtain green electricity for their EVs (regrettably the City Council doesn't have the competence to demand the operators to serve green electricity to EV users).



## 9. Malmö

### Local Background: The environmental Programme for City of Malmö

At 2009, the environmental Programme for City of Malmö, covering the period 2009 until 2020 was adopted. This programme is intended to function as a common starting point for continued environmental work in Malmö. One of the main environmental objectives for City of Malmö is to become Sweden's most climate friendly city by 2020. In order to reach this objective, we need to reduce energy consumption, increase the use of renewable energy and bring a transition in transport and travel. The goal is to reduce greenhouse gas emissions by at least 40 %, calculated from 1990.

At November 2011, municipal government adopted "Action plan for climate and environmental work in the city of Malmö in 2011-2014", explaining the action to be taken during this term in order to achieve the long-term objectives in the Environmental Programme.

In the Action plan there are 26 specific measures. These include improving the city's bicycle roads and pedestrian streets, greatly increasing the production of biogas and reducing the environmental impact of traffic by stimulating the market for gas and EVs. Other important parts are investing in green IT or building out of large-scale wind power or increase. Environmental work is to be done jointly between the municipality, citizens, companies and organizations.

### Vision: Malmö climate neutral by 2020

By 2020, the City of Malmö's own organization will be climate neutral and by 2030 the whole municipality will run on 100% renewable energy.

### Goals: To create good conditions for EV owners

To invest in electro mobility is a step in the right direction in order to reach Malmö targets regarding climate protection. This work has already started, the city has bought seven electric cars to its own fleet and is running several projects. Also cooperation with local energy supplier has been initiated.

In order to facilitate the establishment of EVs, City of Malmö will together with other organisations create good conditions for owners of EVs. By 2015 everybody who wants to use electric vehicle will be able to charge the vehicle within a reasonable distance from home or working place.

### **Initiative: Clean vehicle strategy for city's own fleet**

City of Malmö owns approximately 600 passenger cars. In order to stimulate the market, it is important to show a good example and be the first to use new technology. By 2015, all personal cars owned by the city will be clean vehicles<sup>25</sup>. Out of those, 75 % will be run by bio gas, hydrogen or electricity (including plug in hybrids). During 2015, new targets should be set for Malmö's Clean vehicle strategy.

### **Initiative: Charging infrastructure**

In order to reach large scale deployment of EVs, the charging infrastructure must be available for the drivers. Especially households living in central parts of the city, without garage parking need access to public charging infrastructure. But also the visitors and people working in the city must be able to safely charge their electric cars. The charging infrastructure must be user friendly and tailored after the needs of the users.

City of Malmö will only build up charging infrastructure for its own use and in the city owned parking houses. However, the city is cooperating with private organizations in order to facilitate the development of charging infrastructure on the both private and public land.

### **Initiative: Financial incentives**

The initial cost for electric vehicle is very high today, and thus creates a barrier for larger scale adoption of EVs. It is important to use incentives and other measures in order to initially stimulate the market.

From the 1<sup>st</sup> January 2012, the Swedish government will pay 40 000 SEK bonus to the first 5,000 private persons / businesses purchasing an electric vehicle. City of Malmö supports this activity, as it is very important for overcoming the initial barriers. However, also local incentives and other supportive measures will be introduced.

City of Malmö considers reintroducing reduced parking fees for EVs. Previous experiences with reduced parking fee for clean vehicles have shown that it had positive effect on new sale of clean vehicles.

The public, as well as other private shareholders do not have adequate information about EVs today. The city of Malmö will therefore work with promotion activities in order to increase the knowledge about the new technology and also about the benefits that EVs offer. An example for this is currently running Test households<sup>26</sup>, where 20 private families have opportunity to use electric vehicle for three months period. The experience the families gain during the test period is spread through press articles, social media and public events. In the coming years, information targeted to local businesses, seminars and test driving opportunities will be organized by the city.

---

<sup>25</sup> Clean vehicles include petrol and diesel cars emitting max 120 g CO<sub>2</sub>/km; E85 powered cars with max consumption 9,2 l / 100 km, nature / bio gas powered cars with max consumption 97 m<sup>3</sup> gas / 100 km and electric vehicles with max consumption 37 kWh / 100km.

