Electric Vehicles in Urban Europe
Baseline Report

URBACT II network

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http://urbact.eu/en/projects/low-carbon-urban-environments/evue/homepage/

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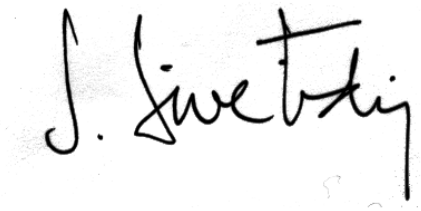
Foreword

I am delighted to introduce this Baseline Report for the Electric Vehicles in Urban Europe network. It sets the stage for what promises to be an exciting programme of activities that will help partner cities to make sustainable investment and delivery choices.

In London we know that we need to make electric cars, vans and motorbikes an easy choice. If we're to really achieve a revolution in green travel and meet the Mayor of London's own target of 25,000 charging points by 2015, we need to find ways to make installing them faster, cheaper and simpler.

By sharing knowledge and best practice with other European cities we can ensure that we are all at the forefront of technological developments, so that we offer a clean, green and economical alternative to petrol and diesel. It is in all our interests to make our cities more attractive and more competitive. So we welcome the opportunity to work together to get more electric cars on our streets quickly. I look forward to seeing the positive results of the network over the next two and a half years.



Dr Savas Sivetidis,

On behalf of Westminster City Council

1 Background and Introduction

1.1 URBACT

URBACT is a European exchange and learning programme promoting sustainable urban development.

It enables cities to work together to develop solutions to major urban challenges, reaffirming the key role they play in facing increasingly complex societal changes. URBACT helps cites to develop pragmatic solutions that are new and sustainable, and that integrate economic, social and environmental dimensions. It enables cities to share good practices and lessons learned with all professionals involved in urban policy throughout Europe. URBACT is financed by the European Union (European Regional Development Fund).

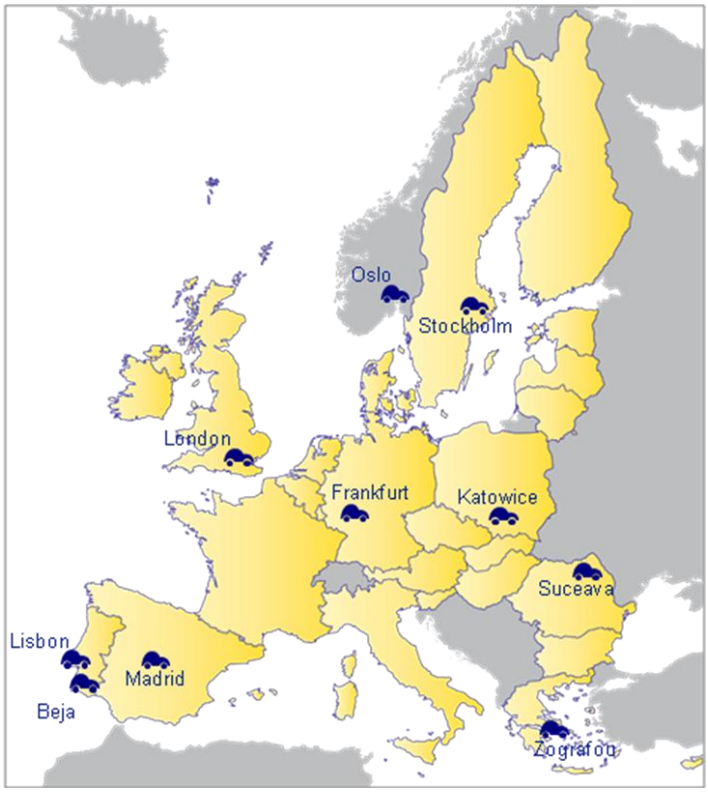
1.2 EVUE

EVUE stands for Electric Vehicles in Urban Europe. It is an URBACT Thematic Network of ten cities, led by Westminster City Council in London. The overall aim of EVUE is to explore, exchange and implement ideas on how cities can develop integrated and sustainable strategies to increase the use of electric vehicles. The objectives are to:

- Promote exchange of experience and learning amongst policy makers and practitioners about introducing electric vehicles as part of an integrated and multimodal transport plan
- Disseminate the lessons drawn from the exchange and ensure transfer of knowledge, and maximise the impact of the transnational exchange, both within the EVUE partnership and beyond.
- Support better action planning for city wide transport polices that incorporate introduction of electric vehicles
- Speed up the policy innovation processes and contribute to an information base for the 'long term revolution' of clean car use in European cities

The EVUE partner cities are:

- Westminster City Council, UK, Lead Partner
- Lisbon and Beja, Portugal
- Madrid, Spain
- Frankfurt, Germany
- Oslo, Norway



- Stockholm, Sweden
- Suceava, Romania
- Zografou, Greece
- Katowice, Poland

The ten cities represent a good geographical spread, a balance between Competitiveness and Convergence regions of Europe and a range of electric vehicle knowledge levels, from some of the most advanced cities to those starting from zero in challenging conditions.

EVUE belongs to the URBACT Thematic Pole of Low Carbon Cities. Its results will feed into European sustainable development policies, linked to urban environment, transport and mobility.

1.3 Baseline Report

This Baseline Report is a requirement for the Development Phase of all URBACT projects. It aims to:

- build knowledge of issues in each city
- deepen and share understanding of the way that related policy has developed elsewhere in Europe and at EU level
- develop a shared understanding of the issues, needs and research agenda for the network's implementation phase.

The methodology used to compile this report was

- Desk research
- Baseline questionnaires
- City Visits
- Network meetings
- Validation workshop

This Baseline Report serves as a tool to build the foundations for the Implementation Phase of EVUE. The conclusions and recommendations in Section 4 will form the basis for the work plan and determine the priorities and actions to be undertaken within the network between June 2010 and December 2012.

1.4 Definitions

Throughout the Report the term electric vehicles is used. This includes both Electric Vehicles and Plug in Hybrid Electric Vehicles (PHEV).

Electromobility is an umbrella term for all vehicles using electricity as a vector, including buses, trolleybuses, pedelecs, and freight vehicles.

The focus of EVUE is primarily on electric cars for use in public and private sector fleets, as well as individual and family use. Some partners will also share experience of some other forms of electromobility, such as pedelecs and buses.

EVUE Partners at the Kick Off Meeting, London, February 2010

2. Overview

This chapter presents an overview of the development of electric vehicles to date. It starts with international trends and historical developments, including the lessons learnt from pilot actions in Europe so far. It highlights the most relevant European policy initiatives and summarises a number of relevant European networks, projects and funds. It then outlines the perspectives and challenges for the key stakeholders involved in the emerging electric vehicle market. It concludes with a summary of the outlook for cities.

2.1 International trends

The world appears to be on the cusp of an automotive revolution, with global demand for eco-friendly cars expected to soar in coming years. The trend is driven by concern about the impact of conventional cars on global warming, signs that the world is running out of petrol and European dependence on foreign oil.

Electric vehicles are part of this revolution alongside other models that run on natural gas, biofuels and hydrogen.

Several European countries, as well as the US, Japan, China and others, have recently announced bold plans for the introduction of electric vehicles. These include fiscal incentives, funding research on batteries and electric vehicles and plans for the deployment of a charging infrastructure. Major cities such as London and Paris have announced electric car-sharing systems, while public administrations and companies using large captive fleets are purchasing electric vehicles.

In many **European** countries, regions and cities, public authorities have started to design, adopt and finance strategies designed to increase the uptake of electric vehicles, and to pilot local electromobility programmes. The significant resources being invested demonstrate the level of commitment to make electric vehicles a reality in cities.

The initiatives are linked with policies to support car industry to move into greener technologies, often as part of economic recovery plans. The aim is to accelerate the transformation of the automotive sector to a low carbon economy, recognizing that manufacturing electric vehicles and key components (like energy storage systems) is important for competitiveness. Examples include the plan for the development of clean cars announced by the French government with a target of two million electric vehicles by 2020[i] and the German national development plan for electromobility with a target of one million electric vehicles in the same time frame[ii].

The International Electric Vehicle Symposium in Norway[iii], motor shows and exhibitions confirm the market trend, with strong participation from the range of agencies involved in electromobility as a system beyond the vehicle such as ICT, charging solutions, after sales services, marketing.

The **United States** has made ambitious plans**.** The Department of Energy (DOE) provided 2.4 billion US Dollars in federal funding through the American Recovery and Reinvestment Act of 2009 (ARRA)[iv] to

support the development of advanced electric drive vehicles. It published a battery roadmap for the next five years that indicates a rise of energy density by a factor of two, an increase of battery lifetime by a factor of three, and a drop in cost to 30% of today's values.[v] In early August 2009, the DOE announced funding for 48 advanced battery and electric vehicles projects.[vi] The Transportation and Domestic Fuel Security Provision gives a tax credit for buyers of plug-in electric vehicles. The amount is US $2,500 plus an additional $417 per kWh for batteries greater than 4kWh. The credit will be applied to the first 250,000 plug-in cars sold in the US and will be phased out to 50% for the following two quarters, and 25% for the two quarters after that before ending. The total cost of the credits will be US$ 758 million.

In **Japan**, a first fleet of 100 electric vehicles equipped with lithium ion batteries was tested in 1999. In order to maintain its national position the Japanese Ministry of Economy, Trade and Industry (METI) considers that a further increase in battery performance by a factor of three, and a decrease of costs to 20% of today's values are required in the next ten years.[vii] The plans will be supported by the implementation of infrastructures, standards and regulations.

The **Peoples' Republic of China**[viii] is making vast progress in manufacturing lithium ion battery technology for electric vehicles. The government has a national programme in place to attract foreign companies to set up joint ventures and partnerships with Chinese companies. China, along with Bolivia, is in a strong position to control the natural resources required to produce batteries and electric machines, such as lithium, thus leading to a global monopoly which risks replacing oil with lithium dependency.

India's vehicle manufacturers are very active in developing production capacity for electric vehicles, and **South Korea** is implementing an ambitious national programme.

Another forerunner is **Better Place**, a US company that acts as global electric vehicle services provider, catalyzing the transition to sustainable transportation. It builds and operates the infrastructure and systems to optimize energy use and integrated solutions. Better Place has contracts to develop electric vehicle services in Denmark, Israel, Australia, the USA and Japan.

National electric vehicle plans and incentive schemes for EVUE partner countries are summarised in Annex 1.

It is clear from these international trends that electric vehicles will play a strong part in the future of transport. For Europe to maintain its competitiveness, it must not only participate, but lead in the development and implementation of this new paradigm.

2.2 Lessons learnt in European cities

The production of electric vehicles began as far back as 1838 – 52 years before combustion engine vehicles. However, after 1913 the mass commercialisation of the combustion engine led to a rapid decline in electric vehicles. They re-appeared in the late 1990s and early 2000s, most often used by public workers and energy utility companies. Simple public charging stations appeared and were made commercially available. France, in particular, took a leading role in introducing technologically reliable electric cars into fleets of numerous energy providers, local authorities and businesses. For example, in La Rochelle electric cars were successfully introduced in a car-sharing service open to everyone, and electric vans had a broad spectrum of users

including many courier companies and craftsmen.

Rotterdam worked on a large lightweight hybrid electric city bus, whilst, within the ELCIDIS project, Stockholm introduced hybrid electric delivery trucks (large E-vans and HE-trucks produced by Daimler). Of the 600 battery electric cars introduced in Sweden over 300 are still in operation. At the end of the 1980s, Denmark developed electric light vehicles (Kewet, Mini-el/Ellert) suitable for short distance commuting purposes. These vehicles are still being produced and marketed by SMEs in Norway

A Buddy driver plugs in.

(Kewet/Buddy) and Germany (City-El, about 6,000 vehicles produced).

Despite limitations in performance, autonomy and comfort, drivers and fleet operators were generally satisfied with these vehicles. However, it remained a niche market with no breakthrough into the mainstream. The barriers identified by these pilots included the high cost of the vehicles compared to conventional cars, limited experiences with the different energy storage systems, and unrealistic expectations.

In the late 1990s, several national (PREVIEW, NL, Elektrofahrzeug Großversuch (Rügentest), DE) and EU demonstration projects related to electric and hybrid vehicles were established in the framework of the THERMIE and JOULE programmes (e.g. ELCIDIS, EVD-Post, Sagittaire, E-Tour for electric two-wheelers, etc.) Various European cities took part in these initiatives. The technology was still immature and there were many technical difficulties during everyday operations which prevented wide scale deployment of the vehicles. More recently, electric vehicles were deployed for captive fleets in urban mobility projects for particular purposes (for example, VIVALDI, MIRACLES, TELLUS).

These projects listed above proved extremely useful to identify major challenges and formulate recommendations. Among the lessons learnt, the development of more reliable and better performing batteries was seen as crucial for all types of electric vehicles. User acceptance studies showed that the battery electric vehicles (BEV), also known as pure electric vehicles, were well liked[ix]. But the promised driving range was often unrealistic and insufficient. In addition, there were long waiting times for spare parts, which were considered unacceptable, and, sometimes after sales services were inadequate.

The diversity and attractiveness of vehicles needs to be increased to provide consumers with comparable choices between ICE and electric vehicles. The price-performance ratio and the overall reliability of these vehicles should meet the high standard that has been reached with ICE vehicles. In order to overcome the high battery price, a split between the costs of vehicle and batteries was recommended. For all users in the above mentioned projects, home-charging equipment appeared to be sufficient, although the availability of public charging points was seen as a confidence boosting measure for using the vehicles.

Lessons about energy efficiency and how this should be calculated over the car's lifetime have been and continue to be an integral issue with electric vehicles. With a tank-to-wheel efficiency in the range of 60 to 80 %, they outperform conventional cars four-fold. Compared to conventional vehicles, and based on the current average European electricity supply, electric vehicles have 50 % less emissions. Further benefits can be achieved if the carbon intensity of power generation continues to decrease with further greener and renewable energy sources. Indeed the greatest potential for CO_2 reduction lies in the opportunities for using energy from carbon-free and renewable primary sources for transport. More about this is in Section 2.5.3

In the broader context of electromobility, a number of EU cities are now using electricity as an energy vector for road transport in cars, buses, trucks, waste collection vehicles, etc. While the market for hybrid electric vehicles (HEV) has accelerated, plug-in hybrid electric vehicles (PHEV) and battery electric vehicles (BEV) remain for the moment in their niches.

Experiences in European cities of introducing other clean vehicle technologies like ethanol, CNG, or bio fuels have highlighted that the whole chain of vehicle providers, sellers, maintenance, repairs, spare parts, fuelling/ charging infrastructure, fuel/electricity providers, incentives providers and neutral information providers have to work together and simultaneously to overcome the barriers to clean car market development. The EU funded BEST (Bio Ethanol for Sustainable Transport) project showed that it is possible for a city to influence the market spread of cars.

These lessons should inform future urban policy on electric vehicles.

2.3 European policy

This section references the EU Transport, Energy and Environment policies most relevant to electric vehicles.

2.3.1 EU climate and energy package 2009

Transport accounts for about a quarter of the EU's emissions of carbon dioxide, CO2 – a key greenhouse gas. It is the only sector with growing emissions.

The EU climate and energy package which became law in June 2009 set a series of demanding climate and energy targets to be met by 2020. These are:

- A reduction in EU greenhouse gas emissions of at least 20% below 1990 levels.

- 20% of EU energy consumption to come from renewable resources
- A 20% reduction in primary energy use compared with projected levels, to be achieved by improving energy efficiency.[x]

The reduction in CO2 emissions that electric vehicles can deliver and the potential to harness renewable energy sources and smart grids make are important for city 20:20:20 targets.

2.3.2 EU Legislation on car fleets

EU car fleet targets have been a major driver for the car industry to increase production of cleaner vehicles. Regulation (EC) 443/2009 of 23 April 2009 set emission performance standards for new passenger cars as part of the Community's integrated approach to reduce CO_2 emissions from light-duty vehicles. Key elements of the regulation are:

Limit value curve: the fleet average to be achieved by all cars registered in the EU is 130 grams per kilometre (g/km). A so-called limit value curve implies that heavier cars are allowed higher emissions than lighter cars while preserving the overall fleet average.

Phasing-in of requirements: in 2012, 65% of each manufacturer's newly registered cars must comply, on average, with the limit value curve set by the legislation. This will rise to 75% in 2013, 80% in 2014, and 100% from 2015 onwards.

Lower penalty payments for small excess emissions until 2018: If the average CO_2 emissions of a manufacturer's fleet exceed its limit value in any year from 2012, the manufacturer has to pay an excess emissions premium for each car registered. This premium amounts to €5 for the first g/km of excess, €15 for the second g/km, €25 for the third g/km, and €95 for each subsequent g/km. From 2019, the first g/km of excess will cost €95.

Long-term target: a target of 95g/km is specified for the year 2020. The methods for reaching this target and aspects of its implementation, including the excess emissions premium, will have to be defined in a review to be completed no later than the beginning of 2013.

Eco-innovations: because the test procedure used for vehicle type approval is outdated, certain innovative technologies cannot demonstrate their CO_2-reducing effects under the type approval test. As an interim procedure until the test procedure is reviewed by 2014, manufacturers can be granted a maximum of 7g/km of emission credits on average for their fleet if they equip vehicles with innovative technologies, based on independently verified data.[xi]

2.3.3 European legislation on electric vehicles

Although the operation and maintenance of electric road vehicles within the European Union is clearly regulated (usually at national levels, but also on EU level, such as Regulation No 100 of the Economic Commission for Europe of the United Nations (UNECE) concerning the approval of battery electric vehicles), electromobility is only marginally referenced in EU legislation. The reasons for this are the limited knowledge from mostly isolated research projects in the past which could not demonstrate the comparative advantage compared to conventional vehicles, but also the fact that EU legislation avoids differentiating between particular fuels or vehicle types. However, it is increasingly accepted that electromobility includes a wider dimension in terms of operation and services, with benefits on energy security and environmental impacts. The most relevant pieces of legislation are:

- Directive 2009/33/EC of the European Parliament and of the Council of 23 April 2009 on the 'promotion of clean and energy-efficient road transport vehicles' ; and
- The Action Plan on urban mobility [COM(2009) 490], particularly Action 10 – Research and demonstration projects for lower and zero emission vehicles.

2.3.4 Communication on Transport 2009

In June 2009 the European Commission adopted the Communication 'A sustainable future for transport: Towards an integrated, technology-led and user friendly system'.[xii] It aims to launch a debate on the main challenges and opportunities for the transport sector in the next 20 to 40 years. It states that the 21st century will most likely see the replacement of ICE vehicles by electric vehicles.

2.3.5 Discussion paper on electric vehicles 2010

In February 2010, the Spanish Presidency of the EU launched a discussion paper aimed at boosting the electric vehicles industry in Europe. The discussion paper is very positive about Electric Vehicles, stressing that "Hybrid and electric vehicles will play a big role in tomorrow's mobility". It addresses electric vehicles in the broad sense, including pure electric, hybrid, plug-in hybrid, and extended-range electric vehicles.

The paper draws a brief analysis of the potential, opportunities and challenges that are likely to arise from an increase in battery-powered mobility. It seeks to establish broad political understanding concerning action required at the European level, noting that clear European guidelines are necessary to ensure consistency between member states.

The paper's launch meeting in February 2010 concluded that electric vehicles are the future of transport and that the EU should draft a European strategy to address the obstacles facing their implementation. .[xiii]

Two major *electric vehicle associations* have provided a response to the Discussion Paper. Going Electric – the European Association for Battery electric vehicles and AVERE[xiv], the European Association for Battery, Hybrid and Fuel Cell electric vehicles welcomed the initiative of the Spanish Presidency. In their response they stress the importance of the following when elaborating a European electric vehicle strategy.

1. Vehicle type benefits and categorisation:

Battery electric vehicles (BEVs) are the most sustainable technology, but they are mostly suitable for relatively short distances, such as daily commuting and urban trips, which represent about 80% of the mileage driven worldwide by cars.

Extended-Range electric vehicles (EREVs), such as the upcoming Opel Ampera, are BEVs complemented with a small engine powering an on-board generator that turns on once the batteries are empty. They are very sustainable because they can fully operate in electric mode over short distances (80% of the mileage) while

producing less emissions than equivalent fuel cars during long trips (20% of the mileage).

Going Electric and AVERE propose a new category for Ultra-Small Urban electric Cars (USUC), and possibly one for Ultra-Narrow Urban electric Cars (UNUC) that are now entering the market.

2. Infrastructure priorities

Regarding charging infrastructure, the electric vehicle associations argue that governments should first concentrate on making it possible for electric vehicle drivers to charge close to where they live.

Once batteries are capable of charging in less than 15 minutes, BEVs will be able to compete on long trips. Only then, they argue, will it be worth installing fast charging stations on road networks.[xv]

2.3.6 EU's proposed Strategy on Clean and Energy Efficient Vehicles

In the course of 2010, the Commission aims to establish a European strategy on clean and energy efficient vehicles. The strategy will propose action in the areas where it can have distinct added value and complement the actions taken by industry, national and regional public authorities.

In addition to the existing and proposed legislation on the CO_2 emissions of light-duty vehicles outlined above[xvi], this strategy will provide part of the response to the challenge of sustainable mobility. It will contribute to climate change action, improving air quality and to addressing Europe's dependency on fossil fuel resources.

It will provide industry with a medium term orientation (up till 2020) so that it can successfully restructure, anticipate the skills that will be necessary in line with the evolving technology and maintain its competitive edge with regard to clean technologies. The strategy will aim to strike the right balance between economic competitiveness and environmental goals.

The European strategy for clean and energy-efficient vehicles will be composed of two pillars:

I. Promotion of technologically advanced, clean and fuel efficient vehicles based on the internal combustion engine, while ensuring that all available measures are taken to reduce emissions and fuel consumption.

II. Promoting and facilitating the market uptake of alternative vehicle propulsion technologies, which is expected to lead to a step change in mobility. The main focus of this pillar will be on fully electric and plug-in hybrid vehicles3, reflecting the building momentum behind these technologies both in national support programmes and industry plans.

In response to the EU's proposed strategy, *car manufacturers* have emphasised the need for continued research into electric vehicle technologies so as to create viable products. They argue that for the foreseeable future, meaning well beyond 2020, the ICE will remain the dominant propulsion system for road vehicles. For an increasing share of passenger and light goods vehicles, the ICE will be combined with an electric motor in a hybrid vehicle, ranging from micro to plug-in versions. (See section 2.5.2 for forecast global market shares)

The carmakers argue that continued research into all these technologies is necessary. Pure battery electric and hydrogen fuel cell vehicles are advancing in terms of utility and cost. The technologies available will enable a full spectrum of combinations of conventional and electric drive, from pure ICE vehicles to pure electric.[xvii]

2.4 EU projects and networks

This section lists some of the most relevant EU projects and networks with regard to electric vehicles. They will be part of a two way exchange, providing both sources of information and targets for dissemination of results for EVUE.

2.4.1 European Green Cars Initiative

The European Green Cars initiative[xviii] provides 5 Billion euro of financial support for research into the green technologies that will propel cars, trucks and buses in the near future. These will take the form of grants from the European Commission's scientific research budget and loans from the European Investment Bank.

The initiative is a response to the global economic crisis which has impacted vehicle production and sales in Europe.

Research will be funded in a variety of areas such as greener combustion engines for trucks, bio-methane, and electric and hybrid vehicles and infrastructure.

These financial support measures are supplemented by demand-side measures, involving regulatory action by Member States and the EU, such as the reduction of car registration taxes on low CO_2 cars to stimulate car purchase by citizens.