<sup>26</sup> Test household project is an initiative within E-Mobility Malmö project, which is a cooperation between City of Malmö and E.ON. The project is running until the end of 2012.



Rome Municipality will replace petrol and diesel powered cars with EVs.

## 10. Rome

### Local background: Congestion problems

To better understand Rome situation it is worth to mention some preliminary data:

- Rome inhabitants: 2,761,477 (2010);
- Rome Municipality extension 1.308 km<sup>2</sup> (the biggest Municipality in Italy and one of biggest in western Europe);
- Motor vehicles circulating in Rome: 2.544.216;
- Motor vehicles/1000 inhabitants: 934 (Barcelona 390; London 330, Paris 310).

These few data make clear Rome situation where the intensive use of private vehicles (mostly cars and mopeds) has deep impact on several aspects:

- High level of pollutant emissions ;
- Congestion problems ;
- Road safety problems, mostly linked to the use of PTW;
- High land consumption due to parked vehicles;
- Economical growth problems due to congestion;
- Problems related to historical heritage preservation (both pollutants and vibrations due to traffic).

### Vision: Complete decarbonisation of the mobility in the city

Rome Municipality has decided to tackle the challenges above with a long term vision of the "Complete decarbonisation of the mobility in the city".

### **Initiative: Decarbonisation of the inner city centre**

The long term vision will be implemented with a step by step approach. The first step and objective is the decarbonisation of the inner city centre (the most important historical centre in world). This strategy is pursued following four different action lines:

- Expanding mass rapid transit system. New underground, tramway and bus lines are under constructions or planned.<sup>27</sup>
- Increasing the use of bicycles. Increasing the cycling lanes network, increasing bike sharing system, measures for boarding bicycles on public transport vehicles. Call for tender for a new bike sharing system should be published before March 2012.
  - Supporting and enhancing pedestrian mobility. Increasing pedestrian areas and dedicated paths. New pedestrian areas are foreseen to be implemented in 2013.
- Supporting and spreading of zero emission vehicles (e-vehicles) both in public and private fleets (see below).

This short report will focus on the activities supporting the spread of e-vehicles. The strategy addresses four groups of activities:

- Increasing public and private charging networks;
- Administrative support to e-vehicles spread;
- Increasing public e-fleet;
- New form of e-vehicles sharing.

### **Initiative: Charging networks**

Previous experiences of Rome Municipality on e-vehicles pointed out the absence of an effective charging network. To overtake this limitation, Rome Municipality involved Rome main Energy Utilities (ENEL and ACEA) in the process of defining a common framework. Rome Municipality, ENEL and ACEA have finalized, at the end of 2011, an agreement to define together:

- A common charging standard;
- A common business model to allow vehicle charging and the payment, in any charging point.

The charging standard and the business model have not yet been officially defined. In the meanwhile, Rome, in cooperation with ENEL and ACEA, is increasing its charging network:

- ENEL implemented 98 charging points in 2011;
- ACEA has planned to implement 200 charging spots within 2014, mostly in institutional buildings or close to big company buildings.

These activities are completely funded by the Energy utilities (ACEA and ENEL).

### **Initiative: Administrative support to e-vehicles diffusion**

Rome city centre is a Limited Traffic Zone (LTZ), where only authorized users can access with their private vehicles (the cost for this permission is actually 600 € per year). To support the diffusion of e-vehicles, since March 2011, the access to the LTZ is free<sup>28</sup>. Other measures are under evaluation,

---

<sup>27</sup> The new underground line C is now under construction and already existing. Line B is under improvement with implementation of Line B1. The Line B1, which is about 4 km long, should open in January-February 2012 if no major problems will occur. The first part of Line C (about 15 km) should open latest by the end of 2013.

<sup>28</sup> The Municipal Council deliberation n° 58 of 9 March 2011 authorized EV owner to access for free to the LTZ. To enter for free the LTZ, EV owner has to provide car plate number to the Rome Mobility Agency that will insert the



such as free parking and incentives, but Rome Municipality has not yet decided when to implement these new measures. These activities will be funded by Rome Municipality.

### **Initiative: Public e-fleets**

Concerning e-vehicle fleets Rome Municipality is well advanced. Rome has the biggest e-bus fleet of Europe; at the moment 50 e-buses are operating in the inner centre. The fleet will be increased up to 100 buses by the end of 2012. The new buses will be provided with air-conditioning and increased autonomy. The fleet increase will be completely funded by ATAC (Rome Municipality public transport company).

Rome Municipality has decided to renew its vehicles fleet and that of the controlled companies<sup>29</sup>. At least 20% of the new vehicles must be e-vehicles that means that among the 3,500 vehicles of Rome Municipality and its controlled companies by the end of 2015 700 will be e-vehicles. ACEA has decided to start immediately and has bought 40 e-vehicles and has planned to buy further 200 e-vehicles by the end of 2012.

This initiative will be funded by Rome Municipality and its controlled companies.

### **Initiative: Sharing of e-vehicles**

Although the Mass Rapid Transit network<sup>30</sup> is under strong development, the users mobility on the first and last mile needs still to be addressed effectively and efficiently. Rome aims at testing a possible solution for this issue: the MicroMobility.

MicroMobility (MiMo) aims to solve the last mile individual mobility problem, integrating conventional collective Public Transport (PT) with e-vehicle sharing, thus defining a real opportunity for PT to compete with private transport. MiMo stations will be spread on the territory allowing users to rent an e-vehicle (e-bike, e-moped or e-car) according to their needs<sup>31</sup>.

The first step consists in running a demonstration to better understand and specify:

- Technologies to be used in term of vehicles, charging and management systems (both hardware and software);
- Service billing system;
- System management plan considering also financial aspects;
- Business model.

The demonstration will be composed by 3 MicroMobility stations (about 45 charging points) and 45 e-vehicles (e-cars, e-mopeds, e-bikes). If the results of this demo will confirm the technical and

---

plate number in the authorized vehicles list. In this way, cameras checking the LTZ gates will automatically iconize the authorized car.

<sup>29</sup> Rome Municipality has several controlled companies, among the others: ACEA the main utility company in Rome for water and energy distribution, ATAC the public transport company of Rome and Roma Servizi per la Mobilità (Rome Mobility Agency).

<sup>30</sup> Nowadays the full extension of underground lines in Rome is about 37 km and the new Line C (full extension of about 25 km) and the new Line B1 (full extension of about 4 km) are under construction. These two new lines will double the underground extension of Rome in few years.

<sup>31</sup> MiMo is based on the integration of PT with individual transport system. The idea is to implement a dense network of stations (at least 40 in city centre) where users can rent small electric vehicles (such as a moped or a pedelec) to cover short distance trip. For long distance trip, over 3-4 km, users will be invited to use PT for the biggest part of the trip and MiMo just for the last mile.



economical feasibility of such solution, further development will be defined by Rome Municipality. The demonstration will be designed and implemented during 2012 and will run along 2013. The MiMo demo will be partially funded with Green eMotion funding, Municipality of Rome funding and private involvement.



As a UNESCO World Heritage site, Strasbourg's historical centre has to be protected as far as possible against pollution.

## 11. Strasbourg

### Local Background: A UNESCO world heritage

As a UNESCO World Heritage site, Strasbourg's historical centre had to be protected as far as possible against pollution and the invasion of the private car.

The City and the Urban Community of Strasbourg have been heavily involved for several decades in promoting sustainable transport solutions and are already prioritizing a variety of innovative and multi-modal experiments.

The City and the Urban Community of Strasbourg, which have long been committed to sustainable mobility, are seeking to encourage the development of less polluting vehicles.

### Vision statement: Promote a sustainable transport system

For the City and the Urban Community of Strasbourg, the environmental issue is, however, not limited to just promoting the use of public transport or clean travel options: the two authorities are currently involved in implementing a «Climate plan» which embraces globally the management of sustainable development for the whole urban area.