2.4.2 EVA

The EVA (Electric Vehicles for Advanced cities) consortium, coordinated by the city of Rotterdam, hopes to secure funding from the European Commission as part of the Green Cars Initiative. (See 2.4.1)

The consortium of 19 cities and regions (including EVUE partners Stockholm, Lisbon, London and Madrid), 11 electricity suppliers and 13 carmakers have joined forces in a bid to undertake a major effort to accelerate the adoption of electric vehicles.

EVA plans to gather information from the deployment of over 9500 electric vehicles on European roads to support their integration into urban environments for local journeys and to accelerate rollout. Carmakers already committed to the project include BMW, Fiat, Mitsubishi, Nissan- Renault, Peugeot and Volvo.

The partnering cities and regions already boast 14,000 charging points and so could also serve to investigate vehicle-to-grid interactions.

If successful, EVA could become the largest ever European demonstration of electric vehicles. It would support the development of standards, recommendations and roadmaps for the general deployment of electric vehicles. EVA could contribute to legislation related to the promotion of clean and energy efficient vehicles, public / private procurement, environment, research and others.

The outcome of the EVA bid will be known in June 2010.

2.4.3 The E3Car (Energy Efficient Electrical Car) Infineon Technologies AG.

The E3Car[xix] (Energy Efficient Electrical Car) project brings together 33 automotive companies, key suppliers, and research

facilities from a total of eleven countries to collaborate on boosting the efficiency of electrically-driven vehicles by more than one-third. The goal of the project is to extend the travel range of electric vehicles by up to 35%, with a battery unit of the same size as a current baseline. This means that battery units up to 35% lighter and more compact, which provide the same travel range, will be possible. It is hoped that the results of the E3Car project will help make Europe the world leader in the advancement and production of electric vehicles.

As part of the E3Car project, and by the end of 2011, Europe is targeting research on innovative electronic components that play a key role in electric vehicle power consumption. Research will focus primarily on semiconductor components and power modules that control the supply and distribution of power in electric vehicles. These are used in the powertrain, which consumes most of the car's energy, as well as in power converters and lithium-ion batteries. Project efforts are concentrated on extending the travel range per battery charge, on integrating components to make the battery, charge unit and power distribution network lighter and more compact, and on increasing the efficiency of the power converter so that as much battery charge as possible is used to drive the vehicle and is not lost through heat dissipation.

2.4.5 Polis

Polis is a network of European cities and regions working together to develop innovative technologies and policies for local transport. Set up in 1989, the network brings together local and regional authorities and transport-related organisations to develop integrated transport strategies. The political group of Polis formulates recommendations to the European institutions. EVUE cities, Frankfurt, Madrid and London are members of the Polis network.

2.4.6 CIVITAS

The CIVITAS Initiative is part of the European Union 7th Framework Programme for Research. It helps cities to achieve a more sustainable, clean and energy efficient urban transport system by implementing and evaluating an ambitious, integrated set of technology and policy based measures. CIVITAS stands for City-VITAlity Sustainability. Several EVUE partners are involved in CIVITAS projects on mobility management and clean vehicles.

2.4.7 Intelligent Energy Europe

Intelligent Energy Europe is a part of the EU's Competitiveness and Innovation Programme. The programme is the EU's tool for funding action to move towards a more energy intelligent use in Europe. Electromobility is included in the IEE themes.

2.4.8 Eurocities

Eurocities is the network of major European cities bringing together the local governments of more than 140 large cities in over 30 European countries. It has a Transport and Energy Efficiency Forum that develops a framework of energy efficiency measures for alternative transport modes. The Forum also aims to respond to key energy and transport policy and promotes existing and future energy efficiency projects, actions and campaigns.

EVUE partners Frankfurt, Katowice, Lisbon, London, Madrid, Oslo and Stockholm are members of Eurocities. EVUE has initiated a dialogue with the Eurocities Mobility Forum and will be presented at the next meeting in June 2010.

2.4.9 EPOMM

EPOMM is the European Platform on Mobility Management, a network of governments in European countries that are engaged in Mobility Management (MM). They are represented by the Ministries that are responsible for MM in their countries. The main aims of EPOMM are to promote and further develop Mobility Management in Europe and to support active information exchange and learning on Mobility Management between European countries. EPOMM acts as a knowledge platform on amongst other things, electrification of mobility and low carbon cities.

2.4.10 AVERE

AVERE is the European association for battery, Hybrid and Fuel Cell Electric Vehicles. Founded in 1978 it is a European network comprised of members including users, NGOs, associations, interest groups, public bodies, research and development entities, vehicle and equipment manufacturers, electricity utilities. Its main objective is to promote the use of Battery, Hybrid and Fuel Cell Electric Vehicles, individually and in fleets and for priority uses, in order to achieve greener mobility for cities and countries. The main activities to achieve these objectives are related to dissemination, networking, monitoring, participation in European and multilateral projects, lobbying, research and development. In public policy advocacy AVERE presents the electric drive industry's and R&D bodies' concerns to the European Commission.

It is the European network of the World Electric Vehicle Association.

AVERE's President, Robert Stüssi, supports the EVUE project aims and will cooperate with and, where appropriate, participate in the network's activities.

2.4.11 Going Electric

Founded in May 2008, Going-Electric, the European Association for Battery Electric Vehicles is an international non-profit association (AISBL) under Belgian law.

Going-Electric members are businesses, associations, NGOs and individuals promoting Electric Vehicles (EVs) in Europe, as the most sustainable motorised road vehicles.

It promotes electric cars, and also electric trucks, busses, motorcycles and bicycles, whether Battery Electric Vehicles, Extended Range Electric Vehicles and Fuel Cell Vehicles, in the European Union.

Going-Electric is the only organization whose mission is "to be the voice of all EV stakeholders towards a European legal framework enabling a European leadership in EV production and commercialisation".

2.5 Stakeholder perspectives and challenges

As clearly demonstrated by the projects and trials described in previous sections, the successful deployment of electric vehicles will require the close cooperation of all stakeholders including public authorities and policy makers from all around Europe, the car industry, infrastructure and energy suppliers.

Each stakeholder has different motivations, challenges and constraints and some of these are described in the next section.

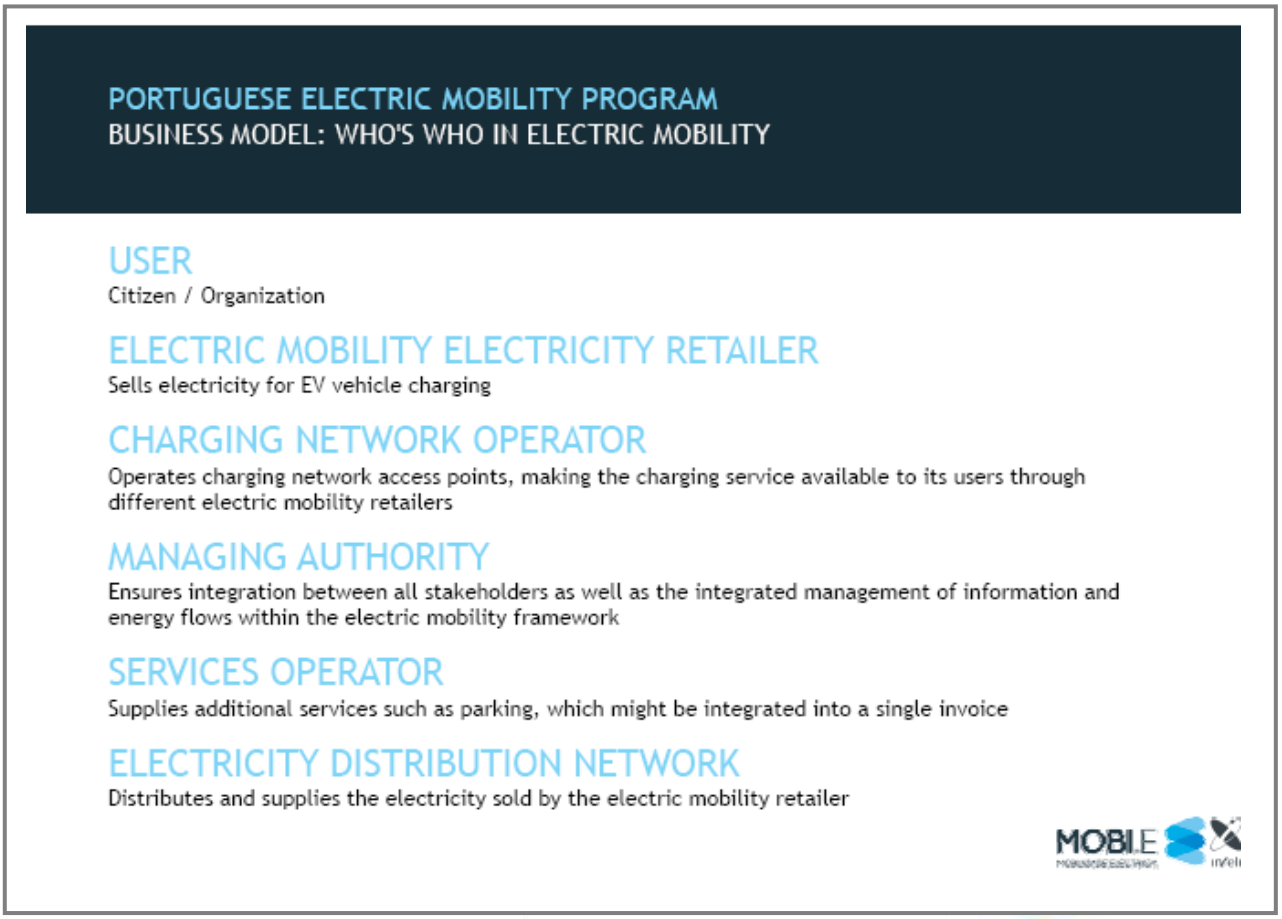
2.5.1 Cities

Cities have a key role to play in supporting the uptake of electric vehicles.

Following the first wave of tests the 'electrification of mobility' is now accelerating, led by a number of pioneer cities who see electric vehicles as a key element in the development of a sustainable urban transport system. Battery driven vehicles are especially well suited for short distances which correspond to the mobility pattern of a great proportion of people living in Europe's urban areas. Road vehicles used in cities are increasingly being electrified or hybridised.

For cities electric vehicles will:

- reduce noise and improve local air quality, and thus help compliance with European directives;
- decrease CO_2 emissions from road transport due to a higher efficiency compared to the internal combustion engine (well-to-wheel)[xx] and the opportunity to make use of



renewable sources of energy for transport (e.g. enforced through a cap-and-trade system);

- reduce dependence on crude oil as the primary source of energy for transport.

The challenge for cities now is to create new business models, partnerships and marketing approaches, which integrate electric vehicles with other modes of transport.

In cities such as London and Oslo, measures like congestion charge exemptions and free parking are now creating a favourable environment for the emergence of local markets for clean vehicles, including BEVs and HEVs. Many countries are offering extensive tax breaks to encourage electric vehicle ownership, and a range of other programmes have been initiated across Europe. (See Annex 1 for more detail.)

Car manufacturers are relying on cities to invest in visible and accessible charging infrastructure that generates confidence in the public to buy electric vehicles. They are also depending on public authorities to provide the generous tax subsidies for zero-emissions cars to be able to offer plug-in cars at prices comparable to similarly sized diesel models.

At a time of constrained public expenditure cities face challenges to invest and pull in external resources to finance electromobility and to provide clear leadership and high level coordination.

2.5.2 Vehicle manufacturers

While public authorities have intensified their efforts to drive clean mobility, many vehicle manufacturers are also rising to the challenge. Car makers are integrating electromobility as a core component of their strategy, leveraging many years of Research and Development and studies of customer behaviour to make the first generation of pure electric cars market-ready in the coming years. Renault and Nissan, for instance, have made leadership in electric vehicles a central plank of their corporate strategy.

In terms of product range, the hybrid electric car has recently become the most common form of electric car while plug-in hybrid and battery electric vehicles have remained a niche product.

As of 2009, the world's most popular battery electric car was the REVAi, also known as the G-Wiz, which is produced by an Indian company and sold in a number of countries in Europe and Asia. In Europe, pioneering work has been carried out by Think in Norway. Numerous other manufacturers have announced the market introduction of BEV models. The industry has already achieved significant progress in terms of batteries, energy recovery systems, lightweight components and aerodynamics.

Renaut- Nissan are planning eight electric models over the next four years, the biggest line-up of any major car making group. Toyota is launching lease trials of its Prius Plug-in Hybrid Vehicle in several European cities.

However, and despite the very important investments already made, there are still major challenges. Batteries still need to be improved, in particular concerning the energy and power density and the resistance to quick charging. Technical improvements, combined with mass manufacturing will lower battery costs. Increasing energy and power density, in contrast, will be a medium to long term goal. At the beginning of the 2010, the current generation of electric vehicles will have a range (from 100 to 200 km) which is primarily adapted to urban mobility.

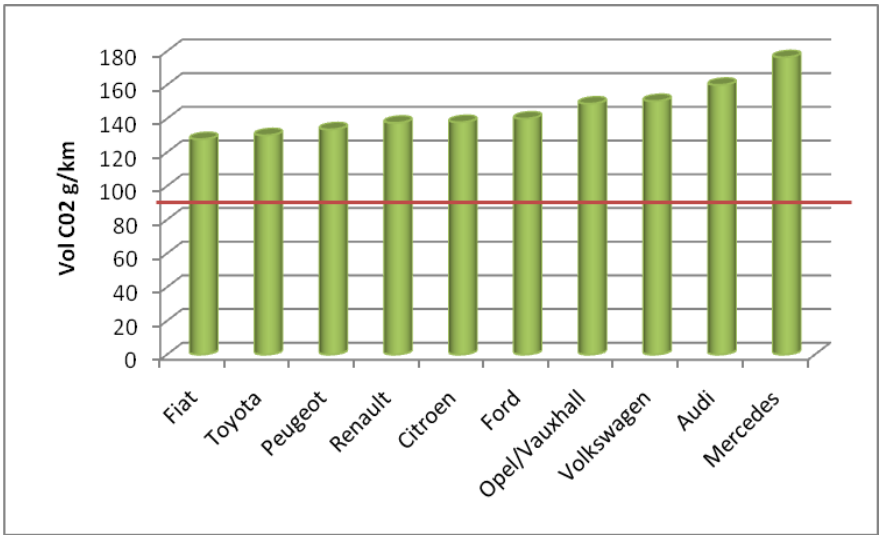
Toyota has made the observation that while there may be small, incremental improvements in battery technology, a significant improvement in battery performance is likely to require a technological breakthrough as they are reaching the technical limits of lithium capability and that the ability to recharge batteries is required to compensate for this limit in the foreseeable future.

In terms of motivation two major incentives are behind car industry efforts in electromobilty. Firstly, and by far the most significant driver, is the European political and legal environment that requires car manufacturers to achieve CO_2 emissions targets. For the passenger car fleet the target is average CO_2 emissions of 130g CO_2/km by 2015 and 95g CO_2/km by 2020, from about 150g at present. (See section 2.3.5)

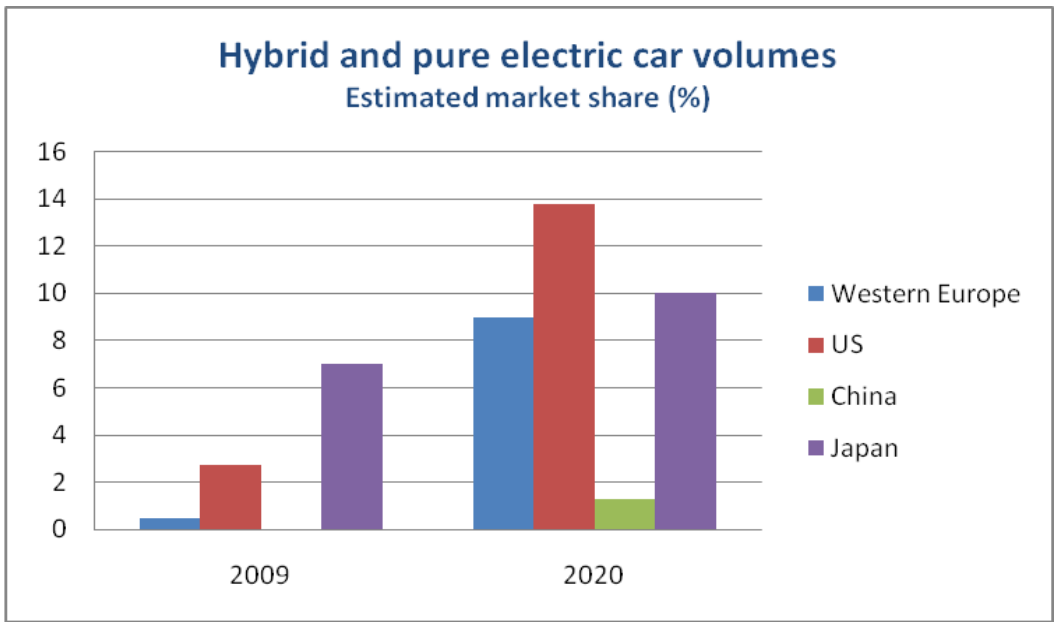
Industry analysts say car makers will only reach the emissions targets with the help of smaller cars and electric and alternatively fuelled vehicles. The new technologies are expensive and hard for a manufacturer to shoulder alone, hence a number joining forces to share multibillion dollar investment in cleaner vehicles. Daimler and Nissan Renault, for instance, are collaborating in joint purchasing of parts and the building of electric cars.

The market shift will take many years. Industry analysts and some carmakers, including those planning plug-in models themselves, predict that electric cars and hybrids will account for a tenth of the global market by 2020.

CO_2 emissions of top European car brands showing target level for 2020 (source: Jato, in Financial Times 10/04/2010).



Secondly, as outlined in Section 2.1, the economic crisis has resulted in stimulus packages to re-orient car makers and consumers towards greener technologies. These conditions and requirements favour in particular electric vehicles.



Source: J D Power

While most predict a long-term move to electrification, the analysts say the cars' higher initial cost and the lack of widely available recharging infrastructure will limit demand initially, although this varies across regions, and for instance is not a problem in Nordic countries.

In short, the challenge for manufacturers is to bring to market affordable electric vehicles that offer consumers comparable performance to ICE cars and allow the industry to achieve its C02 emissions targets. This requires significant investment in new technologies and a long term approach. Carmakers are looking to cities to support the trend with consumer confidence building measures, such as infrastructure and incentives for owners, to integrate electric vehicles in their own fleets, and to work together in multi stakeholder partnerships.

"Shifting successfully to the next generation of vehicles requires manufacturers, consumers and public authorities to play a vital role. For cities on the front line in tackling the challenges of urban mobility, multi-stakeholder partnerships that promote environmentally friendly technologies such as plug-in hybrids and electric vehicles seem the best way to maximise benefits to all citizens. I believe that the EVUE project will go a long way in helping to achieve this better future. We would support initiatives like this that help to accelerate the commercialisation of environmentally sustainable technologies."

R.Graham Smith OBE
Managing Director
Toyota Motor Europe London Office

2.5.3 Energy and infrastructure suppliers

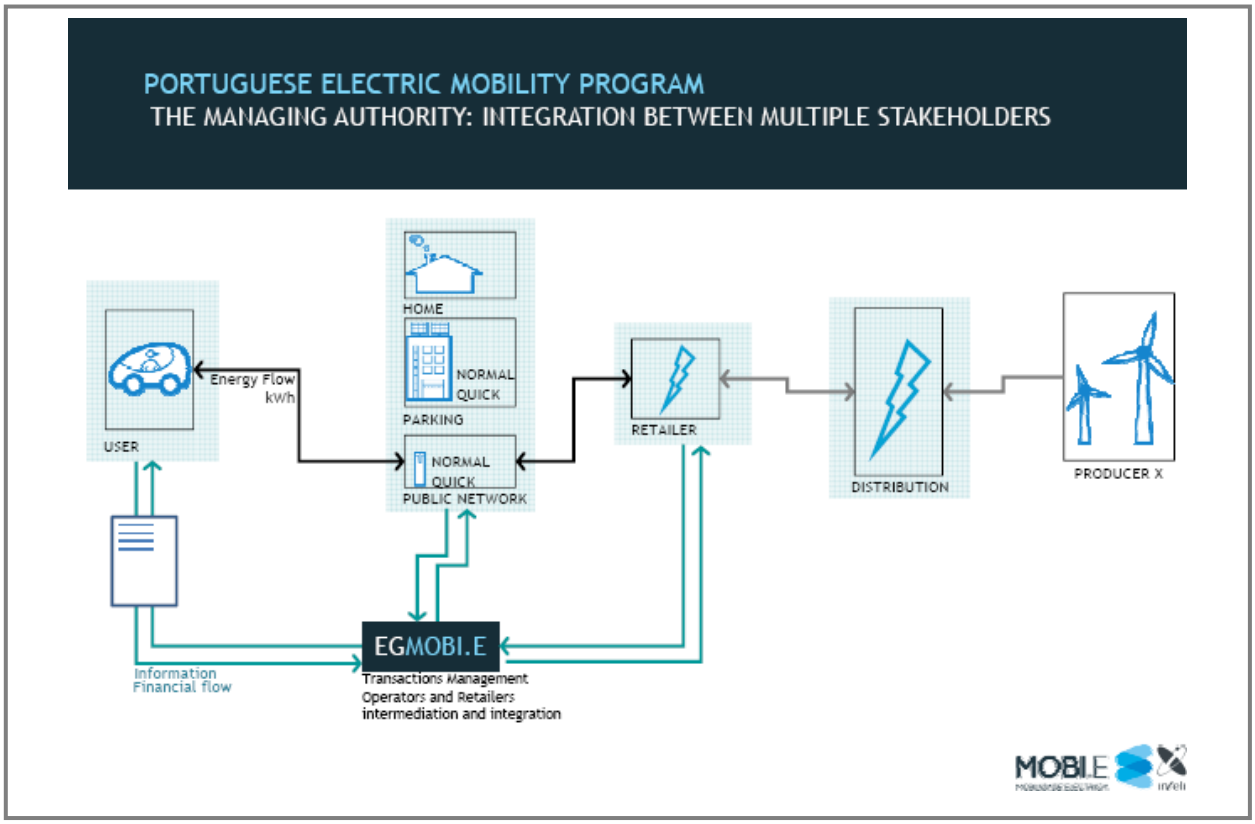
Energy suppliers

Energy and infrastructure suppliers need to be active players in strategies to increase use of electric vehicles. There are new market opportunities for electricity retailers and for those designing, manufacturing and installing charging points, and associated systems.

Many electricity companies are leading pilot projects and trials, such as Fortum's installation of a solar charged electric car sharing scheme in a new housing development in Stockholm and ABG Nova's Frankfurt Modell. In Norway the energy company TransNova is investing in the 'Green Car project' to kick start the electric vehicle market. In countries where the energy infrastructure needs repair and renewal, there are also opportunities to incorporate new technologies and greener transport modes.

found in Norway is that all electric vehicles are sold with RES certificates to stimulate the renewable energy market.

For a real-time and correct verification between use and production of electricity, i.e. simultaneous production and consumption of RES there is a need for a 'smart kW'. At the moment, one possibility is the direct use of local RES, for example a combined station between PV panels and charging infrastructure. Local storage units could ensure the continuing use of renewable sources during the time when



Energy Sources

The identification of the origin of the electricity is an important challenge for electric vehicles, in relation to renewable energy sources (RES). There is an ongoing debate about the ways and extent to which electric vehicles can and should be driven by clean and/or renewable energy, both now and in the longer term. The levels of immediately available RES vary between countries. Electric vehicles bring the CO_2-emissions under the cap-and-trade scheme and can be reduced that way. One solution

RES is not produced. However, this would not be an economically nor environmentally viable solution, due to a lower level of efficiency and, in addition, costs for a second storage battery. So, to foster the use of RES, electricity should be distributed via the charging infrastructure, requiring smarter and more sophisticated smart grid/metering solutions to identify its origin.