### Goals: Encourage the most relevant mode of transport

Starting from the principle that each mode of transport has its own «zone of relevance», the Strasbourg urban authorities opted to take the car out of the city centre and to encourage active travel modes and public transport instead.

Nevertheless due to rapid expansion of peri-urban zone, the car is still used for 46% of daily trips in Strasbourg. Thus, one main goal is to keep efforts to reduce car usage by keeping it at its right place.

Recently, the appearance of new generation of electric vehicle and plug-in hybrid vehicles in the urban landscape gives an opportunity to improve air quality and reduce green house effect. Accordingly, Strasbourg is encouraging less polluting car technology like electric vehicle but with no exclusiveness.

### **Initiative: Limit the car usage in city centre**

Numerous measures (a dissuasive traffic plan, parking charges) were then implemented to limit the use of cars in the city centre. At the same time, relevant effective alternatives were proposed aiming at ending the omnipresence of the car in the city centre: between 1990 and 2009, the number of vehicles entering the city fell by 28%.

### **Initiative: The Kléber project**

For the Kléber experimentation<sup>32</sup>, Strasbourg is not only acting as the location for the deployment of seventy of plug-in hybrid vehicles. Together the City and the Urban Community are both playing an essential role, alongside EDF<sup>33</sup>, in the installation of a network of special charging infrastructures, which will enable users of this new type of plug-in hybrid vehicle to charge them at home, in the partner companies, but also in public places, public car parks or by the roadside in the city centre.

The City and the Urban Community of Strasbourg are involved at different levels in this project, with an investment of over €100,000:

- Along with several other private and public establishments based in the urban area, Strasbourg is a user-tester of these prototypes, as it is hiring 5 of these new plug-in hybrid vehicles;
- Strasbourg contributes to the installation of charging points in nine car parks in its urban area;
- Strasbourg will encourage connection with tram with charging points at parking location connected to the tram network.
- Strasbourg is setting up roadside stations equipped with free charging infrastructures dedicated to EVs and plug-in hybrids;
- Strasbourg encourages the use of plug-in hybrids in car sharing program Auto'trement<sup>34</sup> by providing dedicated parking places and financial support as well.

### **Initiative: Future charging infrastructure**

Strasbourg City considers that most of charging events should occur at private places at home or in businesses. At home or workplace and based on national plan, 3kW charge will be promoted. On public places, City role is to develop a real public service by providing “reinsurance” charging infrastructure where the use of the car is relevant.

---

<sup>32</sup> Kléber experimentation: Toyota and EDF have been developing since 2007 the Kléber pilot project for conducting tests on plug-in hybrid vehicles combined with communicating charging technologies. In April 2010, the second phase of the project was launched. It comprises a demonstration, in real-life conditions in Strasbourg and its region, concerning 70 plug-in hybrid vehicles and a network of dedicated charging infrastructures. This ambitious and pioneer program is supported by ADEME (the French Energy Efficiency Office) within the framework of its “Demonstrators Fund” research program for vehicles with zero-emission of greenhouse gases, and benefits from the valuable support of the City and Urban Community of Strasbourg.

<sup>33</sup> Auto'Trement the car sharing program started in Strasbourg in October 2010 has now 90 vehicles (mainly with internal combustion engines) split up into 50 stations.

<sup>34</sup> EDF: Electricité de France is the major French utility and also the world's leading nuclear energy company, with solid positions in major European countries

Accordingly, Strasbourg will not encourage slow charging on curbside but will promote implementation of charging points away from town center preferably inside parking lots that are connected to the tram network in order to avoid car usage in the town center and to encourage multi-modal mobility.

Other locations like airport, or malls outside of the town center will be considered also. Strasbourg consider that fast charging has an important role to play as reinsurance service and consider that the municipality should be able to provide this service with limited but well advertised charging points.

According to national plan, all charging points should be available to everybody by giving the opportunity for a new customer to subscribe to the service at the charging point.

Regarding the deployment rate of the infrastructure, Strasbourg will have a pragmatic attitude by providing a sufficient number of charging points at relevant locations observing the real development of EVs and plug-in hybrid vehicles in the urban community.



Better Place's vision is to be the leading provider of services to EVs and thereby help to accelerate a shift to sustainable transport.