Smart technologies

The integration of electromobility with 'smart metering' (mainly on the costumer

level) and 'smart grid' (mainly on the utility level) is considered particularly promising. The transition from the passive to the smart charging infrastructure (via several ICT based applications) will stimulate new business and services.

The new opportunities are considerable and vary from peak charging and demand side management – which are state-of-the-art technology – to sophisticated ancillary services, for example, voltage and frequency stabilisation during black outs, providing balancing power, bi-directional vehicle to grid charging, etc. The basic requirement for the practicability of these new opportunities is the efficient and real time communication between all involved assets (grid, charging, battery, etc.) and actors (utilities, users, stock exchange, etc.)

There are opportunities for energy, systems and infrastructure suppliers in the new electric vehicle market. There is also a chance for cities to increase the use of RES and counter doubts about the real energy efficiency of electric cars. The challenges are to develop effective, intelligent and future proof systems and supply chains.

2.5.4 Drivers, consumers and citizens

For the electric car to achieve a large-scale breakthrough, vehicle technology and smart transport - energy systems alone will not suffice. Electric vehicles will only have a positive impact on the environment if they replace a significant amount of the mileage driven in conventional cars. A fundamental change in purchasing and mobility behaviour is therefore crucial.

It is likely that the first major electric vehicle presence in cities will be through procurement of **car fleets.** Many public authorities, including the cities of Lisbon and Stockholm, are specifying targets, such as 20% of municipal fleet renewal programmes each year should be earmarked for electric vehicles. Electric cars are suited to the mobility needs of many different public functions, such as community nurses, maintenance teams, deliveries, non emergency police or medical staff. Experience of conversion to electric fleets in Trondheim, Norway and elsewhere suggests that attention needs to be paid to driver training to ensure success. There are some differences in operation and performance, and users need support to adapt accordingly.

The visibility that these vehicles offer in moving around cities serves to raise awareness and demonstrate in tangible terms municipal commitment to low carbon transport.

Car sharing schemes and car clubs are often also suited to electric fleets, for which cities can offer incentives and cooperation.

For **individual consumers** there are a number of barriers. The high cost and limited performance compared to ICE cars, as well as perceived or actual lack of charging points are off-putting for many motorists.

A successful electric vehicle needs to answer all customer needs, not only in terms of sustainability, but also in terms of safety and comfort, as shown in the past attempts to deploy electric vehicles. The new generation of electric cars will look and perform like family cars, with four and five door hatchback, such as the Opel Ampere. This is an important factor to bring electric cars into the mainstream. The aim must be that the electric car will replace and not be additional to a family car. In Europe, more than 80 % of car journeys average below 20 km and Europeans drive less than 40 km per day. This means that most trips can be perfectly accommodated by a mid-size electric car. Yet people still tend to buy cars that greatly exceed their daily requirements,

preferring to buy large cars that can also cover the occasional long distance holiday, for example.

To change this consumer behaviour, alternatives must be made available. For instance, electric vehicles could be used for short distances and daily trips, while a supplementary conventional or hybrid vehicle (rented or owned) could be used for the occasional longer journey.

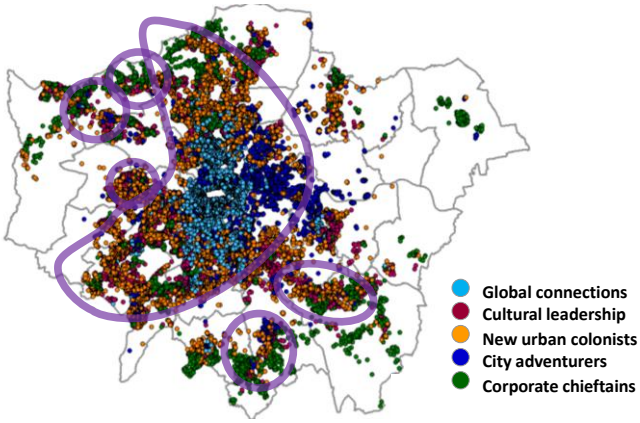
First generation electric car drivers effectively become ambassadors. Experience shows that they have to field questions from curious colleagues and citizens, and it is important that they sell the concept positively. Driver training and support can be of great benefit.

Market research carried out for Transport for London identified a number of target groups as early innovation adopters, most likely to buy electric cars. They are affluent, well educated, environmentally sensitive, and internationally connected consumers.

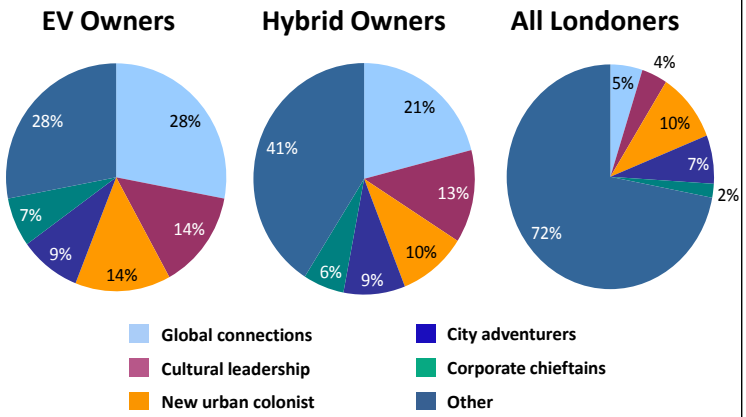
This forecast demographic of private users is likely to be applicable across the European market and can inform marketing strategies and infrastructure locations.

Education and awareness campaigns targeting young people are likely to yield results. There is a general increased concern for the environment, to the extent that they drive less in general, and a willingness to adopt technological innovations. They are both future consumers and exert an influence on parents and family in their car ownership choices.

Likely early EV adopters are located in a band running through central London



EVs and hybrids are predominantly owned by a few consumer segments



Transport for London Market Research

The current lack of availability of electric cars is a major challenge for all potential buyers. Manufacturers are now starting to ramp up production and global sales trends are for this market to take off in the next fifteen years. But for the immediate future there are not enough cars to satisfy demand for fleet or individual use.

In order to achieve sufficient volumes to attract carmakers in smaller markets joint procurement models between cities are under development, for instance in Sweden. A study produced recently - A Swedish mobilisation on Electric Vehicles – has investigated potential for joint procurement between cities

2.6 The outlook for cities

Many cities are rising to the challenge of incorporating electric vehicles as part of integrated multi modal transport strategies, in order to achieve low carbon targets. As clearly described in this Overview chapter these strategies have inherent risks and complexities, not least finding the resources to invest in infrastructure, and harnessing the best technologies in a fast moving market. The benefits that electric vehicles can bring are clear, as long as the vehicles break out of the current niche market and become more affordable for both fleets and individual consumers.

The remaining obstacles include

- consumer acceptance
- high battery costs
- green electricity supply
- limited driving range
- the need for dense charging infrastructure
- the uncertainty of technological developments

Electric transport also needs to be tied into an urban mobility concept that provides new links between different means of transport. A combination of electric car-sharing with mass transit services, for example, would extend the network coverage of public transport providers far beyond their traditional nodes.

Urban policy-makers, researchers, car manufacturers and utilities will have to ensure that smart technology and new business models emerge to ensure that electric mobility can deliver its potential environmental benefits to the full. Informed and supportive consumers are needed to make this happen.

Leading and managing the multi stakeholder process will be key to success. How well and effectively green cars take off in European cities will depend partly on the level of coherence and coordination achieved by city policy makers and planners.

The EVUE project aims to support European cities to develop innovative business models and stakeholder partnerships for electric vehicle strategies.

Transferring knowledge and experience between and within networks such as EVUE cities can hope to deliver quicker and better solutions to achieve these goals.

3. Partner Profiles

3.1 Introduction

The following profiles highlight the relevant key data for each city in the EVUE project.

The information has been collected by means of a questionnaire completed by each city. The data then formed the basis of discussion during each of the city visits, undertaken between February and April 2010. The Local Support Group meetings enabled further exploration of the cities' current situation and aspirations in relation to electric vehicles within the EVUE project.

In some cases data was only available for metropolitan or regional administrative areas, and the scope and limitations of the information is noted in each profile. All data has been provided by our partner cities and is intended to provide a 'snapshot' for the framework of the EVUE baseline.

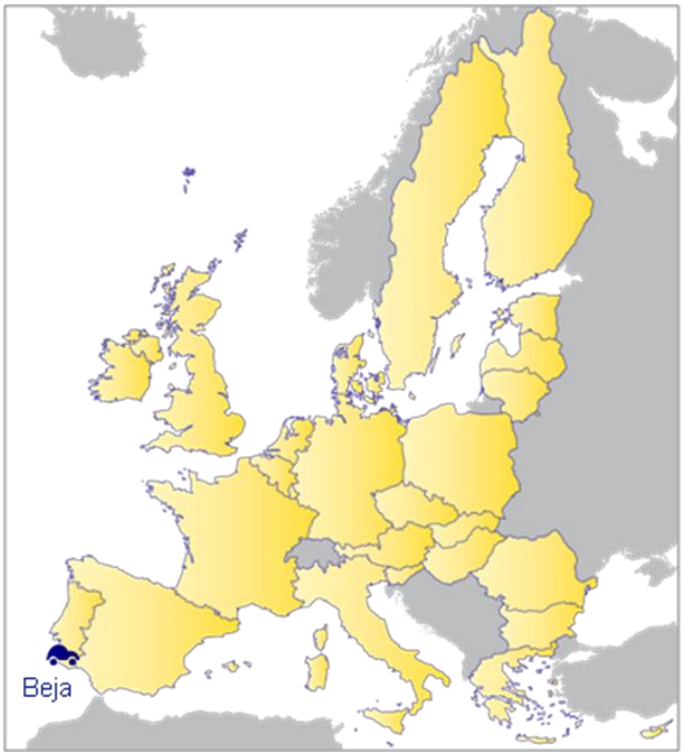
As all cities are at the start of a steep learning curve about the introduction of electric vehicles, there was some debate within the network about what transport, mobility and environmental data is most relevant to these strategies. EVUE partners will continue to discuss together the most important indicators that help them to

develop, monitor, manage and evaluate electric vehicle strategies. EVUE results will include any conclusions after two and a half years' experience.

It was agreed that modal split is important, as cities need to ensure that citizens do not switch from greener modes, such as walking, cycling and public transport to electric vehicles. Congestion levels are relevant, as electric vehicle incentives could exacerbate congestion, by making it more attractive to drive. Environmental indicators such as CO_2, NOX and PM levels are key, as one of the main arguments for an increase of electric vehicles is to improve air quality, and help cities to achieve EU targets. ICE registered vehicles and rates are included to indicate general car ownership, car culture and the rate at which cars may be upgraded or switched to electric vehicles. Demographic and geographical information is included if it may have an impact on electric vehicle uptake. For instance, evidence suggests that electric vehicles will mostly be bought initially by younger, well educated and environmentally aware consumers. Road networks, city layout and climate are included where they may have an impact of how charging infrastructure is designed or parking exemptions incentives.

3.2 Beja, Portugal

Câmara Municipal de Beja



Partner Details

Jorge Pulido Valente, Mayor

Câmara Municipal de Beja

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Praça da Republica 7800-390
Beja
Portugal

Tel: +31 284 311 800
Email: Jorge.valente@cm-beja.pt

Introduction

Beja is a small city located in the Alentejo region in Portugal. It is a partner in the ambitious national MOBI.E "Program for Electric Mobility in Portugal" which is implementing the electric mobility network. Beja sees electric vehicles contributing towards European energy targets, with the potential to make use of renewable energy sources and smart grids. The city is keen to develop understanding of how to adapt urban planning regulations to support EV infrastructure.

Key facts

- Population: 34,387
- Surface area: 1,147.14km2
- 327,029 km of roads
- Population Density: 30 inh/km2
- Per capita Income: 19,038 €/yr

Transport and Mobility

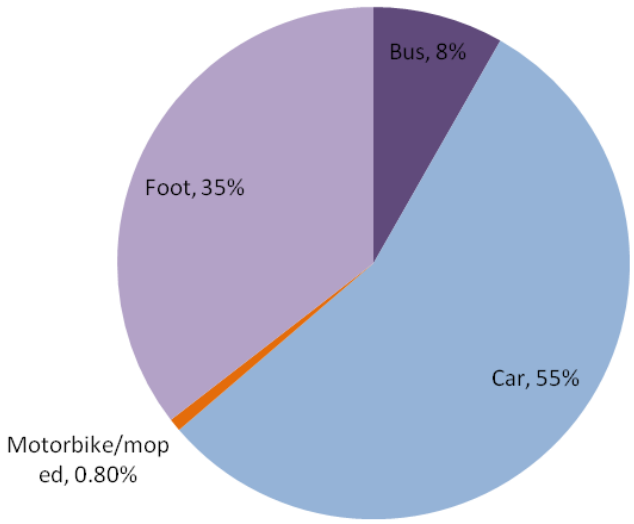
Regular cars

- There are 16,158 registered cars in Beja and 21,775 registered vehicles.
- Motorization rate is 629 cars per 1000 inhabitants.
- The average age of cars is 9.6 years.

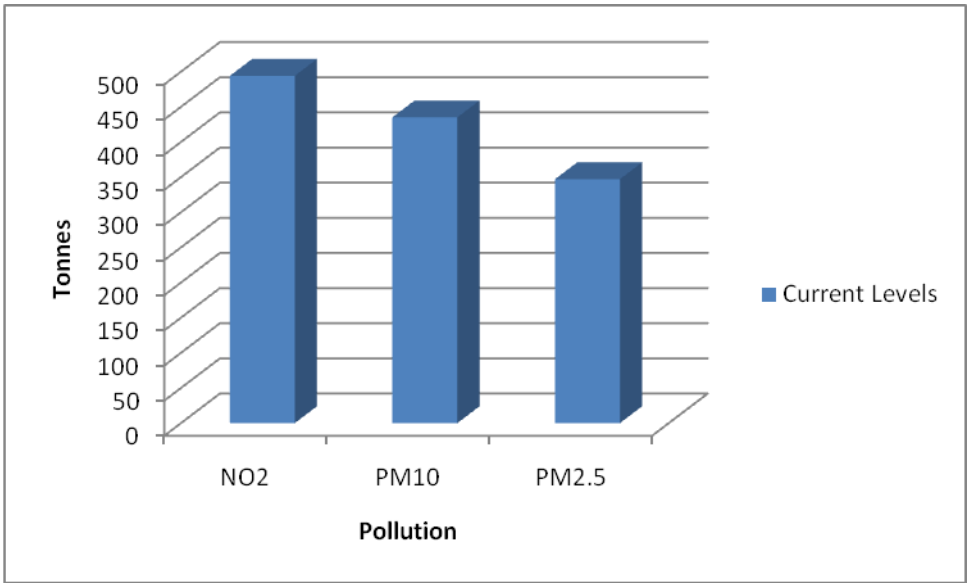
Demography and Geography

- The city has an ageing population, although there is an increasing student population, currently at 3,000 students.
- The climate is Mediterranean with hot summers and mild winters, allowing for micro-generation for powering charging stations.

Modal split



Environmental Indicators



Electric Vehicle strategies

Governance

- Portugal has an integrated policy for mobility and an electric charging network nationwide.
- There is a national agreement with Renault-Nissan for the supply of large electric vehicles. Renault-Nissan plans to build a battery plant for electric cars in Portugal.
- Beja is actively trying to change attitudes and behaviours that contribute to a better society and a cleaner environment. It does this through the following initiatives
  - Plan for Sustainable Mobility of Beja which defines guiding principles and strategic objectives in the field of urban mobility
  - EcoXXI Award, which aims to recognise the work done by the municipality in support of sustainable development.
  - Partner Network Ecos, called 'Network of Cities for Creativity and Innovation', which focuses on energy efficiency.
- Beja's Energy Action Plan for 2009 to 2013 includes priorities on energy efficiency and energy production. It includes a Municipal Plan for Electric Mobility which aims to increase the use of charging points, the supply of electric vehicles and the establishment of incentives. It has a target that 20% of the Municipal fleet should become electric.

Projects

- Beja is partner in the national MOBI.E "Program for Electric Mobility in Portugal" programme which is putting in place the electric mobility network in Portugal. The programme was adopted by the government, defining concepts, services and business models for electric mobility, an adequate legal and regulatory framework and guidelines for technical solutions.

Beja's URBACT Local Support Group

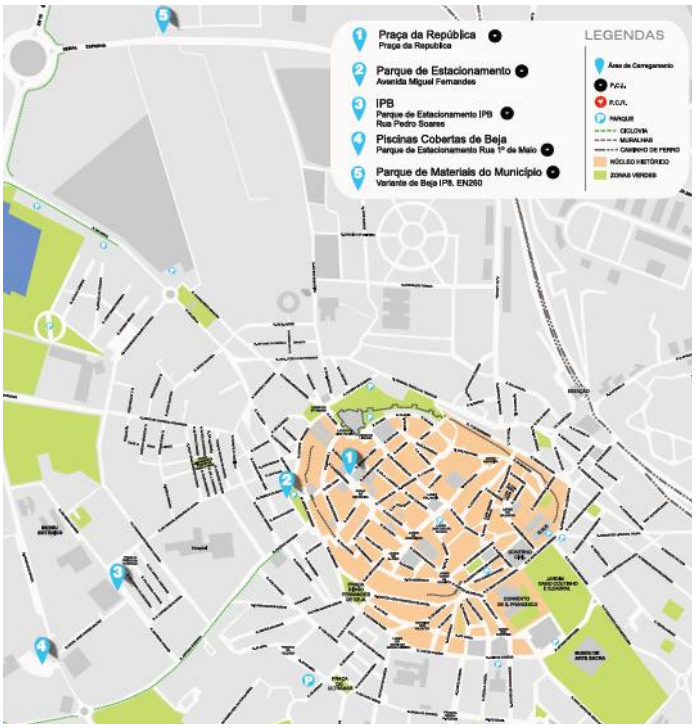
Infrastructure

- There are no charging points in place at present. There are plans underway to implement slow charging points by the end of 2012. By 2015 there will be charging points extended throughout the county.

Vehicles

- There is currently one Municipal fleet electric vehicle, and a target of 4 Municipal fleet electric vehicles by 2012.

Beja map of planned charging points



Incentives and Marketing

The main political measures adopted to incentivize the purchase of electric vehicle are tax incentives, direct subsidies and other special conditions for electric vehicle drivers.

- € 5,000 direct subsidy on electric vehicle purchase + € 1,500 from "cash for clunkers" program (for the first 5,000 electric vehicles sold until the end of 2012)
- Electric vehicles-purchase and road tax-exemption
- Tax incentives for private-owners and companies
- 20% state-owned annual car fleet renewal with s
- Government direct purchase of 20 electric vehicles for awareness and advertising purposes
- Use of electric vehicles priority lanes and parking spaces
- Public pilot infrastructure funding (320 charging points in 2010 and 1.350 in 2011)
- Implementation of a research, development and testing platform for Electric Mobility Management Systems

Other incentives are being explored in cooperation with the University of Minho:

- Total or partial exemption from parking fees
- Two-way capacity of the network – exploring ways that electric vehicles could sell electricity to the grid
- Business models to put in place associated equipment to loading areas such as cyber cafes, vending machines etc.

EVUE opportunities and expectations

Challenges

- Involvement of citizens in the process of transformation.
- Implementation of a system of incentives for the introduction of electric vehicles.
- Creating visibility and awareness of electric vehicles in the municipality.
- Availability of electric cars.
- Fill the information gap on vehicle development and availability.

Expectations

- To learn from partners' experiences.
- To develop scheme of incentives.
- To implement a robust communications strategy to create a unique brand and to raise the profile and awareness of electric vehicles.

Partner Inputs

- Experience and lessons learned from participation in the MOBI.E programme.
- Polytechnic university is carrying out a study on the green business and job creation opportunities around electric vehicles.

Charging point in Portugal

URBACT Local Support group

Beja's URBACT Local Support Group will comprise of:

- **João Duarte Margalha** from Câmara Municipal de Beja
- **João Martins** from EDIA – Empresa de Desenvolvimento e Infra-estruturas do Alqueva;
- **José Queiróz** from Nerb / AeBal - Business Association do Baixo Alentejo and the Alentejo Litoral;
- **José Rosado** from CCDR Évora; **Maria João Macedo** from Alentejo Tourism; **Margarida Duarte** from Inovobeja - Empresa Municipal de Desenvolvimento EM;
- **Manuel Catarrunas** from of EDP Innovation; **Nuno Rosário** from the Polytechnic Institute of Beja; **Rui Matos** from Commercial Association of Beja;
- **Vitor Luzia** from IRMÃOS LUZIAS;
- **Luis Borba** from RHCastilho Lda.
- **Daniel Montes** from O Trevo
- **João Santos** from Herdade da Malhadinha

"I will set ambitious targets- learnt from London. It is a process that won't go backwards. Beja must be in the first phase" **Mayor**

"In Beja it must be about business and job creation and the strategy to develop tourism in the region."

Local Action Plan

Priorities for the Local Action Plan have been identified as:

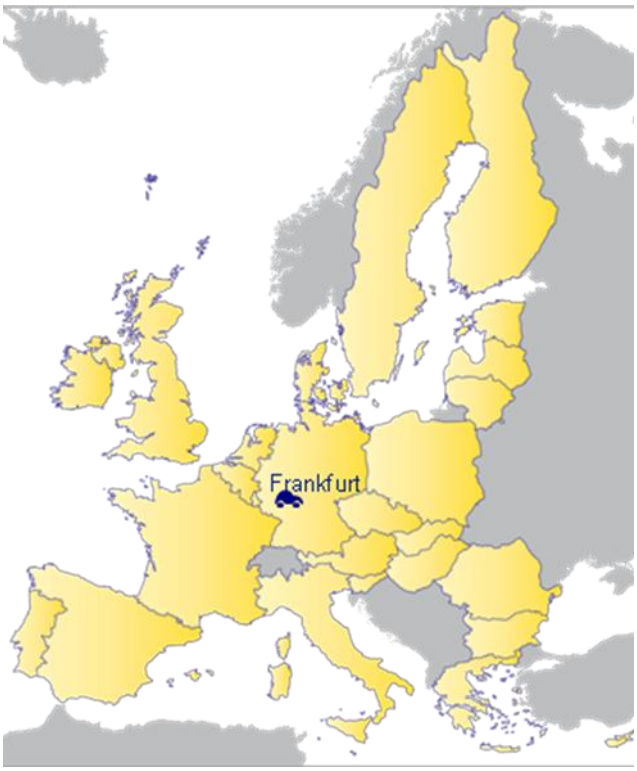
- Communications measures, increasing awareness and visibility of electric vehicles and promoting behavioural change.
- Create synergy between citizenship, sustainability, environment, development of the territory.

Managing Authority

The Managing Authority is the Regional Coordination of Alentejo (Évora), and will take part in the Local Support Group.

3.3 Frankfurt, Germany

City of Frankfurt am Main



Introduction

The City of Frankfurt is Germany's financial capital. A number of banks, insurances and other big workplaces are dominating the area and causing traffic through the commuting of employers, visitors etc. coming from the whole Rhine-Main-Region to Frankfurt everyday.

There is also a high density of air pollution from flight traffic and car emissions from two motorways crossing near Frankfurt.

In accordance to improve the situation of noise and air pollution the City of Frankfurt formed a LSP and joined the EVUE project.

Partner Details

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Frankfurt Economic Development GmbH
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60314 Frankfurt am Main
Tel: +496921238764
Email:
ansgar.roese@frankfurt-business.net

Key facts

- Population: 678,353
- Surface area: 248 km2
- 1,350km of roads
- Population Density: 2,709 inh/km2
- Per capita Income: 21,939 €/yr

Transport and Mobility

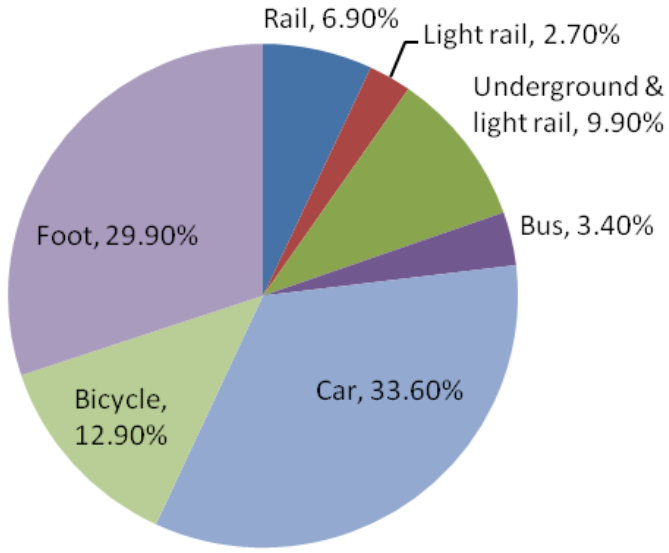
ICE cars

- The restricted space on the streets and limited parking facilities encourages public transport use.
- 335,571 registered vehicles.
- Motorization rate of 546 per 1000 inhabitants in the city.
- Average age of vehicles is 8.1 years

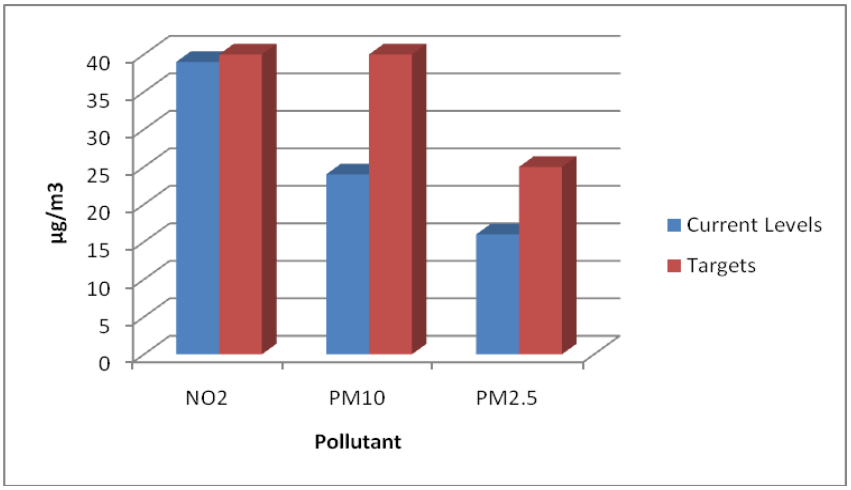
Demography and Geography

- Frankfurt is a young and dynamic city with a highly educated population.
- Frankfurt is largely flat, and is surrounded by small cities with a high density of population.
- High levels of air pollution due to two motorways crossing the city.
- The high volume of daily car commuting traffic in and out of city every day is problematic.

Modal split



Environmental Indicators



Note: EU targets for pollutants are higher than actual levels in Frankfurt. Figures are for 'urban background' pollution levels.

Electric Vehicle strategies

Governance

- The Federal Government initiated the 'Electric Mobility in Germany' project, which is supporting 8 regions to prepare regional markets for using electric vehicles between 2009 to 2011. The trials will bring together actors from science, industry and local authorities to work together to improve electric vehicle infrastructure and promote electric vehicle use.
- The State of Hessen has some activities in the field of electric vehicles, located in the Ministry of Science. They are supporting different kinds of technology development and are also supporting companies and car manufacturers by developing electric vehicles.
- The City of Frankfurt is the local Authority responsible and is responsible for transport and mobility in the Frankfurt City area. The city is a partner in the German model project on electric mobility. The city plans to install a fleet of electric vehicles in the city administration and in city owned companies.
- The Urban Transport Plan has reference to low emission engines for buses.

Projects

- 'Electric Mobility in Germany' national project.
- The state of Hessen is planning an initiative ("Hessen – Modellland für eine nachhaltige Nutzung von Elektroautos") to promote EVs use. The state of Hessen has commissioned the Fraunhofer Institute IWES to list the existing and planned charging stations and display them on the internet
- 'The Frankfurt Model' – In its electric vehicle programme, the city of Frankfurt is implementing a lot of charging stations (e.g. traffiQ mobility centre, parking lots at ABG Holding) and will promote electric vehicle use in all city owned companies.

Presentation of the 'Frankfurt Model' at the Roemer

The traffiQ solar charging station

Infrastructure

- 11 charging points are in place in total: the Solar powered charging point, Hauptwache, the Stock exchange garage charging point and 9 charging points provided by the RWE energy supplier, which are open to the public.
- Plan to build up a network of charging points. RWE, the energy supplier plans to put 20 charging stations in residential areas. 14 are planned for off-street locations with the remaining on-street.

Vehicles

- Electric vehicles are in use by UPS, Fraport AG and Mainova AG.
- Plan to get a fleet of electric vehicles in public use and to get a first busline with electric buses.

Incentives and Marketing

- In Germany, electric vehicles are exempt from the annual circulation tax for a period of five years from the date of their first registration. Subsequently, they will pay a tax amounting to €11.25 (up to 2,000 kg), €12.02 (up to 3,000 kg) or €12.78 (up to 3,500 kg) per 200 kg of weight or part thereof.
- The state of Hessen is planning an initiative ("Hessen – Modellland für eine nachhaltige Nutzung von Elektroautos") to promote electric vehicle use. It has charged the Fraunhofer Institute IWES to list the existing and planned charging stations and to show them for the public in a database.

EVUE opportunities and expectations

Challenges

- Education and public awareness of electric vehicle use
- To get electric vehicles in all city companies

Expectations

- International exchange of knowledge and experience
- Ideas for campaigns to promote electric vehicle use as part of a multimodal mobility plan and how to increase public awareness and confidence in electric vehicles which are sustainable, future-proof and bring benefits to all people.
- To create the chance to implement electric vehicles in Frankfurt.

Partner Inputs

- Experience of being one of the 8 regions involved in the German national Elektomobiltat project
- Results of the ABG Nova (electricity company) 'Frankfurt Model' project including pedelec-sharing, combined parking and charging machines, installing charge points in car parks.
- Concept to install EV charge points/cars in park and ride facilities.
- Electric vehicles in use by Fraport, the Frankfurt Airport Authority
- Frankfurt is a member of the Polis network, which aims to develop integrated sustainable transport strategies. Frankfurt will be able to disseminate EVUE results through the network.

URBACT Local Support group

Frankfurt's URBACT Local Support Group will include representatives of:

- City of Frankfurt (Departments for traffic, economy and environment), traffiQ Frankfurt GmbH, Frankfurt Economic Development GmbH
- Companies: ABGnova GmbH, Fraport AG, EuroSun
- Supporters: Umweltforum, Prof. Lanzendorf (University of Frankfurt), Prof. Schaefer (University of Applied Sciences Frankfurt)
- Media Partner: Frankfurter Rundschau, Hessischer Rundfunk

Existing electric vehicle strategy groups are Umweltforum Frankfurt, Leitstelle Modellregion Rhein-Main fuer Elektromobilitaet, and ABGnova GmbH

The main aims of the LSG will be to promote and coordinate the development of electric vehicle charging points and support companies buying and operating electric vehicles.

STADT FRANKFURT AM MAIN

ABGnova traffiQ

"The city of Frankfurt has the aim to become Germany's leading city in electric vehicle use"

Councillor Markus Frank

Local Action Plan

Priorities for the Local Action Plan have been identified as:

- Define Frankfurt as a model city for electric vehicle use.
- Reduce CO2 emissions by changing the fleet of vehicles in the City of Frankfurt and in the surrounding areas.
- Promote electric vehicles for public and private use.
- Support car manufacturers in development electric vehicles
- To develop a charging station system and recruit new ideas for charging points.

Managing Authority

The Managing Authority is the Ministry for Economy, Transport and State Development of the State of Hessen. The theme of electric mobility is more directly tackled by the Ministry of Science. We are cooperating with both ministries. The MA will give formal support, while the Ministry of Science is supporting the EV theme actively.

Dr Johannes Theissen shows Matthew Noon, EVUE Project Coordinator the solar charging point.

3.4 Katowice, Poland

City of Katowice

Partner Details

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EU Fund Unit Officer

City Hall Katowice

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Introduction

The City of Katowice is the capital of a 2.1m agglomeration, located in the Upper Silesian Highlands at the crossroads of major European communication junctions.

The challenges for Katowice in relation to electric cars are the price of electric vehicles, the need to demonstrate the benefits and also the urgent need to minimise air pollution from the use of traditional vehicles.

The city expects to learn how other European cities promote and develop new technologies.

Key facts

- Population: 308,914
- Surface area: 164.7km2
- km of roads: 558,09
- Population Density: 1,876 inh/km2
- Per capita Income: €12,125/yr

Transport and Mobility

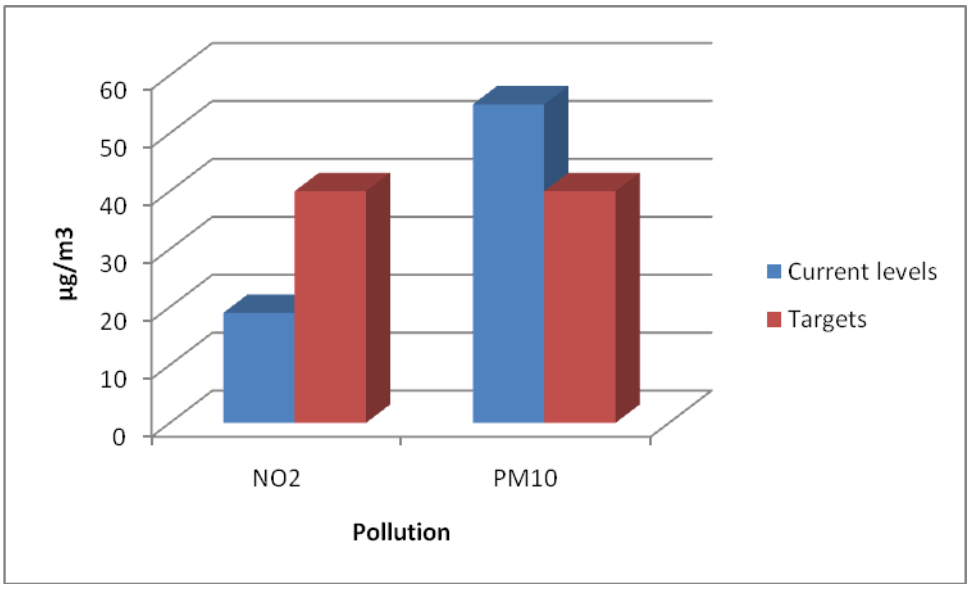
Regular cars

- 202,634 registered cars, of which 1,548 are buses.
- Motorisation rate of 437 per 1000 inhabitants.

Demography and Geography

- Katowice is capital of a 2.1m agglomeration. Once associated with heavy industry it is now a modern European city. It is located in the Upper Silesian Highlands at the crossroads of major European communication junctions. Half the city is covered with woodland.
- The A1 highway is under construction. There is both a local airport and an international airport. Cycle ways are being put in place.

Environmental Indicators



Note: Figures for NO2 are 2004, figures for PM10 are 2006. EU NO2 targets are greater than current levels in Katowice (in 2004).

Electric Vehicle strategies

Governance

- Decision of the City Mayor from 15.07.2009 concerning the participation in Green Stream Project,
- City Development Strategy KATOWICE 2020. Includes aims, directions and propositions about how to develop the city from now until 2020.

Projects

- City of Katowice is a partner in **Project Green Stream**. Green Stream Project is a cluster of companies, organizations and persons who take an attempt to reverse environmentally damaging tendencies. Becoming independent of oil is acknowledged as a priority. (http://www.greenstream.korporacja.org/?q=en). In 2010, 53 charging points will be installed and the City of Katowice will receive 4 electric vehicles for testing new technology. These new vehicles will be tested by the municipal public transport company, which will also have 5 charging points located on site.

- The **"Partnership Energy Planning as a tool for realising European Sustainable Energy Communities" (PEPESEC)** project will support the emergence of European sustainable energy communities through increasing the use of local community planning for the efficient supply, distribution and use of RES (Renewable Energy Sources) and conventional energy, demand-side management and associated mobility. The main objective of the **SEC-BENCH** project is the development of a web-based tool that will help municipalities to realise their potential in terms *of energy savings and conversion to renewable energy sources.*

Infrastructure

- There are 2 charging stations in Katowice. They are publicly accessible in front of the municipal buildings.
- It is planned to put in 53 more on-street charging points in 2010, under the Green Stream project.
- The city is facilitating the installation of charging points by making places available for them to be located.

Vehicles

- There are currently 8 electric vehicles in the city of Katowice. Two of these are private. There is a target to have 4 municipal fleet electric vehicles by 2010.

Incentives and Marketing

- There are currently no incentives for electric vehicles in Katowice.

Katowice provide charging stations, through the GreenStream project

EVUE opportunities and expectations

Challenges

- Price of electric vehicles
- Demonstration of the benefits of electric vehicles
- To minimise air pollution from the use of traditional vehicles.

Expectations

- Would like to promote the use of electric vehicles and the use of renewable energy sources.
- Expect to learn from transnational partners how similar problems are solved; how other European cities promote and develop new technologies.

Partner Inputs

- Experience and outcomes of the Green Stream project.
- Experience of the PEPESEC project in relation to use of renewable energy sources.

URBACT Local Support group

Katowice's URBACT Local Support Group will be made up of representatives of:

- The City of Katowice
- Municipal Company of Public Transport
- Silesian University of Technology
- Techno-Science Park
- Managing Authority
- Green Stream Cluster

There is an existing electric vehicle strategy group as part of the Green Stream project, which will take place in the LSG.

The LSG will help to identify what the city can offer to the EVUE project in the form of good practice; help disseminate findings of the project to a wider local audience and ensure that end-users have a voice in the decision-making process; act as project champions to help mobilise the political and institutional support required to ensure that the Local Action Plan leads to real change.

Local Action Plan

Priorities for the Local Action Plan have been identified as:

- To diversify energy production methods and sources
- Support and implement innovative solutions in the electric vehicles market in Katowice
- Increase the use of electric vehicles in the city.

Managing Authority

The Managing Authority is the Marshal Office of the Silesian Voivodeship.

They will be involved in the EVUE project.

"We must reduce pollution emissions and electric vehicles can help us with this"

3.5 Lisbon, Portugal

EMEL – Municipal Parking and Mobility

Partner Details

Tiago Farias (Phd)
Board Member

EMEL – Municipal Parking and Mobility Company

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Introduction

Lisbon is the capital of Portugal with a population of 489,562. The partner in EVUE, EMEL, is the Municipal Parking and Mobility company. At local level, Lisbon is leading the Electric Mobility project, part of the national Programme for Electric Mobility in Portugal (MOBI.E)

The Lisbon ULSG will feed progress and results, such as infrastructure architecture and standards and consumer surveys, into EVUE transnational exchange.

The LAP will focus on Public Private Partnership and Communications Strategies.

Key facts

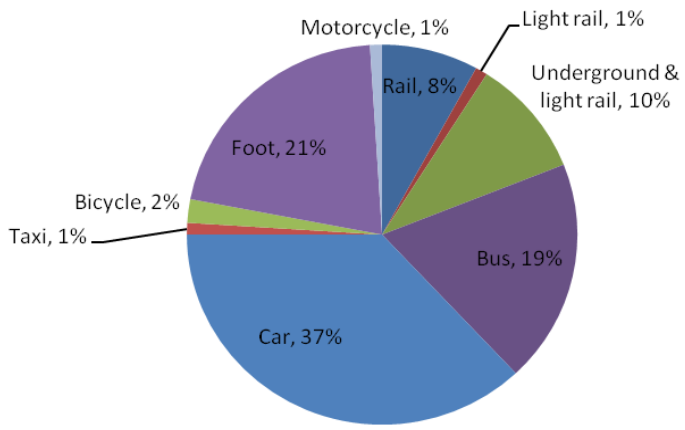
- Population: 489,562
- Surface area: 84.7km2
- Population Density: 5777 inh/km2
- Per capita Income: 20,106 €/yr

Transport and Mobility

ICE cars

- 332,386 registered cars
- 313,400 parking spaces
- Rate of motorization: 540 per thousand
- 37.9% of vehicles are age 5 to 10; 31.2% are over 10 years.
- 87.5% of car journeys are commuting to work
- 38.4% of daily trips are by car

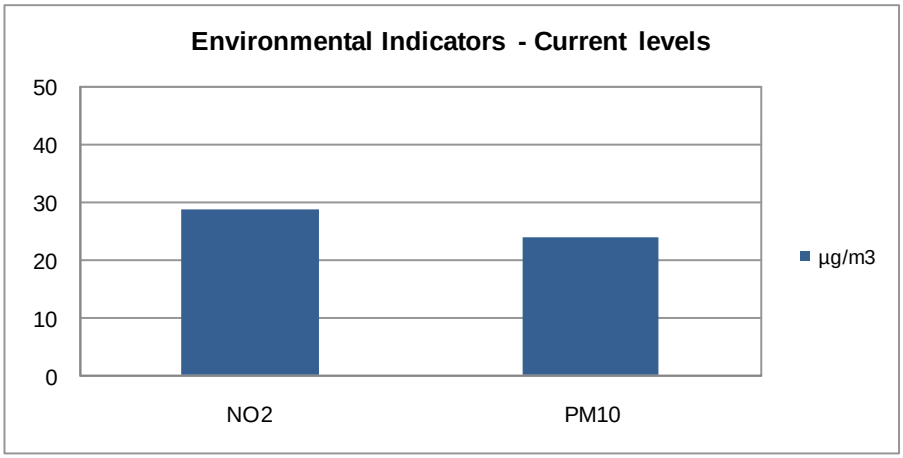
Modal split



Demography and Geography

- 53% of the population aged 25-64. (75% of this group have ISCED 5 and 6).
- City of Lisbon is compact and hilly, with a Mediterranean climate.

Environmental Indicators



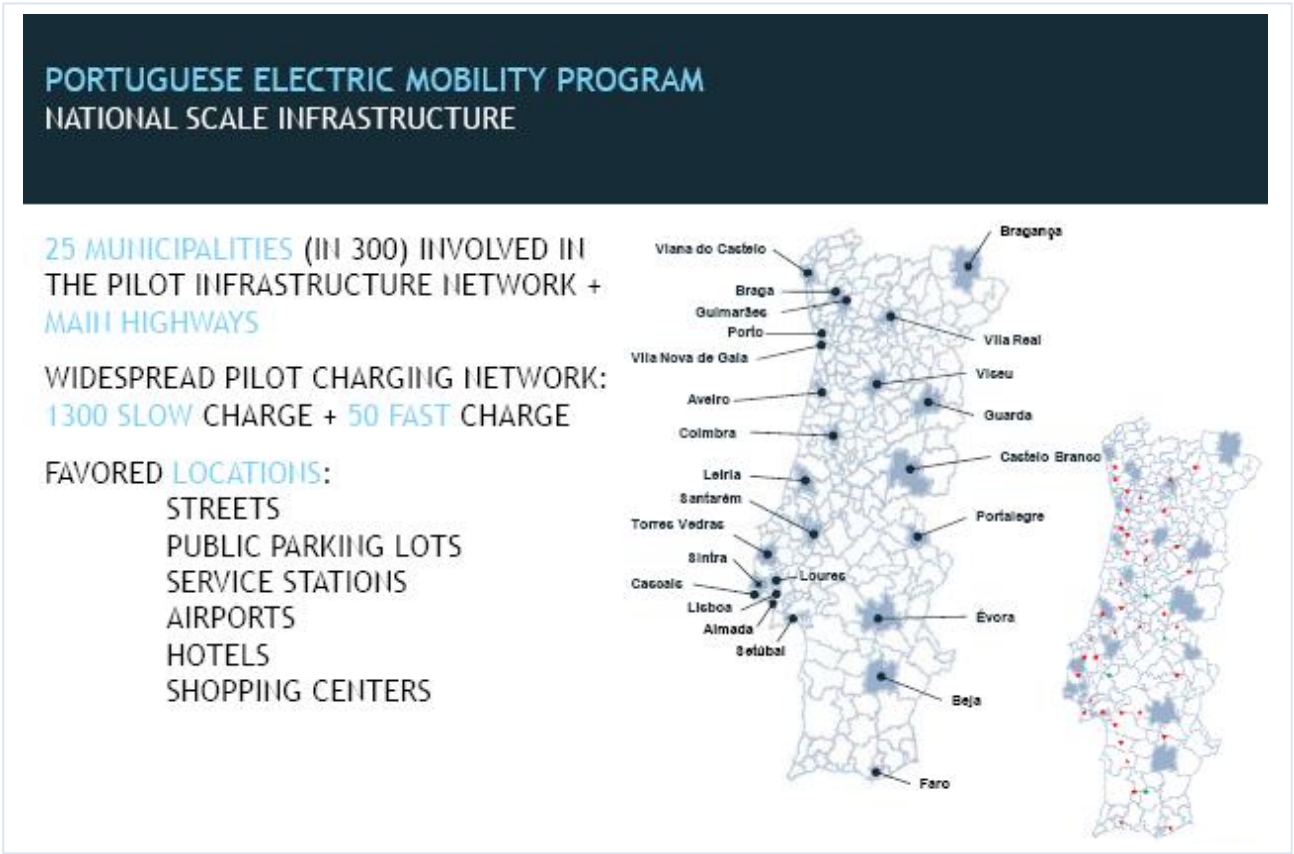
Electric Vehicle strategies

Governance

- National "Program for Electric Mobility in Portugal"(MOBI.E) adopted by the government, defining concepts, services and business models for Electric mobility, an adequate legal and regulatory framework and guidelines for technical solutions.
- In 2009 the Model for Electric Mobility was approved, principles of the model are:
  - Total cost of ownership must be lower compared with traditional cars
  - There will be universal access to car makers, utilities, retailers and operators
  - The market will be open to provide multiple choices for the user
  - It will be based on private investment.
- 25 municipalities and over ten companies are putting in place a national charging network between 2010 and 2012 as part of the MOBI.E programme.
- At local level, Lisbon is leading the Electric Mobility project. It has developed a pilot network of 6 prototype charging points in the city.

Projects

Lisbon is involved in the EVA project proposal, currently under assessment.



Infrastructure

- 1,070km of road network length
- 6 experimental charging posts in place, plans to put in 750 by 2011.
- Plans are in place to put in 100 'on-street' charging posts.
- Energy source is mainly thermo (45.5%), then Hydro (13.7%), Wind (11%), Co-generation (8%) and Other (3.8%).
- Nearly 100% of private parking has access to electricity supply.

Vehicles

There are 50 EVs in the city, of which 10 are privately owned, 30 are municipal fleet vehicles and 10 are private sector fleet vehicles. The target is to have 100 municipal fleet EVs by 2012.

Prime Minister José Socrates promoting national electric vehicles programme

Incentives and Marketing

The main political measures adopted to incentivize the purchase of EV are tax incentives, direct subsidies and other special conditions for EV drivers.

- € 5,000 direct subsidy on EV purchase + € 1,500 from "cash for clunkers" program (for the first 5,000 EVs sold until the end of 2012)
- EV-purchase and road tax-exemption
- Tax incentives for private-owners and companies
- 20% state-owned annual car fleet renewal with EVs
- Government direct purchase of 20 EVs for awareness and advertising purposes
- Use of EV priority lanes and parking spaces
- Public pilot infrastructure funding (320 charging points in 2010 and 1.350 in 2011)
- Implementation of a research, development and testing platform for Electric Mobility Management Systems

Lisbon City Council has signed an agreement that at least 20% of all new vehicles bought should be electric.