## 12. Better Place Denmark

### About Better Place Denmark

Better Place was founded by Shai Agassi in 2007 and is headquartered in Palo Alto, California. Better Place Denmark was established in February 2009 and is owned by Better Place Global and the Danish energy company DONG Energy, which is a minority shareholder.

Better Place's vision is to be the leading provider of services to EVs and thereby help to accelerate a shift to sustainable transport. Better Place offers an infrastructure and a range of services that make an electric car financially attractive to buy, easy to use and great to own. It is a huge challenge that requires new solutions and cooperates in all branches of the new global transportation ecosystem.

### How to develop a successful electromobility strategy

The municipalities play a pivotal role in bringing the EV to the market and in revolutionizing the transport sector. When deploying charging points in public or semi-public environment the municipalities are key stakeholders in identifying where to deploy. The municipalities possess very important information on all relevant parking spots, e.g. is it parallel parking? Easy access to this kind of information makes deployment easier to prioritize. In order to develop a strong relationship with the municipalities and make it easy for the municipalities to influence Better Place's deployment strategy, Better Place Denmark has created a special website for municipality partners, where municipality staff can access a closed site. Here it is possible to a) get an overview of the deployment progress in the municipality and b) suggest new locations for deploying charging points.

Better Place Denmark have a number of suggestions on how municipalities can make their electromobility strategies concrete and potentially lead to a faster transition into EV-based transportation in Europe. The recommendations are divided based on their nature.

## Strategic anchoring

'Strategic anchoring' refers to how the municipality ensures an optimal coordination and implementation. The municipality must do the following:

- Integrate the strategy in the overall Municipality Plan so the strategy is anchored at highest level.
- Ensure cross-sectorial coordination of electro-mobility strategies. The municipalities should coordinate actions across environmental departments, building departments, procurement departments etc.
- Ensure coordination across local, regional and national authorities.
- Communicate the electromobility strategy towards a broad range of stakeholders: Residents, companies, educational institutions and the municipality staff.
- Use the municipality's urban development plans and construction plans to leverage the infrastructure roll-out. The future need for EV-infrastructure should be incorporated in all new-constructions as well as urban renewal projects. This should also include encouraging housing associations or housing agencies to invest in charging infrastructure as part of their property and maintenance investments.

## New procedures

'New procedures' refers to the lack of case work processes in the municipalities.

An electromobility strategy should address how to ensure access to charging for potential customers with no access to private parking, i.e. residents in urban areas with no private parking. This could be done by allowing exclusivity for EVs on selected parking areas and ensure that the capacity follows the demand. This could be implemented by allowing private service providers to gain concession on running these public – but EV-exclusive - parking spaces. Procedures for construction and operation of EV-exclusive parking space is needed. The following issues needs to be considered when developing charging parking lot/areas:

- The concessions should be given in periods which are long enough for private service providers to get a satisfying return on investment as public EV infrastructure is currently expensive to deploy with a high risk.
- Concessions should be given to a certain amount of parking spaces so the service provider doesn't have to apply for new spaces each time a new customer in the area signs up. The concession could for example be given for 10 parking spaces. If the service provider only has 5 customers they might only deploy 5 charging points for its customers initially and might only reserve those 5 parking spaces for EV's. As more customers arrive the service provider can expand the parking lot up to the maximum spaces without having to re-apply for the concession, but maybe just informing the municipality about it each time the number of spaces are increased between the initial 5 and up to the 10.
- The municipality should have an easy procedure for extending the concession in time and expanding the number of parking spaces.
- The municipality should together with the service provider define "overhead" requirements for the parking lot. The "overhead" should be additional charging points for visitors who are not living in the area. For example if the service provider have 5 customers in the area the overhead could be defined as 2 extra spaces and charging points – resulting in a total of 7 parking spaces and 7 charging points to serve the 5 customers who are registered on the specific site.
- Better Place thinks that the municipalities should convert their own fleet to EVs. The municipalities should consider how calls might prevent EV operators to bid, how calls can be used to stimulate the conversion from conventional cars to EVs. The municipalities could also

consider how they can stimulate a similar conversion among suppliers of e.g. taxi driving through their calls for tenders.