EVUE opportunities and expectations

Challenges

- Increase energy efficiency associated with mobility
- Improve local air quality
- Cost of batteries and consumer psychological issue of battery ownership
- National laws with regard to who can sell electricity

Expectations

- Exchange experience and learning with other cities and share learning of the MOBI.E programme and Lisbon EV Programme.
- Define models for PPP namely with car sharing companies, energy suppliers, parking companies and OEMs
- Define a communication strategy for Lisbon
- Develop a strategic plan for EVs in Lisbon

Partner Inputs

- Survey of citizen attitudes to EV will be available soon from Lisboa E-Nova
- Results from the MOBIE.E national project
- Sophisticated technology and systems architecture, similar to ATM networks
- Information about global standards for charge points developing in TEPCO (Japanese led consortium) via EFACEC
- Renewable energy and smart grid concepts

URBACT Local Support group

Lisbon's URBACT Local Support Group will build on the existing Electromobility working group. The Local Support Group will comprise of:

- City Councillor (Chairman)
- EMEL – Municipal Parking and Mobility company
- Lisboa E-Nova – Metropolitan Energy and Enviroment Agency
- GAMEP – Government Bureau for Electromobility*
- INTELI – National Program (MObi.e) manager*
- APVE – Portuguese Association of Electric Vehicles
- EDP inovação – National Electric Energy provider
- GALP – Major national oil & energy company (potential EV charging point)
- EFACEC – stakeholder (Charging system developer)
- CARRISTUR – stakeholder (Car-sharing manager)
- IDMEC – IST – Technical University department

"We are missing demand side information- what is the driver for personal use? We have to communicate the concept of Total Cost of Ownership and reduce the perception of cost"

Local Action Plan

Priorities for the Local Action Plan have been identified as:

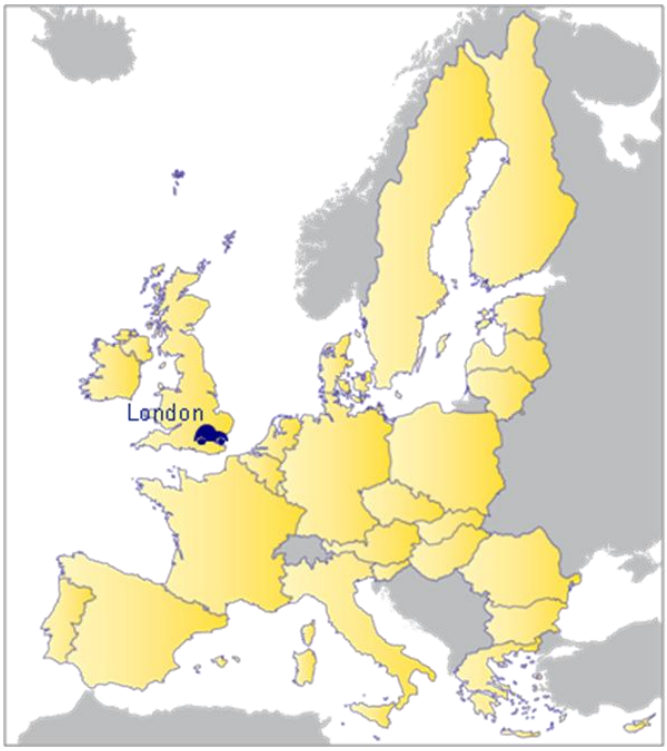
- Development a strategic plan for EVs in Lisbon
- Defining Models for PPP namely with car sharing companies, energy suppliers, parking companies and OEMs.
- Defining a communication strategy for Lisbon.

Managing Authority

The CCDR Lisbon region is the Managing Authority and is keen to fund more projects in the field of electric vehicles. A representative, Alexandra Almeda, attended the first ULSG/City Visit meeting . The Managing Authority believes EVUE will provide opportunities for feeding into the next Structural Fund programming period.

3.6 London, United Kingdom

City of Westminster



Partner Details

Matthew Noon, Project Manager,

Cross River Partnership, City of Westminster

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City of Westminster
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Introduction

Westminster City Council is Lead Partner of EVUE. It is part of Transport for London's Electric Vehicle strategy group and will involve London -wide stakeholders in the network.

London will share in EVUE the experience of delivering the Infrastructure Strategy, which aims to deliver 25,000 charging spaces in London by 2015, 100,000 electric vehicles on street and at least 1,000 electric vehicles in the municipal fleet by 2015.

Key facts

- Population: 7,556,000 (2005)
- Surface area: 1587 km2
- Population Density: 4761/km2
- Per capita Income: 30,000€/yr

Transport and Mobility

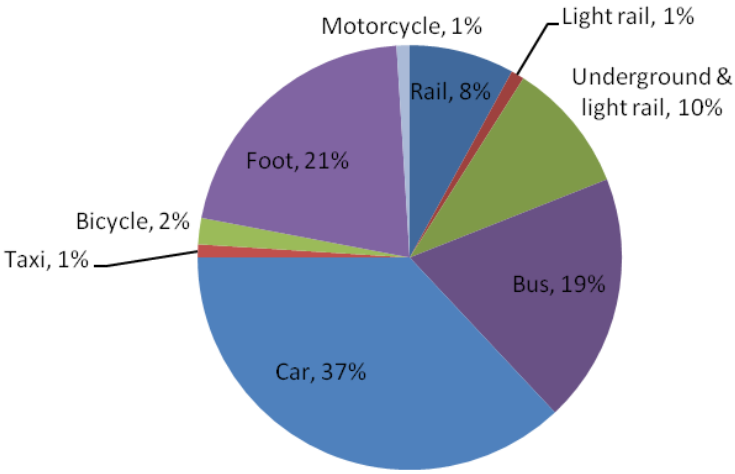
ICE cars

- There were 2,497,000 private cars registered in Greater London in 2007 of which 6% were company cars.

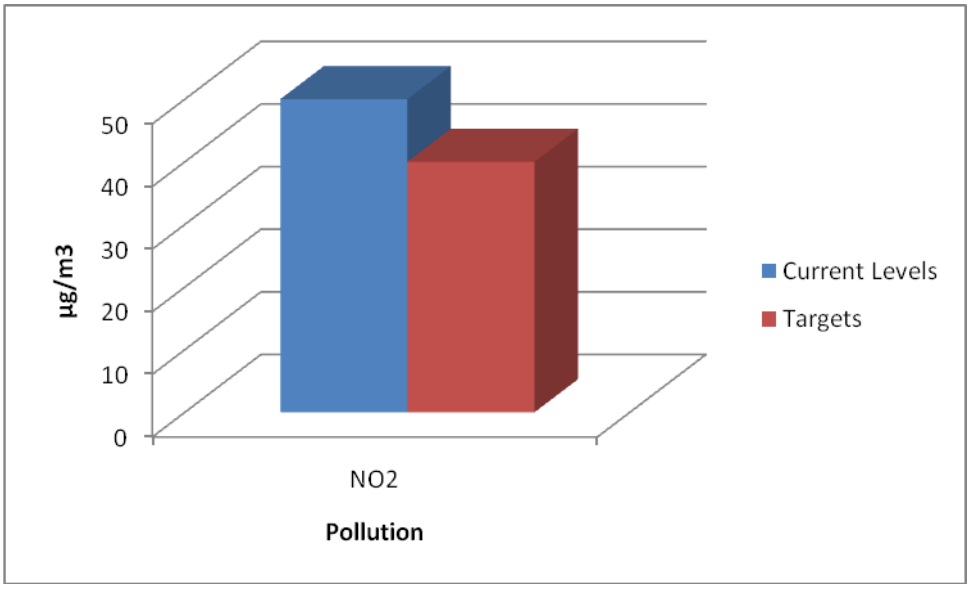
Demography and Geography

- London is the 18th largest city in the world with a lower than average age profile for the UK.
- London is located in the Thames valley flood plain and spans both sides of the river Thames. As a tidal river, London is very much at risk from global warming and rising sea levels.

Modal split



Environmental Indicators



Electric Vehicle strategies

Governance

- The UK government has set ambitious carbon reduction targets over the next 20 years and with road based transport a leading contributor, is encouraging the shift to low emission vehicles.

  The administration of London is formed of two tiers—a city-wide, strategic tier and a local tier. The city wide level is controlled by the Mayor of London who has responsibility *inter alia* for public transport (including the congestion charge), air quality and overall city planning. The second tier involves 33 local authorities (including the Cities of London and Westminster) who control 95% of the road network, on street parking and local planning.

- The Mayor of London has produced an Electric Vehicle Delivery Plan and a draft Electric Vehicle Infrastructure Strategy, which aims to deliver 25,000 charging spaces in London by 2015, 100,000 electric vehicles on street and at least 1,000 electric vehicles in the municipal fleet by 2015

- To achieve these targets, the Mayor must work with each individual local authority as they are responsible for the local road network and parking opportunities.

Projects

- London is a leading participant in the UK governments Plugged-In Places programme which aims to develop electric car technology and uptake. This will provide £17 million in funding for vehicles, charging points and new technology trials over the next 4 years.

- London is also participating in the CENEX programme which provides grants to organisations installing electric vehicle charging points.

Infrastructure

- There are 231 electric vehicle charging points in London with plans to increase this to 25,000 by 2015.

Vehicles

There are currently about 2,000 electric vehicles in London ranging from 2 seater commuter vehicles to utility and delivery vehicles.

Incentives and Marketing

- From 2011, the UK government will offer EV purchasers a rebate of £2000 - £5000 of the purchase price.
- Electric vehicles are currently exempt from purchase and annual vehicle taxes.
- In London, electric vehicles are exempt from the daily £8 congestion charge for driving into central London.
- A number of Boroughs also offer free or subsidised car parking

EVUE opportunities and expectations

Challenges

- As a region with almost 8 million people, the efficient movement across, to and through London is essential. The current modal pattern however has created significant air and noise issues as well as significant congestion. By moving to electric vehicles it is envisaged that environmental indicators will improve, while making London a more attractive and viable place to do business.

Expectations

- To learn from partners' experiences
- To identify new methods to encourage EV consumer adoption
- To participate in the development and implementation of new educational approaches associated with electric vehicle technology

Partner Inputs

- London is a member of the Polis network, which aims to develop integrated sustainable transport strategies. London will be able to disseminate EVUE results through the network.
- Significant experience has been gained with regard to charging point operation and installation. In addition, the large scale public procurement activities currently underway will assist all of our partner cities through knowledge transfer.

Electric Vehicle electricity consumption display

URBACT Local Support group

London's URBACT Local Support Group will comprise of:

- City of Westminster
- London Borough of Camden
- London Borough of Lambeth
- London Borough of Hounslow
- Greater London Authority
- Transport for London
- London Development Agency
- Office of Low Emission Vehicles
- Energy providers
- EV Infrastructure providers
- Educational institutions
- Toyota Motor Group *

*Observer member

Local Action Plan

Priorities for the Local Action Plan have been identified as:

- Encouraging the uptake of electric vehicles
- Mitigating the occurrence of modal shift from public transport to electric vehicle road congestion
- Increasing the number of electric vehicles in municipal fleets
- Ensuring the private sector can capitalise on the business opportunities associated with the shift to electric vehicles.

Managing Authority

- The London Development Agency is the Managing Authority for operational programmes in London and is committed to the project.

In London we know we need to make electric cars, vans and motorbikes an easy choice."

3.8 Madrid, Spain

Fundación Movilidad, Madrid City Council

Partner Details

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Introduction

The partner in EVUE, Fundación Movilidad, is a non profit institution steered by the Madrid City Council in the area of sustainable mobility management.

Madrid is one of three Spanish cities involved in the MOVELE national pilot that aims to demonstrate the feasibility of electric cars from technical, energy and economic aspects.

In EVUE Madrid will take the opportunity to evaluate its own plans through peer discussions and share MOVELE results.

Key facts

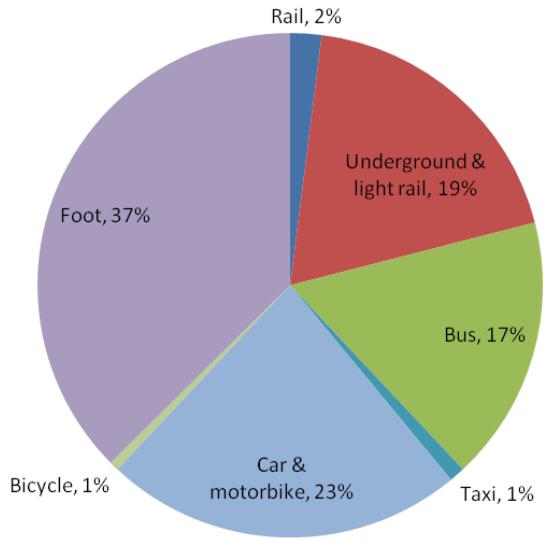
- Population: 3.2 million
- Surface area: 698 km2
- 3,415km of roads
- Population Density: 5,198 inh/km2
- Per capita Income: 21,388 €/yr

Transport and Mobility

ICE cars

- 1,743,427 registered cars (2010)
- 23% of journeys are by car (including motorcycles)
- 1 million vehicles enter and leave the city every day.
- A large number of journeys are and to and from the satellite suburbs, which are expanding.
- Average road traffic speed is 24.18km/hr
- 330,000 hours are lost every day due to congestion on the roads accessing Madrid.

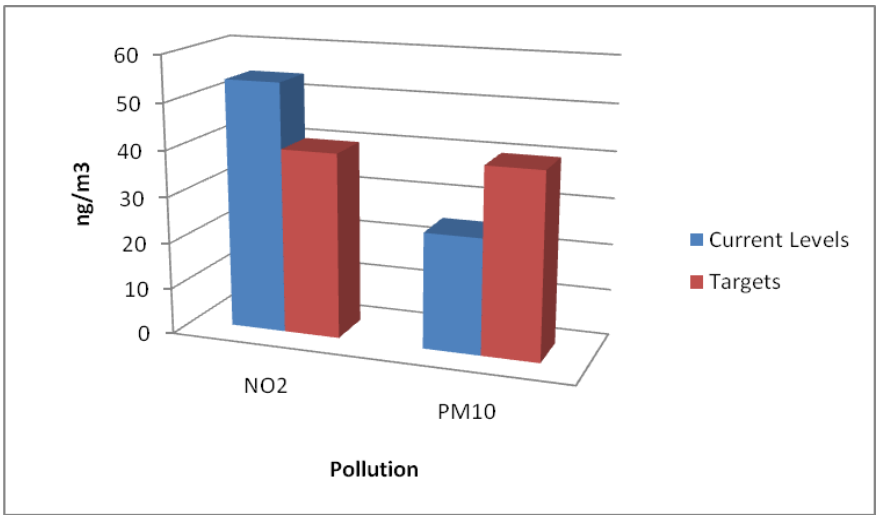
Modal split



Demography and Geography

- 21.6% of the population is aged 15 to 29.
- Madrid has a Continental Mediterranean climate with cold winters with sporadic snowfall and hot summers.
- Built on a series of small mounts, the city's average altitude is 654m above sea level.

Environmental Indicators



Note: PM10 EU targets are higher than actual levels in Madrid. Due to the current fleet, predominantly new diesel vehicles (70%), higher NOx emissions are being produced though PM10 is decreasing due to particle filters.

Electric Vehicle strategies

Governance

- Pilot project for the introduction of electric vehicles is planned under the 'Energy Saving and Efficiency Strategy of Spain' and the 'Energy Save and Efficiency Activation Plan 2008-2011. The pilot will aim to demonstrate the feasibility of EVs from technical, energy and economic aspects.
- The Plan Azul de la Comunidad de Madrid (Madrid Regional Strategy for Air Quality, Blue Plan) aims to achieve a significant improvement in air quality in the region through the implementation of actions to reduce emissions of pollutants and greenhouse gases. It includes the purchase of environmentally friendly vehicles for the institutional fleet, and also financial and tax incentives to promote low emission vehicles.
- The Madrid Strategy for Air Quality 2006-2010 aims to reduce levels of air pollutants caused mainly by urban traffic. This is supported by the city's Plan for Sustainable Use of Energy and Climate Change Prevention which aims to cut GHG emissions.
- The Foro Pro Clima de Madrid (Madrid Pro-clima Forum) is made up by the main private companies with large vehicle fleets operating in the city. It was designed to be an exchange platform for environmental innovation ideas and also for developing new ways of pollution control. It is open to companies that would like to play a role in the fight against atmospheric pollution and push Madrid to a more sustainable development. The Foro considers electric mobility as a valid and real alternative

Projects

The MOVELE project aims to test electric mobility in urban contexts. It is managed and coordinated by the Spanish Energy Diversification and Saving Institute. The project was a result of the national Energy Save and Efficiency Activation Plan. The project aims to:

- Demonstrate the technical and energy feasibility of electrical mobility in urban environments, so as to place Spain among the few countries with real experience demonstrating electrically powered mobility technologies.
- To activate measures to stimulate the use of electric vehicles among local authorities: public recharging infrastructure, reserved parking spaces, allowing electric vehicles to use bus/taxi lanes, etc.
- To involve private sector businesses in the introduction of electric vehicles: electricity companies, insurance companies and financing firms (renting), etc.

Madrid is also a partner in the EVA project proposal, currently under assessment.

Electric vehicles for advanced cities

MOVELE
Proyecto de Movilidad Eléctrica

Infrastructure

- 41 charging points located in two underground car parks.
- 280 charging points to be put in place by the end of 2010 under the MOVELE project. 140 to be located in car parks, 40 on street (2 of them already installed) and 100 at big companies.

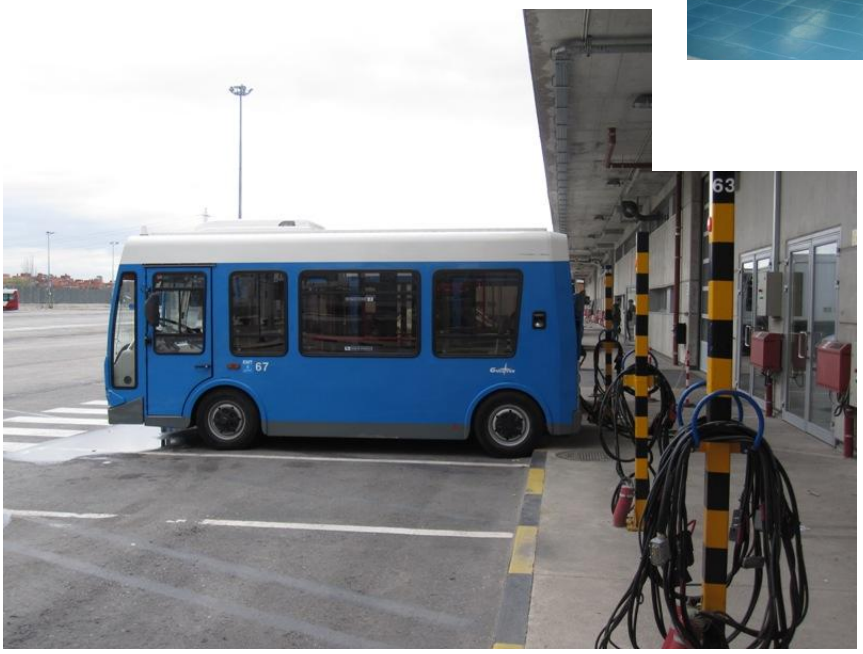
Vehicles

There are 114 electric vehicles in Madrid, 94 are privately owned, 20 are buses. 68 of these are electric motorbikes.

Incentives and Marketing

- The Spanish government offers EV purchasers a rebate of 20% of the purchase price, up to €6,000.
- The Royal Legislative Decree of 2004 provides for a 75% tax reduction on electric vehicles.
- Electric vehicles are exempt from registration tax
- Electric vehicles are exempt from municipal on-street parking charges and time limitation.

One of the dedicated parking slots in hotels



Electric bus in Madrid- part of a 20 vehicle fleet operating two routes in the old part of the City

One of the models of charging point implemented In Madrid – May 2010.

EVUE opportunities and expectations

Challenges

- Madrid's main mobility and transport problems are caused in part by the growth of satellite suburbs at the expense of the city centre. This results in a huge amount of periphery to periphery car trips each day.
- High price of electric vehicles
- There are currently no EU standards; need to avoid making costly mistakes.

Expectations

- Exchange experience and learning with other partners' experiences and approaches
- Define business models
- Join forces to change regulations and standards which block progress

Partner Inputs

- Results of the MOVELE project are due in May 2011. Electricity companies are contributing financially to infrastructure
- 1.5 years' experience with small electric bus fleet.
- Annual car show takes place in Madrid,
- Bi-annual International Congress on Mobility
- Experience of fast charging points in municipal car parks.
- Madrid is a member of the Polis network, which aims to develop integrated sustainable transport strategies. Madrid will be able to disseminate EVUE results through the network.
- Memorandum of Understanding with Toyota and Renault to lease trial cars
- "Practice before rules" approach

URBACT Local Support group

Madrid's URBACT Local Support Group will comprise of:

- City of Madrid (different departments such as environment, mobility, public works and public transport company)
- Fundacion Movilidad
- Madrid Movilidad S.A.
- ENDESA (Electricity company)
- GAS NATURAL FENOSA (Electricity company)
- IBERDROLA (Electricity company)
- ACS Cobra (infrastructure company)
- DG Energía, Industria y Minas (Madrid regional government)
- IDEA (Spanish Energy Diversification and Saving Institute)
- FRAVM (Regional Federation of neighbours)
- CEIM (Confederación de Empresarios de Madrid – Chamber of Commerce of Madrid)

"We have a 'practice before rules' approach. We want to avoid making expensive mistakes"

Local Action Plan

Priorities for the Local Action Plan have been identified as:

- Develop and implement local incentives. Developing strategic lines for the implementation of EV within the city
- Developing a minimum charging point network by the end of 2010. Find optimal place for inserting charging points
- Stimulate supply of electric vehicles
- Increase the number of electric vehicles in several city departments
- Achieve knowledge about possible business models

Managing Authority

- The Managing Authority is the "Subdirección General de Administración de Fondos FEDER" del Ministerio de Economía y Hacienda (Ministry of Economy/Department of European Funds). Madrid will keep them informed of the work of the EVUE project inviting them to relevant meetings.

3.9 Oslo, Norway

Traffic Agency, City of Oslo

Partner Details

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Introduction

The EVUE partner is the Oslo City Traffic Agency, and other City Departments will also be involved.

Norway is undoubtedly advanced in its electric vehicle strategies and has much experience to offer the network. There is a national target to have 200,000 electric vehicles and Plug-in Hybrid Electric Vehicles by 2020.

As a partner state city Oslo sees great advantages in the EVUE network, as way to share experiences with EU member states and increase the visibility of its advanced electric car strategies.

Key facts

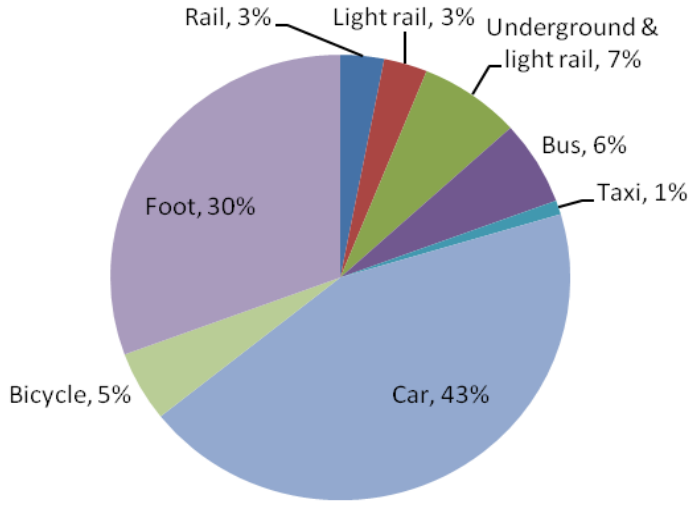
- Population: 580,000
- Surface area: 454 km2
- 1,458km of roads
- Population Density: 1,278 inh/km2
- Per capita Income: 86,875 €/yr

Transport and Mobility

Regular cars

- There are 266,356 registered vehicles in Oslo.
- General motorization rate is of 463 per 1000 inhabitants in the city.
- Average age of vehicles is 10 years.
- Oslo has a lot of commuting traffic as well as freight transport due to harbour and railway freight terminals.