## Incentives

Incentives refer to a number of actions the municipalities should consider in a short term. Incentives should mainly be used in a transition phase until the EV is a 100% competitive solution for the consumer.

- Free EV-parking in city centers. Exemption from parking fees has been adopted in a number of cities around Europe. Among these are Oslo and Copenhagen. The total cost of ownership of an EV compared to an ICE<sup>35</sup> car is still not competitive in many aspects. This type of incentives would make a huge difference for potential customers in both B2B and B2C segments.
- Allow EV-driving in bus lanes: In Oslo EV-drivers have been allowed to drive in bus lanes, which is a huge incentive for the drivers spending much time on busy routes on a daily basis.
- Give a special scrap premium to residents converting from conventional cars to EV.
- Develop a “bonus programme” similar to the ones used by airplane companies, which gives certain benefits to climate conscious residents or companies.
- Exempt EVs from congestion fees. More and more municipalities impose congestion fees on drivers in order to improve city environment and health of its citizens. Due to the advantages of EVs, one could argue for an exemption from congestion fees.
- Parking lots only for EVs. It is essential that there will be established parking lots only for EVs in the cities. First of all it is necessary in order for the EVs to be able to access charging points deployed in the public streets. Secondary it will be a good incentive for people who can otherwise have a hard time finding parking in cities.

## Awareness and behavior change

‘Awareness and behavior change’ refers to how municipalities can stimulate electromobility through communication activities.

- Give residents a chance for testing an EV. Getting people inside an EV and test it is one of the most effective actions towards removing psychological barriers.
- Brand municipality-owned EVs visibly in order to raise awareness. The new generation of EVs, including Renault Fluence ZE and Nissan Leaf, do not look any different than any modern internal combustion car. Therefore, branding of municipality-owned EVs could raise awareness and visibility of EVs in the streets. The customers need to know that the transition is taking place now.
- Support driving schools using EVs. Driving schools are the first behind the wheel for many drivers and therefore a good opportunity to show the future generation of drivers that EVs are real alternatives and a very good driving experience.

## Ensuring “Open Access”

In the recent year Better Place has experienced that an increasing number of local authorities impose requirements of “open access” when deploying charging infrastructure in the public sphere. In many cases there are no clear definitions of open access. As infrastructure operator, Better Place sees a huge need for regulating the deployment of infrastructure more than what is the case today. We need

---

<sup>35</sup> internal combustion engine (ICE)



to ensure that the infrastructure is fulfilling certain criteria. However, in these early stages of deployment of EV-infrastructure policy-makers must be careful not to adopt rules and regulation that is hampering private investments. Rules and regulation on open access should focus on ensuring that private actors comply with a number of principals. Better Place considers the following topics as the most crucial:

- Safety
  - Safe installation carried out by authorized installers
  - Comply with “mode 3” standards
  - No use of extension cords
- Controllability
  - Charging points can be remote controlled
  - All charging points controlled and managed centrally by an operator
  - Ensure increasing integration of intermittent energy resources
  - Protect the existing energy infrastructure
- Openness
  - Comply with international standards
  - Assure that all any EV driver fulfilling the above criteria has open access to infrastructure either through roaming agreements or other feasible solutions including pre-paid cards, apps etc.

In short, a successful transition to electromobility in Europe will be the result of strong private-public collaboration. Private actors are willing to make the necessary investments in infrastructure, cars, services etc. if governments – local as well as regional, national and European – will create the necessary framework conditions. The recommendations above are reflections of Better Place’s practical experiences with deployment of a nation-wide EV-infrastructure and service model in Denmark. Based on these experiences it is suggested that the municipalities make a strategy that goes across all relevant and involved local authorities and that it ensures of strategic anchoring, effective procedures, strong financial incentives as well as increased public awareness. Finally, a couple of ideas about open access to charging infrastructure were shared. As private operator Better Place experience more often requirements of open access when deploying charging points in public sphere. These criteria are very important but if imposed in the wrong way they can be very destructive in terms of investments from private actors.