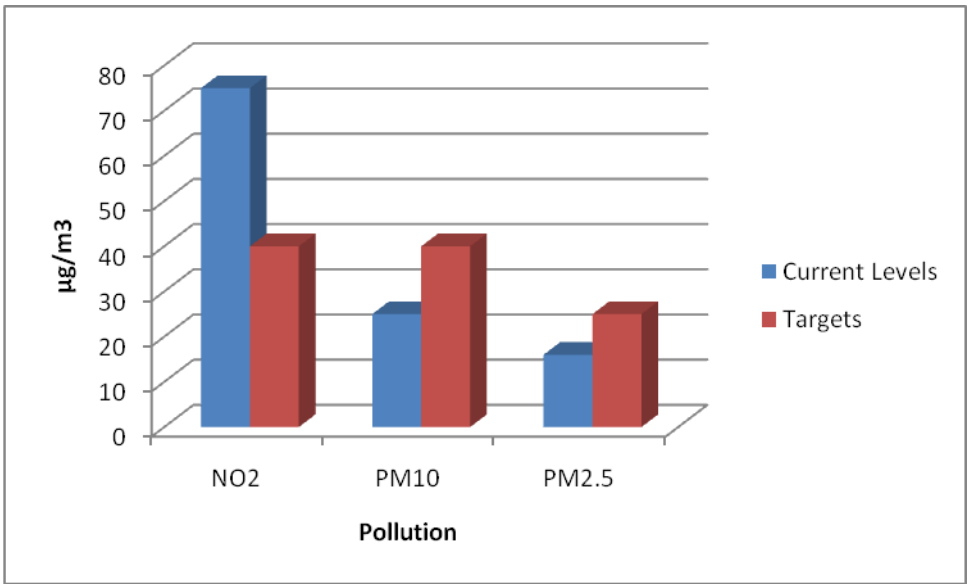
Modal split



Demography and Geography

- Oslo has heavy winters and drivers are used to plugging in cars at home to heat them.
- Olso has good natural resources for production of hydro-power. A significant percentage of Norway's C02 emissions come from off shore oil platforms.

Environmental Indicators



Note: PM10 and PM2.5 EU targets are higher than actual levels in Oslo.

Electric Vehicle strategies

Governance

- There is a national target to have 200,000 electric vehicles and Plug-in Hybrid Electric Vehicles by 2020.
- Oslo City Council has a target to cut CO2 emissions by 50% by 2030. Given population growth, this means more than a 50% reduction in transport-based emissions.
- The City Council is putting in place 400 charging points from 2008 to 2011.
- There has been a political decision to raise the visibility of electric vehicles in Oslo.

Projects

- Oslo city is involved in an INTERREG IVC project called CATCH-MR. Partners are 7 cities with their metropolitan regions throughout Europe. The main focus is on transport-related issues including technology development and renewable energy.
- A website is being planned that will coordinate information for potential electric vehicle buyers
- Green Car project– run by the Norwegian Energy Association Transnova

Electric Vehicles charging on – street in the snow, Oslo

Infrastructure

- 130 charging points are in place. Most are located on-street with some in supermarket car parks and city car parks.
- A further 200 charging points are planned by the end 2010.
- Energy is mainly hydro-electric.

Vehicles

- There are 1,735 electric vehicles in Oslo.
- Most of these are privately owned (1,388) with 312 private sector fleet vehicles and 35 municipal fleet vehicles. 20 are two-wheelers.

Incentives and Marketing

- Fiscal incentives include no import tax and no VAT on electric vehicle purchases.
- Very low annual registration fee
- Free parking in publicly owned parking spaces
- No road toll cost
- Free admission on national road ferries
- Increased mileage allowance in public sector.
- Electric Vehicles have access to bus lanes in Oslo. This has been a highly successful incentive and has affected the update of electric vehicles in certain parts of the population. There is however some doubt regarding this incentive as it has possibly been most effective when it comes to high-income consumers who have chosen an electric vehicle as a second or even third car to benefit from it.

Electric Vehicle rally, Oslo

EVUE opportunities and expectations

Challenges

- The main challenge has been in coordinating subcontractors/entrepreneurs, power suppliers and local authorities in establishing the charging point infrastructure on the streets of Oslo. It has therefore been a long and complicated process.
- Identifying appropriate public street areas for developing charging points has been a complicated process.

Expectations

- Learn about strategies that other European cities have used to deal with the challenges in this field
- Access a European network on transport-related issues

Partner Inputs

- Experience of a range of incentives for increasing electric vehicle uptake. Oslo will share its experience of successful incentives with the partners.
- Experience of putting in place a charging point infrastructure. Evaluation is underway and the results will be known at the end of 2010, which will be shared with the partners.
- Experience of mature electric vehicle owner associations e.g. NORSTART. It advocates for electric cars, helps drivers to sort out problems, provides an interface with government and businesses.
- Fleet vehicles case study to share, from Trondheim
- Development of a database of charging points which will be accessible by web. GPS, SMS.
- Demo project of fast charging points and utility vehicles starting in 2010

URBACT Local Support group

Oslo's URBACT Local Support Group will include representatives or decision makers from:

- Norwegian Association for Electric Vehicles, Norstart
- Norwegian Energy Association
- City Administration.
- Oslo Department of Transport and Environmental Affairs
- Association of Regions and Municipalities

Other organisations may also be included.

The main objective of the URBACT Local Support Group will be to improve information flow between all stakeholders in the field.

Local Action Plan

Priorities for the Local Action Plan have been identified as:

- Development of infrastructure for fast charging points
- Inventory of all electric vehicle parking spaces and measure use by charging and non charging cars.
- Stimulate car producers to export a high volume of electric vehicles to Norway.
- Increase the number of electric vehicles in several departments of the City of Oslo.

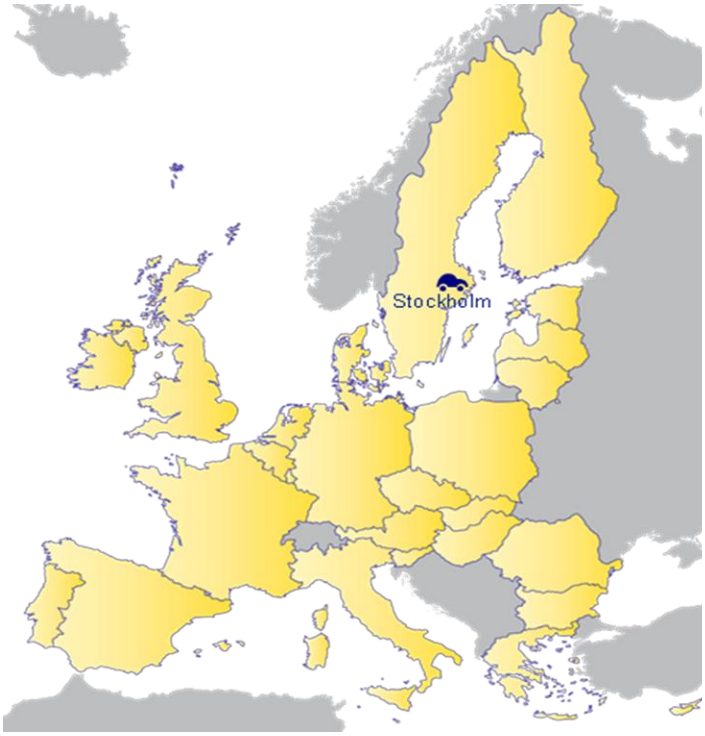
Managing Authority

Oslo will involve the Ministry for Municipal and Regional Affairs by keeping them informed of the work of the EVUE project and inviting them to relevant meetings.

"The Green car project aims to kick start the Electric Vehicles market"

3.10 Stockholm, Sweden

City of Stockholm



Partner Details

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Introduction

Stockholm, the capital of Sweden, has a population of 800,000 and just over 2 million in the metropolitan area. It has high levels of political commitment to fossil fuel transport modes and is Green Capital of Europe 2010.

Current challenges for Stockholm include the low availability and high purchase price of electric vehicles.

In EVUE Stockholm hopes to look at common solutions to common problems, and compare the success of different incentives. It sees EVUE operating as a think tank for how to make the business case for electric vehicles.

Key facts

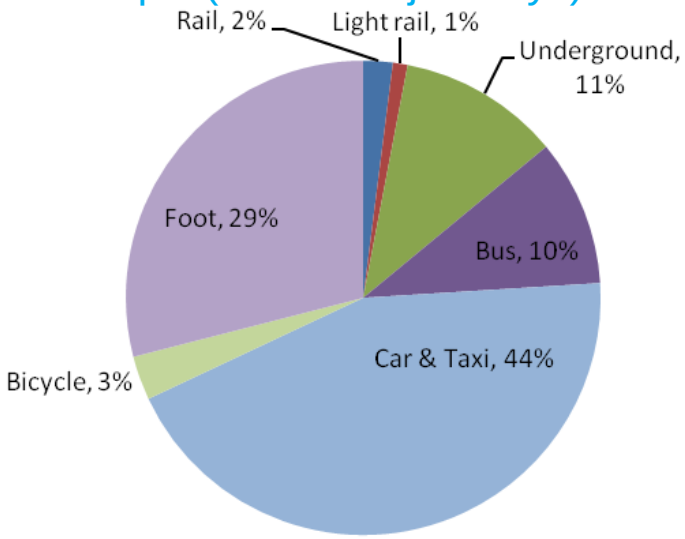
- Population: 2,091,182 (metropolitan area)
- Surface area: 6,500 km2
- Population Density: 311inh/km2
- Per capita Income: 25,550 €/yr

Transport and Mobility

ICE cars

- 792,583 registered vehicles.
- Motorization rate of 379 per 1000 inhabitants.
- Approximately 70% of new vehicles are bought by companies. Citizens mainly buy second hand cars. Average age of cars is 11 years.
- Traditionally large vehicles are preferred by consumers.

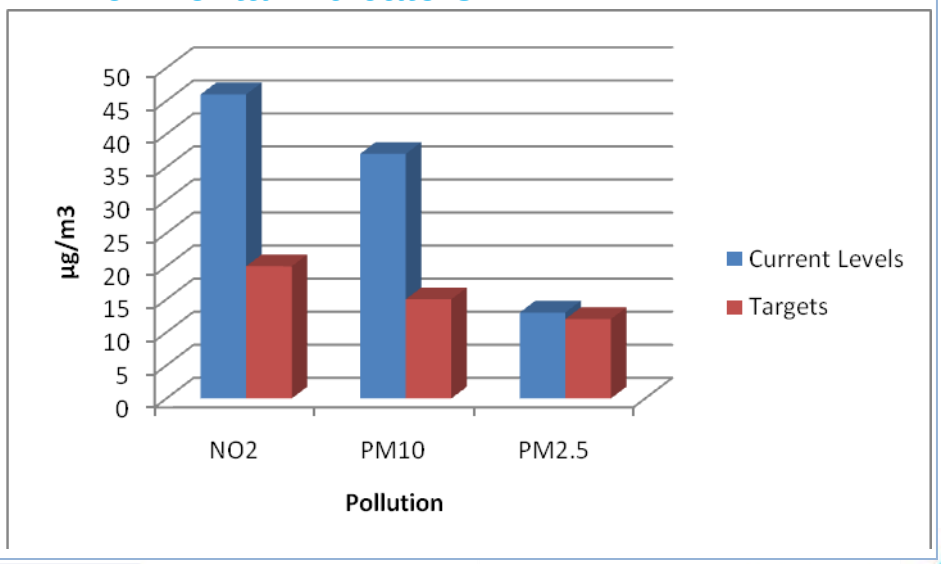
Modal split (% of total journeys)



Demography and Geography

- Stockholm is built on 14 islands with concentrated traffic flows on the limited number of bridges between the North and South.
- The climate is cold, affecting electric vehicle performance. The advantage is that Swedes are in the habit of plugging in cars for heating.
- Sweden is sparsely populated with families often spread out resulting in long car journeys.

Environmental Indicators



Electric Vehicle strategies

Governance

- The national target is that the entire car fleet should be independent of fossil fuels by 2030.
- Stockholm has a political target to become an electric vehicle city by 2030 and fossil free by 2050.
- A detailed electric vehicle strategy is awaiting adoption and will be ready to be implemented in 2010.
- The Climate programme has targets and plans for greenhouse gas reductions.
- The city requires clean vehicles in its procurement of vehicles.
- Stockholm is Green Capital of Europe 2010.

Projects

- Mobilel project – five plug-in Hybrid electric vehicles are tested and electronically monitored for two years to see actual driving and charging behaviour
- Stockholm belongs to the 'Network of Swedish clean vehicle cities', which make joint procurement decisions, lobby national government to change obsolete legislation, carry out joint studies on behaviour, safety, emissions etc.
- Stockholm is a partner in the EVA project proposal, currently under assessment.

Electricity company Fortum charging point in central Stockholm

Infrastructure

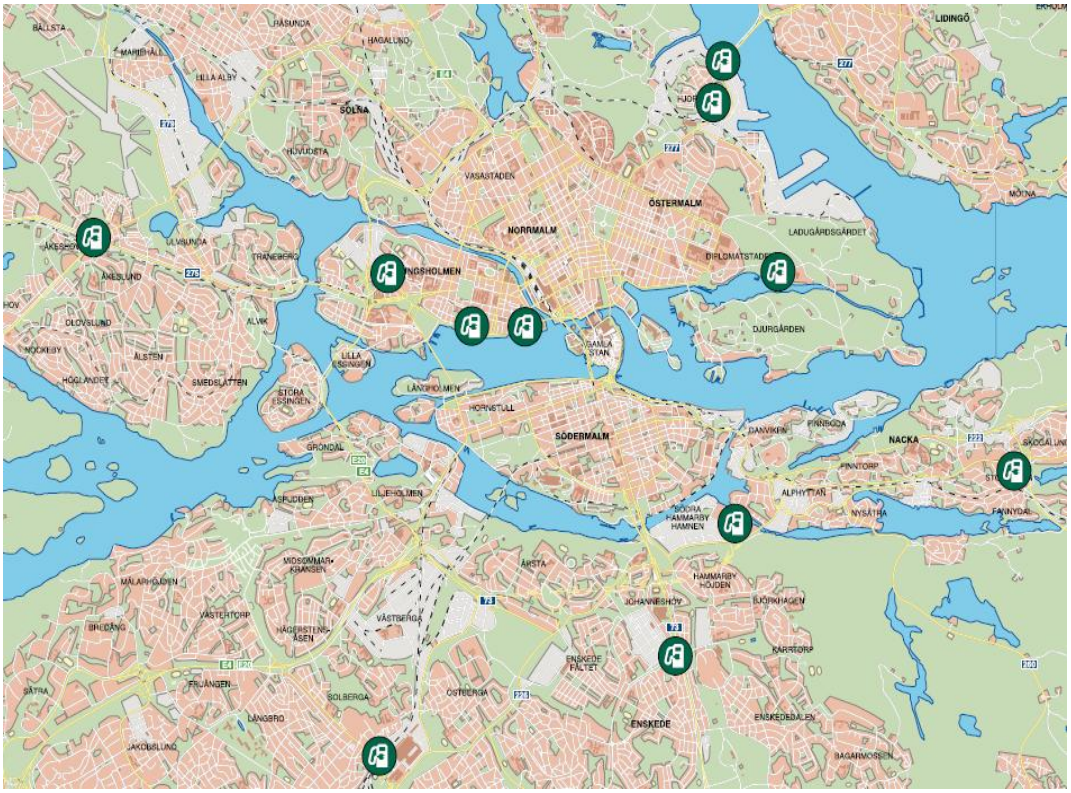
- 112 slow chargers and 2 fast chargers are in place, located in car parks and garages.
- By 2011 there will be 350 slow chargers and an additional fast charge point available for all models of car. In addition around 40,000 homes have access to electric charging through existing facilities (for winter car heating).
- Energy is mainly from bio-co-generated electricity, hydro, some wind power.

Vehicles

- There are 9 registered electric vehicles in city of Stockholm, of which 6 are Municipal fleet vehicles and 3 are privately owned.
- There is a target to have 3,000 electric vehicles in the city by 2013, 85 of which will be Municipal fleet vehicles.

Incentives and Marketing

- Lower annual car tax
- Lower company car tax (-40%)
- Very low electricity price
- Reserved parking



Charging Points in Stockholm

EVUE opportunities and expectations

Challenges

- Low availability of electric vehicles on the market.
- The high purchase price of electric vehicles
- To receive national incentives

Expectations

- To learn from other partners' experiences.
- Make the EU strategy for electric vehicles more specific
- Join forces to change regulations and standards which block progress
- Common solutions/studies on common problems
- Join forces to show European demand for electric vehicles in competition with the USA and Asia
- Compare the success of different incentives
- Think tank for how to make the business case for electric vehicles.

Partner Inputs

- Results of the Mobilel PHEV trial project
- Share success of marketing incentives
- Bottom up and cross party approach to drive electric vehicle strategies
- Joint procurement research
- Hertz/ Sunfleet exploration of EV fleets and a business model to rent out cars and posts
- BEST project experience of market development of Biofuel vehicles

URBACT Local Support group

Stockholm's URBACT Local Support Group will comprise of:

- Environment & Health administration
- Traffic administration
- Fortum – the major electricity provider
- Herz/Sunfleet – one of the major car club/renting companies
- Stockholm Parking Co
- Preem – oil company
- Land management authority
- Motormännen – National Automobile association (national drivers' NGO)

In addition, a group of advisory organisations will be invited to the most relevant meetings.

- National Energy Agency
- Green car drivers (national drivers NGO)
- University of Östersund (EV mechanics education)
- Planning administration (city dept)
- Exploitation adm (city dept in charge of the land owned by the city)
- Tillväxtverket (Managing authority)
- Swedish association of Environmental managers
- Test site Sweden – National demonstration and testing arena for safety, the environment, and ITS
- Stockholm transport
- Clear channel – in charge of Stockholm city bike program
- the Swedish Clean vehicle cities

Local Action Plan

Priorities for the Local Action Plan have been identified as:

- Put in place a plan for making Stockholm an electric vehicle City by 2030.
- Stimulate supply of electric vehicles through joint procurement initiatives
- Develop and implement local incentives
- Analyse safety issues
- Find optimal place for inserting charging points
- Educate drivers

Managing Authority

The Managing Authority is Tillväxtverket. A representative attended the ULSG/City Visit meeting and explained the ERDF OP status. They will follow the work of EVUE and the city will meet regularly with them to find synergies with other projects being funded.

'It is easier to reduce CO2 emissions in buildings than in transport. EVs must be seen as part of an integrated multi modal solution''

3.11 Suceava, Romania

City Hall of Suceava Town

Partner Details

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Introduction

Suceava in north east Romania has a population of 106,000. 72 % of journeys there are made by car, which is the highest of all EVUE partners.

For Suceava the starting point with regard to electric vehicles is exacerbated by challenging circumstances. However, the level of local interest is high, as shown in the first ULSG meeting.

The city hopes to learn what the most efficient model is for putting electric vehicles in place.

Key facts

- Population: 106,753
- Surface area: 52.1 km2
- 138,528 km of roads
- Population Density: 2049 inh/km2
- Per capita Income: 210 €/yr

Transport and Mobility

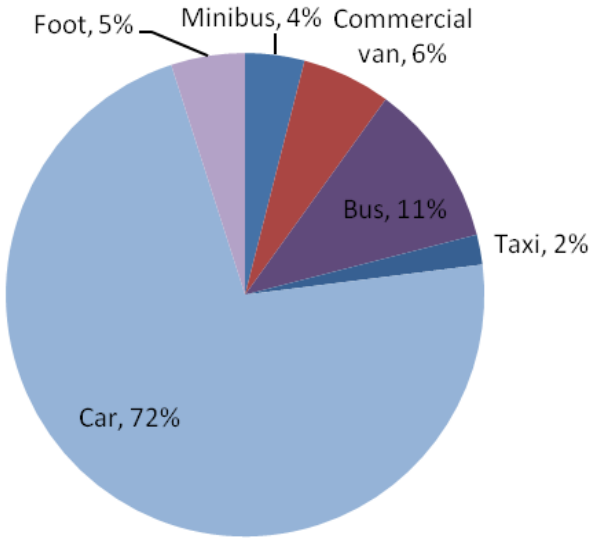
ICE cars

- 44,000 vehicles registered
- Motorization rate is approximately 355 vehicles for 1000 inhabitants
- Average age of vehicles is 7 years
- 70% of trips are made by car

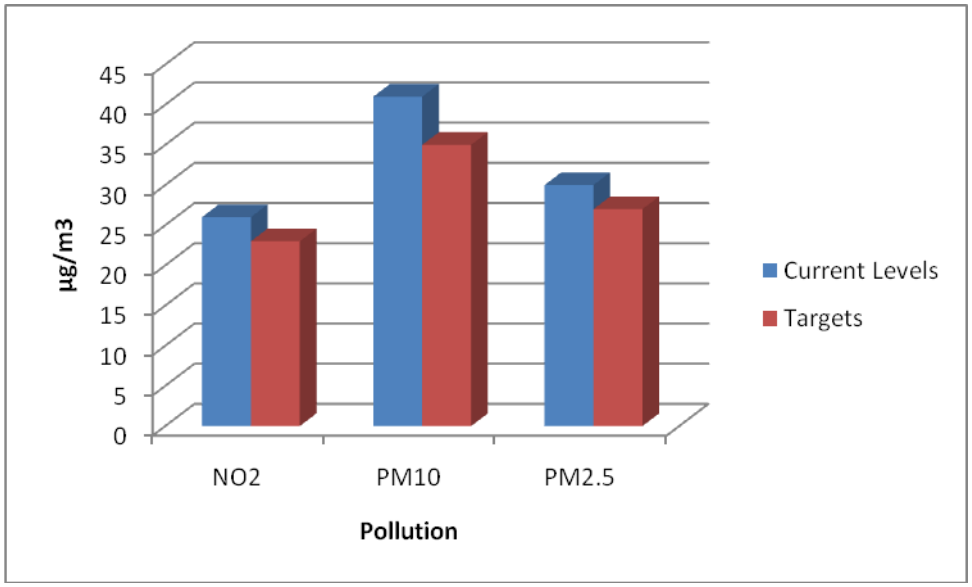
Demography and Geography

- Suceava has a relatively young population with 34% of the population aged 20 to 39.
- Suceava is a compact town, surrounded by hills.
- Suceava is an important national road traffic junction where connections with neighbouring towns converge. These routes pass through the town centre as well as residential areas.

Modal split



Environmental Indicators



Electric Vehicle strategies

Although Suceava does not yet have specific strategies to introduce electric vehicles this page lists infrastructure initiatives that will focus on mobility and the public realm. Suceava will consider the possibility of including EV infrastructure in these projects.

Governance

- The Urban Development Integrated Plan proposes measures and distinct projects for ensuring a sustainable local development, to be funded by ERDF. These include:
  - "Rehabilitation of streets, bridge and passage, parks modernisation and creation of modular bus stations for public transport" – it foresees carriage way improvements, the installation of roundabouts and bicycle lanes, extending of public transport buses routes and also expanding the road network to service new residential areas.
  - "Rehabilitation of the town centre, creation of underground parking facilities, rehabilitation of pedestrian route and adjacent streets" – regeneration of the historical town centre crossing street will be undertaken with increasing pedestrianisation, two underground parking facilities totalling 162 parking spaces will be built, and the supporting road network enhanced.

Projects

- Projects are underway to address congestion in Suceava. These include modernisation of intersections, installation of traffic lights and roundabouts, car access restrictions and information measures (webcams, CCTV) to better manage road traffic.

Westminster City Council Project Coordinator Matthew Noon and Finance Manager Maku Obuobi with Narciza Nenec of the Suceava Town Hall European office

Infrastructure

- There are currently no charging posts in Suceava. There are plans to install 6 charging posts by 2020.

Vehicles

- There are currently no electric vehicles in Suceava. There is a target to have 50 electric vehicles in the city by 2020. It is anticipated that 38 of these will be privately owned, with 10 private sector fleet vehicles and 2 municipal fleet vehicles.

- Trolley buses previously operated in Suceava but due to increasing maintenance and high replacement costs, they were removed in the 1990's. However some infrastructure still remains eg overhead power lines and there is interest in reviving the system.

Incentives and Marketing

An Inter-ministries Commission has been created in 2010 to elaborate Romania's Strategy for Electric Vehicles. The ministries involved in that Commission are: the Ministry of Economy, the Ministry of Finance, the Ministry of Environment and the Ministry of Transport.

Another Commission was nominated to work on finding feasible solutions for tax levels for the low emission vehicles, which brings together representatives from the private sector.

Renault Dacia is planning an initiative for the end of 2010 to offer (for testing) electric cars to Romanian urban local authorities to persuade them to invest in energy charging points infrastructure. The result is envisaged as a Study for implementing a national network for charging points.

17 year old Scout leader Natalia Klus who will be involved in promoting Electric Vehicles to young people in Suceava.

EVUE opportunities and expectations

Challenges

- The level of investment needed for setting up charging facilities could be prohibitive and result in a slow response.
- The introduction of electric vehicles needs to be done at national scale to replace older cars. There is still a low level of car ownership nationally with ownership levels at approximately one car per family.
- The price of electric vehicles and the need to buy new cars are serious impediments.
- Insufficient parking infrastructure available, resulting in congestion on road and pavements as they are used for parking

Expectations

- Transfer know-how from more advanced regions and economies to develop a local integrated strategy for clean vehicles.
- Support for designing a workable model for electric vehicle implementation
- Assistance in developing incentives for adopting clean vehicles
- Learn what the most efficient model is for putting electric vehicles in place

Partner Inputs

Good network of educational, youth and environmental organisations willing to communicate about electric vehicles.

ERDF projects that could incorporate electric vehicle infrastructure

"It is important to teach people that the environment must be protected. We are very happy that Suceava Town Hall has brought us into the electric vehicle project."

Professor Pentiuc of the Electrical Engineering Department of Stefan cel Mare University of Suceava is also President of the National Association of Engineers and will disseminate information through this network.

URBACT Local Support group

Suceava's URBACT Local Support Group will create the opportunity to initiate open discussion about electric vehicles. At the first open meeting in April 2010 coinciding with the Lead Partner and Expert visit 25 people attended to find out more.

It will aim to become a communication point between authorities, associations, operators and user groups. It will involve a range of stakeholders, which will have varying levels of involvement as necessary and appropriate. The group will include:

- Ministry of Regional Development and Tourism – General Direction for Territorial Development department.
- AMR Romanian Municipalities Association, has assigned someone to help with dissemination activities
- URTP Bucharest – the Union for Romanian Public Transporters
- County Police
- Public transport (operators and associations of operators)
- Media (newspaper, local radio)
- Non-governmental organisations (researchers, environmental protection activist, human resources development, pupils reunited to volunteer for change)
- Education centres (high schools, university, organisation of students)
- Local politicians (Suceava Local Council, decision makers).

Local Action Plan

The Local Action Plan for Suceava will be an Electric Vehicles Promotion Strategy. It will seek to:

- Undertake communications campaigns to promote electric vehicles
- Initiate electric vehicles market development
- Plan integrated development of electric vehicles, with legal provisions regarding taxation and accessibility, along with market development
- Find mechanisms for overcoming the financial barriers to adopting electric vehicles

Managing Authority

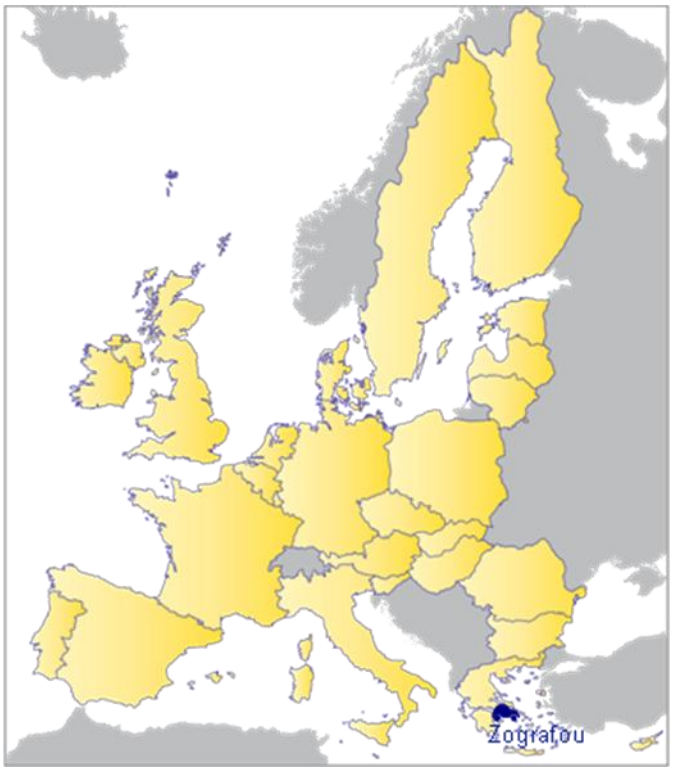
The managing authority is the Ministry of Regional Development and Tourism. A representative is a member of the Local Support Group and will take part in the elaboration of the Local Action Plan offering expertise and ensuring compliance with national regulations.

Opening the debate on technologies to protect the environment will open the way to these initiatives being financed or co-financed in the future.

First meeting of Suceava ULSG on April 14 2010

3.12 Zografou, Greece

Municipality of Zografou - Athens



Partner Details

Anastasia Botou
Deputy Mayor

Municipality of Zografou

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Introduction

The Municipality of Zografou borders the Municipality of Athens in Greece and has a population of 130,000.

Zografou faces serious challenges, starting from zero, in the context of the national financial crisis. Investment in electric vehicles will be very difficult to identify.

Through EVUE participation the municipality will start the process of raising awareness of the benefits of an electric vehicle strategy.

Key facts

- Population: 130,000
- Surface area: 8,517km2
- Population Density: 15.26 inh/km2
- Per capita Income: 15,960 €/yr

Transport and Mobility

ICE cars

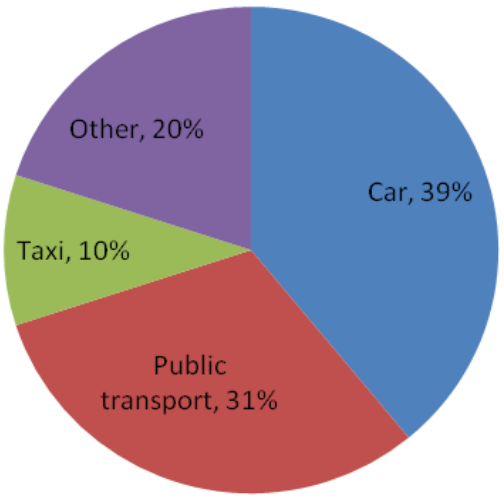
- 30 to 40% of trips are by car

Demography and Geography

- Zografou hosts two major universities, resulting in a high student population who are environmentally aware. The student population creates a lot of through traffic every day.
- Zografou is densely populated with narrow streets and a hot climate. These factors exacerbate the effect of polluting emissions making electric transport an important way of improving quality of life for residents.
- With a high proportion of hills in the municipality, the road network is constrained.
- Zografou is within the secondary cordon for air quality in Athens.

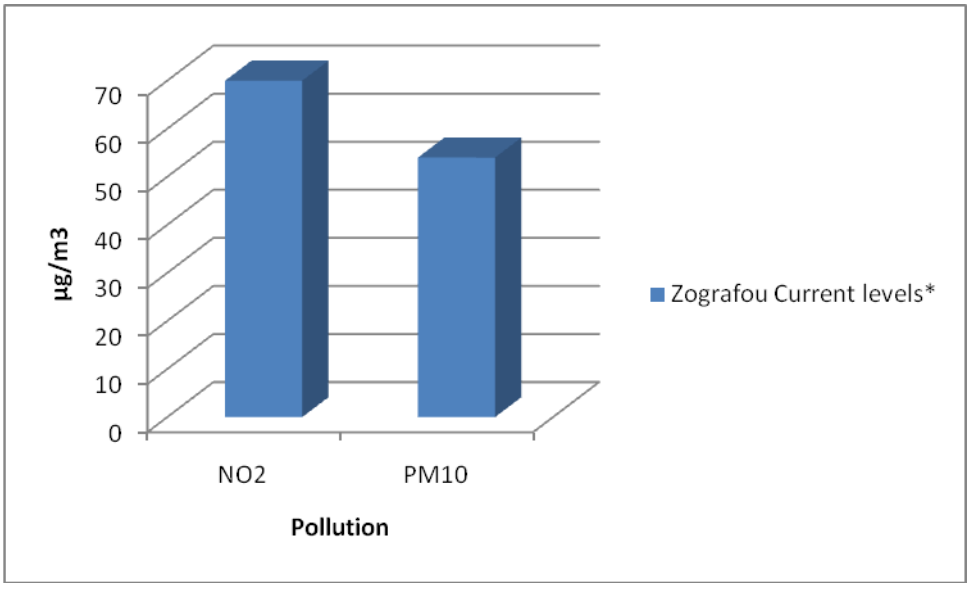
Modal split

For Attica Region, 2001



Source: Development and financing of urban rail infrastructure – the case of Athens (G Nellas).

Environmental Indicators



Electric Vehicle strategies

Governance

- The Ministry of Transport established in January 2008 a Commission for the promotion of "Green Transport" in Urban areas. This commission is composed of 9 interdisciplinary scientists and aims to "study, promote and apply measures for energy saving in the transport sector aiming to improve environmental quality. The commission is looking forward to adapting best and successful innovative practices applied in other EU member states". There are three priorities: 1. research and coordination of measures to obtain green mobility and CO2 reduction. 2. Energy improvement of infrastructures and building facilities. 3. Information and communication for citizens. Among the five actions defined are:

    1. Incentives for accelerating the renewal of the vehicle fleet with environmental friendly motorised vehicles.

    2. "Green vehicles" for public transport: 200 new natural gas buses (in addition to the existing 416), 12 electric buses with batteries (initially for Athens and then for other cities), pilot action for one hydrogen bus and one hybrid bus, study incentives for replacement of taxis with hybrid vehicles.

    3. "Eco-driving" campaign to reduce energy consumption (target 15%).

    4. Policy improvement for emission control for cars and development of gas refuelling infrastructure in cities.

- The Strategic Plan of Zografou (2008), includes a priority to define 'ecologic' vehicles; and one to define the framework for green policies, reduction of emissions and development of renewable energies.

Projects

There is an organisation called "Hellenic Institute of Electric Vehicles" which organises an annual 'High Tech Ecomobility Rally' for hybrid vehicles. In 2009, 12 privately owned vehicles participated in the rally.

Westminster City Council staff give training on URBACT requirements to the Zografou Finance team.

Infrastructure

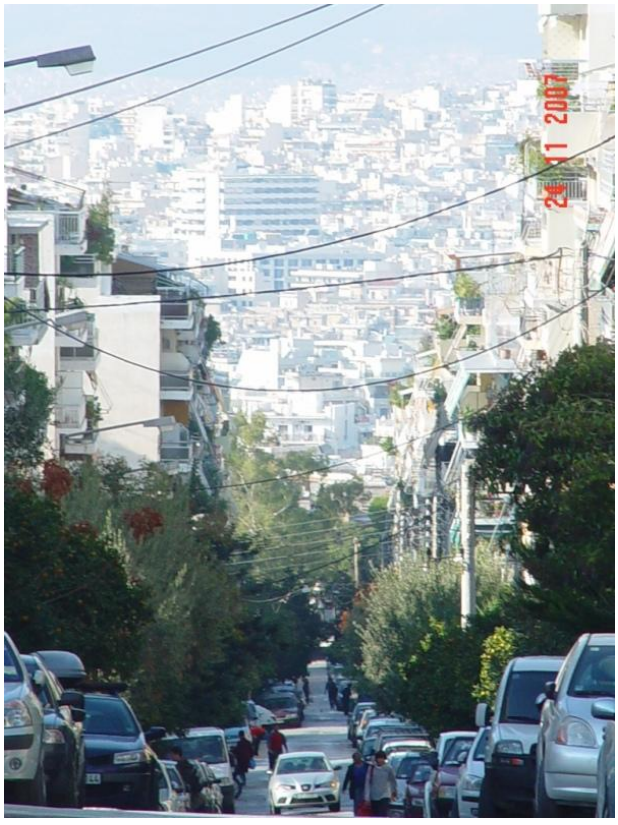
- There is currently no electric vehicle infrastructure in place in Zografou.

Vehicles

- There are currently no electric vehicles in Zografou.
- There are targets to have 2 municipal fleet vehicles and one electric bus by the end of 2012.
- Athens Municipality have been donated ten electric vehicles by Piraeus Bank.

Incentives and Marketing

- There are currently no incentives in place for the take up of electric vehicles.



Street scene, Zografou

EVUE opportunities and expectations

Olaf Palme Avenue , Zografou

Challenges

- Demonstration of the benefits of electric vehicles

Expectations

- Demonstrate environmental benefits of electric vehicles and put in place economic incentives such as free parking.
- Briefing, recording of experience and knowledge, consultation, communication and exchange of good practices with other partners
- Finding solutions to the practical, technical and legal difficulties
- Evaluation of data, sensitization and briefing of citizens
- Planning of a pilot programme for implementation
- Support the development of an EU wide framework for the application of electric mobility.

Partner Inputs

- Challenges of starting from zero, in the context of financial crisis
- Development of a trial electric vehicle project with the Polytechnic University NTAU
- Sharing results from Athens municipality trials with cars donated by the Bank of Pireus.

PV University Zografou

URBACT Local Support group

Zografou's URBACT Local Support Group will build on an existing strategy group at the Polytechnical university of Athens. It will be comprised of:

- Municipal departments for solid waste collection, school buses, social services, municipal service cars, municipal policy.
- Attiki MA of ROP 2007-2013
- Citizens NGOs
- Freight deliveries operators
- Representative of car importers
- University (NTUA) clean vehicles dept.
- Ministry of Transports
- Ministry of Environment
- External collaborators specialised in electrification.

It will also collaborate with other government owned institutions to provide proposals for national strategy. The group will meet regularly and will aim to:

- Provide briefings on electric vehicles and latest developments
- Draw up proposals and innovative ideas
- Discuss possibilities for implementation and financing.

Local Action Plan

Priorities for the Local Action Plan have been identified as:

- Establishment of national and local strategies on electric mobility
- Increase awareness of the environmental and economic benefits of electric vehicles.
- Pool expertise from other partners and experts.
- Planning of a pilot for the implementation of an electric vehicle project
- Pilot action for the municipality of Zografou.

Managing Authority

The managing authority is Management Authority of region of Attiki.

The Managing Authority will be invited to participate in Local Support Group meetings.

"We are starting from zero here, and don't know which stakeholders to involve. But we will turn a weakness into a strength. By getting involved in EVUE we will learn a great deal."

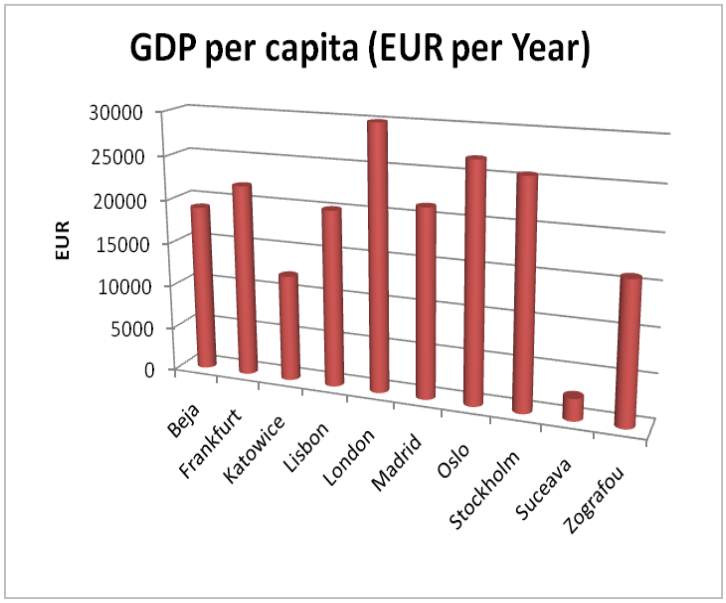
4. Conclusions and call to action

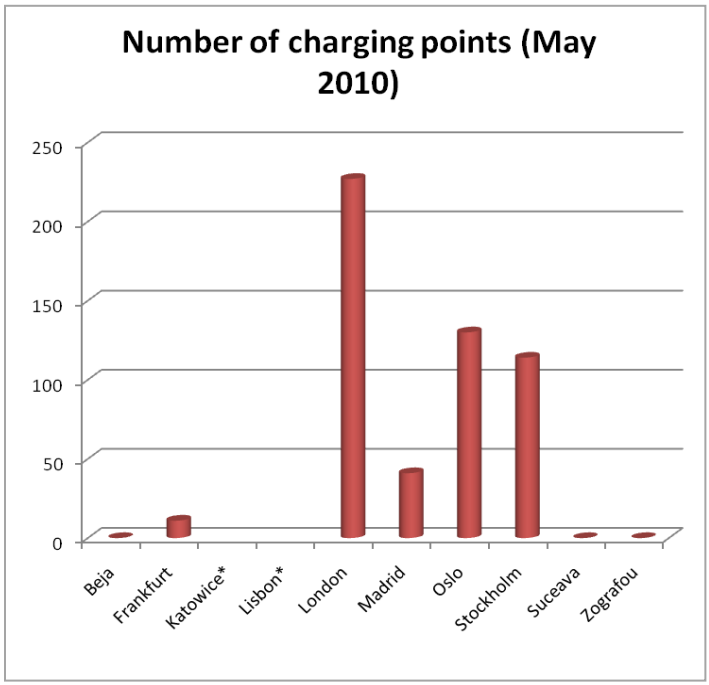
4.1 The common challenges

The Overview chapter and EVUE city profiles of this Baseline Report document the variety of strategies and challenges for increasing the uptake of electric vehicles within and beyond the EVUE network.

EVUE benefits from a good geographical spread with a range of technical and knowledge levels, from the most advanced in Europe to absolute starting points. Political and economic contexts across the partner cities differ, with variations in average GDP, in available resources for investment, attitudes to the environment and general car cultures. The individual city profiles and the table of Partner Inputs outline the expertise and perspectives that each city will bring. This constitutes a rich and diverse source of experience and information to feed into the URBACT EVUE exchange programme.

The commonality across all EVUE partner cities, regardless of current status, is the reality of being at the beginning of a long term innovation process. This is uncharted territory, and cities are facing complex challenges and high levels of risk. As a result all EVUE cities are hungry for practical knowledge on how electric vehicles strategies are working elsewhere.





The common questions arising in all cities are:

- What is the business model?
- What role does the city play?
- How do we make electric vehicles more acceptable, attractive, and affordable?
- What infrastructure is needed and what is the partnership model for investment and implementation?
- What is the best regulatory framework?
- How do we get started?

At this moment in time the answers are not clear.

> ***"The Kick off meeting showed that we are all struggling with the same issues. It was better than paying for a training course, to be able to listen to other city approaches and discuss them."***

4.2 Questions at the heart of EVUE

During the EVUE Development Phase each city completed a baseline questionnaire, hosted a visit from the Lead Partner and Lead Expert and participated in two network meetings. During this process many questions emerged which will need to be addressed by both Local Action Plans and the transnational exchange.

This section elaborates the many and wide ranging questions relevant to cities.

4.2.1 What are the business models for electric vehicles?

This incorporates many elements, such as:

- Who should pay for **infrastructure development** and how?
- Where should charging points be located, and should they be fast or slow charging?
- How can they best be incorporated into the public realm to avoid street clutter and design out any likely health and safety issues from trip hazards?
- How can urban planning regulations for new developments and construction be adapted to support an increase in electric vehicles and charge points?
- What is the best technology and system architecture for user-friendliness and to future proof investments?

- What are the options for payment systems and how are they integrated into the infrastructure?

  How can standards be set to avoid incompatibilities between plugs and charging points?

- How do countries in challenging economic and political contexts get started?

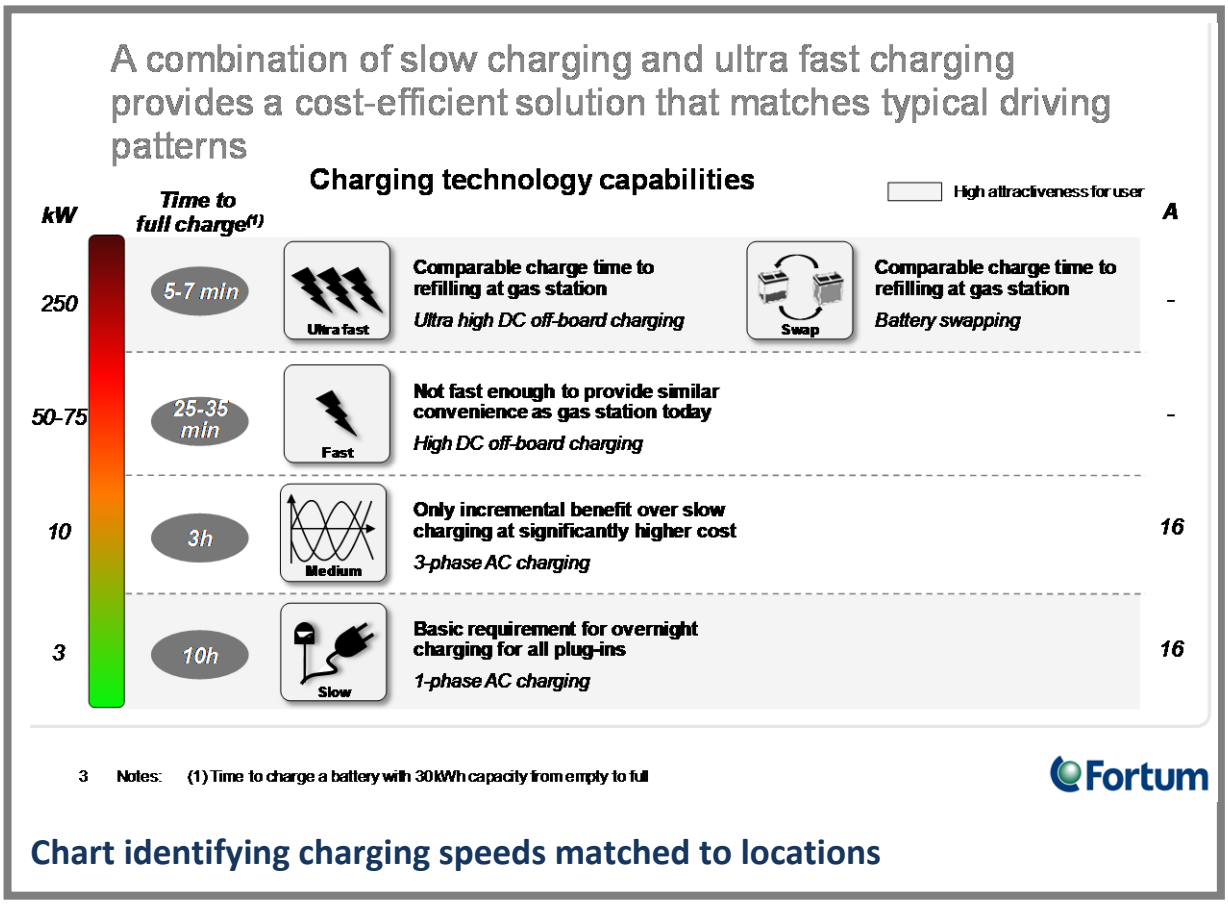
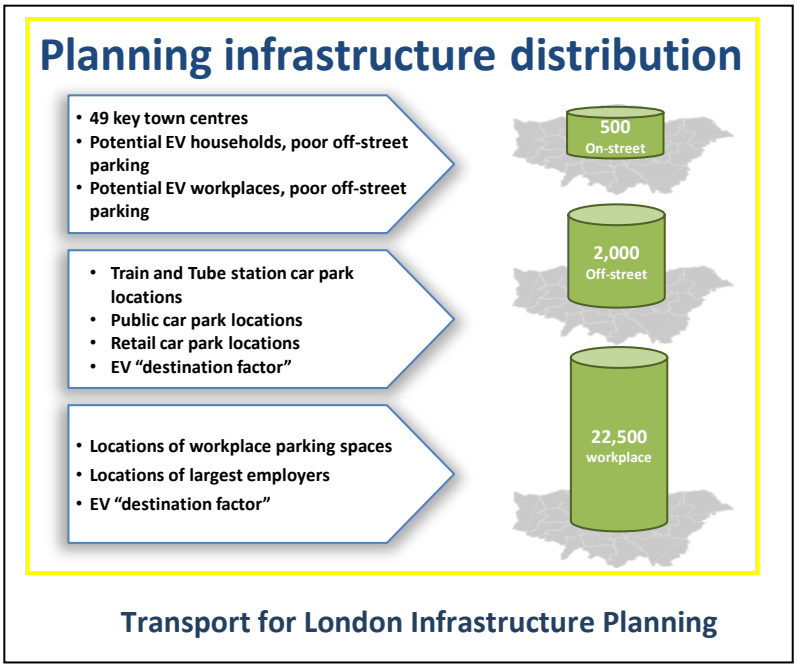


Chart identifying charging speeds matched to locations



Transport for London Infrastructure Planning

How is **energy supply** managed?

- What is the role of the electricity companies?
- How can electricity providers be active stakeholders in developing electric vehicles markets? How well are existing models working?
- Do regulations need to change to charge for electricity on municipally owned land?
- To what extent can and should electric vehicles use green or clean energy, and what are the consequences for electricity supply?
- How can cities develop and capitalise on smart grids?

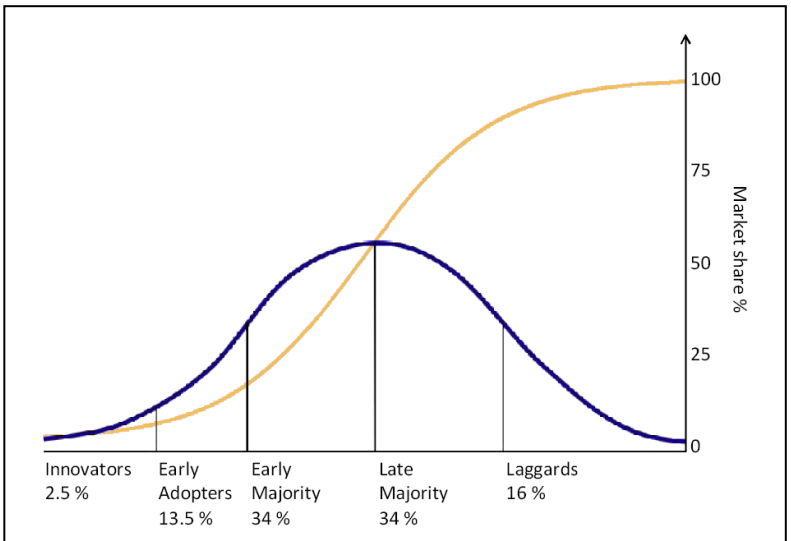
How can **vehicles** be made more **affordable**?

- How can the Total Cost of Ownership (TCO) be communicated and accepted?
- How do cities secure the purchase of the first tranche of electric vehicles for municipal fleets at reasonable cost?
- How can procurement be used as a tool to lever in sufficient volumes and purchasing power, set and achieve electric vehicles targets, and encourage suppliers to convert fleets?
- What national incentives have been tried and how effective are they?

"At the moment we are paying a double premium for electric vehicles: One for the innovation, one for the ecological benefit. "

What is the best regulatory and fiscal framework?

- How can cities use short term **incentives**, such as free charging and parking, to encourage uptake, whilst planning for an economically viable and sustainable scenario in the longer term?
- How can the potential negative consequences of electric vehicles incentives be managed?
- How can cities prevent and monitor modal shift from public transport, cycling and walking to electric vehicles?
- What, if any, are the new safety issues- airbags, electromagnetic fields, rescue services, feeder pillars- for cities to assess risk?



S curve of innovation diffusion to inform electric vehicles market development

"It is not possible to create a free market for electric vehicles. Norway is the only place where individuals are spending their own money on electric vehicles because the attractive framework has been developed by the state."

How can all the stakeholders be brought together in **partnership** to cooperate in electric vehicle development?

- What are the best public private investment models, and how do they change as the market matures?
- What are the respective roles and interfaces between national government, regions, cities and commercial stakeholders such as car and charging point manufacturers, and energy suppliers?
- Who leads the process?

"Technically everything is possible. It's getting the process around it working well."

How can cities measure the benefits of electric vehicles and develop evidence of the business case?

- What are the right indicators?

4.2.2 How do cities raise awareness amongst citizens and electric vehicles drivers of the future?

As well as attractive options for fleet owners, electric vehicles need to become acceptable to mainstream car buyers and not be the preserve of the environmental activists. Manufacturers are working on models that have improved range, comfort and design, that can eventually substitute family cars. An informed and supportive consumer base needs to be built. Electric vehicles car owner associations exist in each country and are coordinated at European level by AVERE.

- How can the public be informed about the benefits of electric vehicles?
- Which are the best ways to educate younger people and will they influence their parents' consumption?
- Can existing electric vehicle drivers of fleet and private cars be supported as 'ambassadors'? If so, how?

"We are missing demand side information- what makes people buy an electric vehicles for professional or personal use? We have to communicate the concept of Total Cost of Ownership and reduce the perception of cost"

4.2.3 How can political support be gained?

It is vital that politicians and the media are well informed about electric vehicles. Cross party, long term political support is needed to sustain the investment and commitment required to effectively introduce electric vehicles.

- What are the winning arguments for different audiences?
- How can cities build and anchor political support for electric vehicles?
- How will competing challenges for road space and on street parking be addressed?
- What targets are realistic and achievable for cities?

"Electric vehicles are a long term issue. The benefits will be seen in 2020/2030 in CO2 reductions. It's hard to get politicians to think in those timescales."

4.2.4 Can electric vehicles contribute to sustainable business and job growth for low carbon economies?

Green technologies are a key focus of strategies to re-orient economic development in line with environmental priorities in both Europe and the USA. Many such policies have been given extra stimulus since the financial crisis.

- How can cities generate business and job growth through the electric vehicle value chains?
- How can electric vehicles promote strategic economic development of a region?
- How can cities harness their knowledge institutions for competitive advantage?

4.3 Knowledge exchange

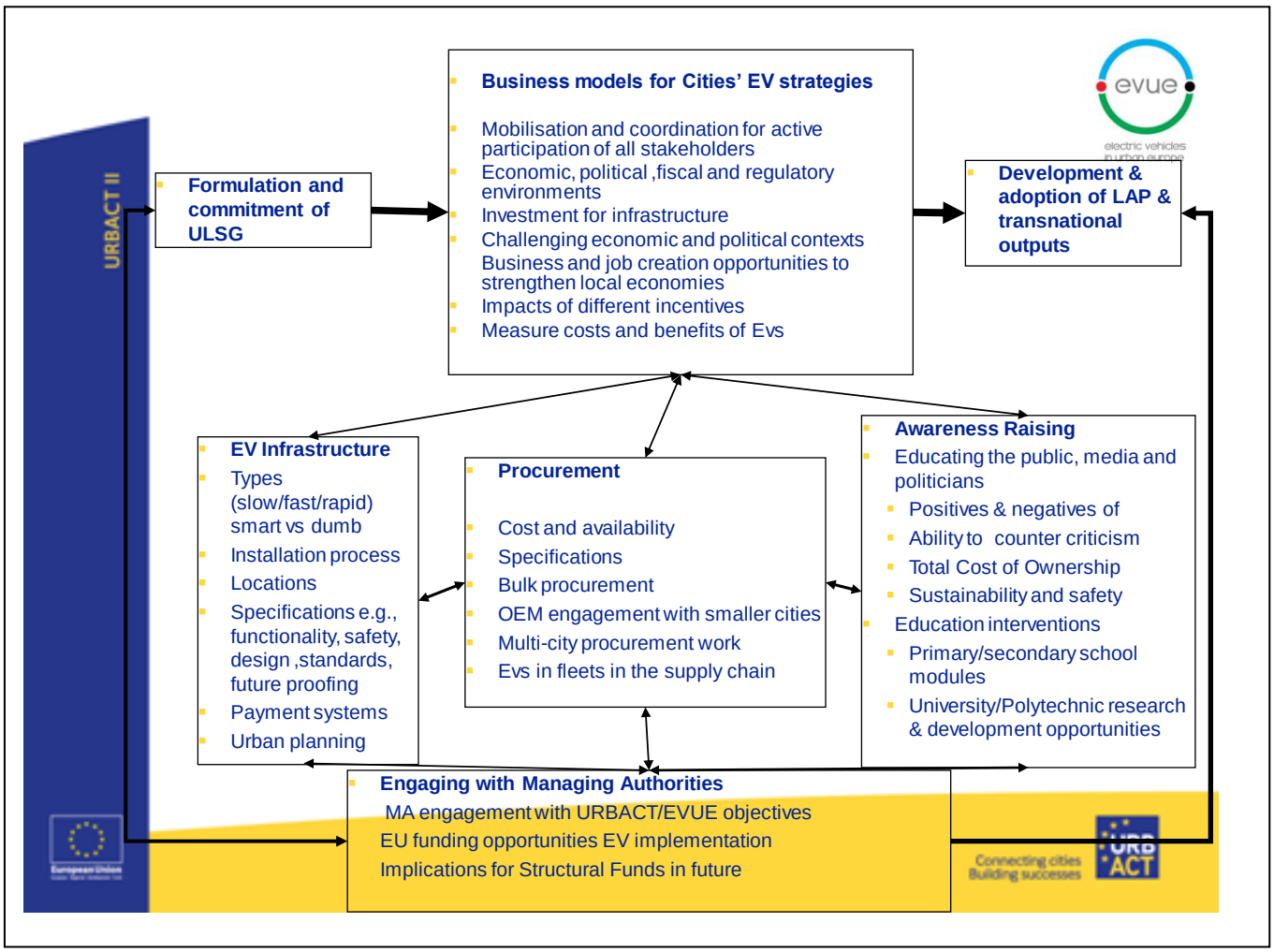
4.3.1 Transnational meeting framework

During the course of the two EVUE network meetings held during the Development Phase the challenge was to take the rich source of information and experience described in previous sections and to develop a transnational meeting framework to reflect and incorporate the specific inputs, expertise and learning needs of each city. (See Summary of partner inputs)

The information was first streamlined into key priority topics to be addressed. The topics then had to be translated into an activity plan for both the transnational exchange and Local Planning processes. In terms of the challenges relating to electric vehicle strategies the common questions arising in all cities related to a wide range of interrelated issues including business models, the role of cities, infrastructure, partnership models for investment and implementation, regulatory frameworks, affordability and acceptability of electric cars, awareness raising of benefits.

The three areas of focus for EVUE, which partners feel merit more in depth analysis are: Infrastructure, Procurement and Awareness Raising. These themes allow EVUE to focus on issues that correspond directly to the competences of cities, and on which they can have the most impact.

To provide insight into the broader and overarching context that these three sub-themes feed into, EVUE will also identify and document existing electric vehicle business models for implementing EV strategies. By 'business model' we mean the combination and interrelation of elements, such as vision, principles, infrastructure, market and customers, communications, operational processes, financing (cost and revenue), and cost-benefit analysis that will underpin electric vehicle strategies.



The EVUE programme is an ambitious one. The participating cities are enthusiastic about and committed to the EVUE exchange. All partners are willing to contribute ideas, time and knowledge to achieve results, and believe that participation will enrich local planning for electric vehicle strategies.

Whilst it is important to understand the context of EU standards, national plans, regulatory frameworks, and indeed all the wider technical and economic questions listed above, EVUE will retain an emphasis on the learning and coordination steps required by city policy makers to deliver clean car strategies.

The summary of partner inputs below will feed into the transnational exchange programme.

Summary of partner inputs

City	Partner inputs
Beja	▪ Study on the green business and job creation opportunities around electric vehicles ▪ Experience and lessons learned from participation in the national MOBI.E programme ▪ Benchmark for smaller cities
Frankfurt	▪ Experience of being 1 of 8 regions involved in the German Elektomobiltät project ▪ Results of the ABG Nova (electricity company) 'Frankfurt Model' project including pedelec-sharing, combined parking and charging machines, installing charge points in car parks. ▪ Concept to install electric vehicles charge points/cars in park and ride facilities. ▪ Electric vehicles in use by Fraport, the Frankfurt Airport Authority
Katowice	▪ Experience and outcomes of the Green Stream project. ▪ Experience of the PEPESEC project in relation to use of renewable energy sources.
Lisbon	▪ Survey of citizen attitudes to electric vehicles from Lisboa E-Nova ▪ Results from the MOBIE.E national project ▪ Sophisticated technology and systems architecture, similar to ATM networks, INTELLI ▪ Information about global standards for charge points developing in TEPCO (Japanese consortium) via EFACEC ▪ Renewable energy and smart grid concepts
London	▪ Experience on the implementation of charging point infrastructure ▪ Public incentives to support electric vehicles adoption and usage ▪ Bulk procurement of infrastructure and vehicles to reduce costs ▪ Market research information on location strategy for infrastructure
Madrid	▪ Results of the MOVELE project in May 2011. ▪ 1.5 years' experience with small electric bus fleet. ▪ Annual car show in Madrid, ▪ Bi-annual International Congress on Mobility

	▪ Experience of fast charging points in municipal car parks. ▪ Memorandum of Understanding with Toyota and Renault to lease trial cars ▪ "Practice before rules" approach ▪ Specification for Charging Points ▪ European Investment Bank support
Oslo	▪ Experience of successful incentives and regulatory framework for electric vehicles ▪ Experience of charging point infrastructure. Evaluation of Phase 1 at end of 2010 ▪ Experience of mature electric vehicle owner association NORSTART ▪ Fleet vehicles case study to share from Trondheim ▪ Transnova national Green Car project to kick start the market ▪ Development of database of charging points accessible via GPS/SMS/web
Stockholm	▪ Results of the Mobilel PHEV trial project ▪ Success of marketing incentives ▪ Bottom up and cross party approach to drive electric vehicles strategies ▪ Joint procurement research ▪ Hertz/ Sunfleet exploration of electric vehicles fleets and a business model to rent out cars and posts ▪ BEST project experience of market development of Biofuel vehicles ▪ Fortum electricity company electric vehicles initiatives
Suceava	▪ Good network of educational, youth and environmental organisations to communicate about electric vehicles ▪ Technically skilled transport workers and University Department of Electrical Engineering ▪ ERDF projects that could incorporate electric vehicle infrastructure
Zografou	▪ Challenges of starting from zero, in the context of the financial crisis ▪ Development of a trial electric vehicles project with the Polytechnic University NTAU ▪ Sharing results from Athens municipality trials

Over the course of the two and a half year programme 12 transnational exchange events will be held to address these topics. The full timetable, locations and themes are in the table on page 97. In summary EVUE will organise:

6 Network meetings during which all city partners will come together for two days. The first will be held in a non partner city, La Rochelle. It is the most advanced electric car city in Europe and has extended an invitation to EVUE. Each network meeting will follow a common format.

- Half day project level news, summary updates on LAPs, and project progress, with one or two short updates or presentations from specific partners or stakeholders on recent news, trends, impacts.
- Half day site visit, meeting with ULSG, networking dinner
- Full day focussed and facilitated exchange on key topic

3 Expert seminars in convergence cities aimed at raising awareness and knowledge levels.

- One day programme
- Targeted at ULSG and wider audience if host city requires
- 3 experts or city representatives give presentations on topics such as electric vehicle strategy, market developments, national initiatives, funding models. The detailed programme to be agreed on a bi-lateral basis with each host city.
- Question and answer sessions
- Dinner and networking

1 Expert Exchange meeting

- One day programme
- Specialist peers come together from a smaller number of cities
- In depth exchange and joint planning on infrastructure planning and educational tools

1 Managing Authority meeting

- One day programme
- In Brussels with DG MOVE and DG REGIO
- Focus on the implications of EVs for Structural Funds
- Representatives of all MAs to be invited

1 Final Event in London

- Open meeting
- Sharing results and celebrating achievements

Within this programme a number of the key stakeholders from the city networks will be invited to present and compare their perspectives. For instance, there will be meetings which include representatives from several cities of:

- Energy companies
- Managing Authorities
- Car clubs/car sharing initiatives
- Fleet owners (private and public)
- EV owner associations
- National Plan Managers
- Infrastructure suppliers

Before each meeting partners will be asked to report on LAP, LSG, MA and budget status, and include any problems encountered. A short, summarised update will be produced for the meeting, to avoid time being taken up with bureaucratic subjects, and to maximise knowledge exchange.

All events will be designed and facilitated by the Lead Partner and Lead Expert to maximise productive and creative exchange. Hosting guidance will be produced and online meetings will be held between the Lead Partner, Expert and host city in advance to agree and prepare agendas and logistics. Programmes will include regular breaks, 'walkabouts' to see electric vehicles infrastructure and local initiatives, and active participation of all attendees.

Results will be presented in concise, coherent and visual reports. Each of the meetings will be documented in a standard reporting template in four sections:

1. Case studies/expert or city input
2. Exchange key points, critical success factors, transferability
3. Do's and don'ts for cities
4. References/links

All presentations and inputs to meetings, will be available online for project partners at all times through a password protected webspace to be provided free of charge by Fundacion Movilidad in Madrid.

	1 June-Dec 2010	2 Jan-June 2011	3 July – Dec 2011	4 Jan – June 2012	5 July – Dec 2012
Exchange Activities	**September – La Rochelle (FR)** **Network Meeting,** **Focus: Planning/ ULSG/LAP** **1 Day site visit** *October – Suceava (RO)* *Expert Seminar* **November – Madrid (ES)** **Network Meeting (International Mobility Congress)** **Focus : Business Models**	*April – Zografou (GR)* *Expert Seminar* **May – Oslo (NO)** **Network Meeting and Mayors Summit** **Focus: Awareness Raising and Communication** *June – London (UK)* *Expert Exchange* *Focus: Education tools (PIMMS conference)*	**September – Frankfurt (DE)** **Network Meeting** **Focus: Infrastructure (Frankfurt Motor Show)** *October – Katowice (PL)* *Expert Seminar* *November – Brussels (BE)* *Managing Authority Meeting* *Focus: Electric vehicles and Structural Funds*	**February - Lisbon/Beja (PO)** **Network Meeting** **Focus: Business models update** **June – Stockholm (SE)** **Network Meeting** **Focus: Procurement**	**November – London (UK)** **Final Conference, (open)** **Focus: Sharing results**
Dissemination	▪ Eurocities Mobility Forum, Denmark, June ▪ European Mobility Week, City PR ▪ International Mobility Congress, Madrid, November ▪ URBACT Annual Conference, Liege, December	▪ ECOMM conference, Toulouse, May ▪ Meeting Active Travel URBACT network	▪ European Mobility Week, City PR ▪ Frankfurt Motor Show ▪ URBACT Annual Conference, Dec	▪ EPOMM conference ▪ Motorshow ▪ International Conference on Land Use, Accessibility and Mobility, Beja, April	▪ European Mobility Week, City PR ▪ URBACT Annual Conference, Dec

4.3.2 URBACT Local Support Groups

All cities have held the first meeting of their ULSG, when hosting the city visit. The range of stakeholders involved is:

- Managing Authorities
- Electricity providers
- Infrastructure and car manufacturers
- Research institutes/Universities
- Environmental associations
- Car clubs/rental organisations
- Parking and traffic authorities
- Electric vehicle owner associations
- Fleet owners
- Business representatives and associations
- Youth associations, high schools
- Councillors and politicians

In most cases the City is chairing and facilitating the ULSG. The frequency of planned meetings varies between once every month and once every quarter. During each transnational event the host ULSG will participate in exchange and networking.

4.3.3 Local Action Plans

All partners have formulated the aims of their Local Action Plans and these are described in the Individual Partner profiles. All cities will contribute to and draw from the transnational exchange to inform their LAPs. Examples include:

- Developing a strategic plan for electric vehicles
- Defining Models for Public Private Partnership namely with car sharing companies, energy suppliers, parking companies and car manufacturers.
- Defining a communication strategy
- Stimulating supply of electric vehicles through joint procurement initiatives
- Increasing awareness of the environmental and economic benefits of electric vehicles.
- Pooling expertise from other partners and experts.
- Planning of a pilot for the implementation of an electric vehicle project

Transnational meetings will include a summarised update on LAP progress prepared in advance by the Lead Expert, based on a simple reporting form. At each event one or two partners will be asked to present a short report on their ULSG and LAP, where there are specific learning points or challenges that other partners may benefit from.

4.3.4 Managing Authorities

All partners have started the process of engaging their Managing Authorities (MA) in EVUE. The MAs and representatives are listed under each Partner Profile. Many of the MA representatives have attended the first ULSG meetings.

All partners are now aware of the opportunities under the relevant priorities of current Operational Programmes, mostly under Environment and Infrastructure. In some cases there will be further calls for projects in the next two years, which will be monitored, for instance, for possibilities to fund electric vehicles infrastructure development.

EVUE will also examine opportunities to influence the Operational Programmes in the next Structural Funds period post 2013. This is likely to be the focus of one transnational meeting to which MA representatives will be invited. The study on potential for low carbon economy jobs and business would feed into this. Several of the MA representatives involved in the first ULSG meetings felt this would be a useful contribution to thinking about reformed or restructured European Fund plans.

As well as ERDF (European Regional Development Fund) and ESF (European Social Fund), EVUE partners have identified other funding streams that may be accessed to implement local action plans in the future. In many cases there are national

funds dedicated to low emission vehicle targets. EU funds under FP7, such as Intelligent Energy Europe and other R&D programmes, interregional cooperation programmes and Norway EEA grants may offer opportunities. These will be considered as part of the Local Action Planning process. Information about calls will be promoted within the network and could result in further collaborations.

4.3.5 Capitalisation

The results of EVUE exchange and learning will be relevant to many other European cities that are on the same learning curve with electric vehicles strategies. Over 30 cities expressed an interest to join the project. EVUE intends to run as an open network, with rapid updates and easily comprehensible reports for other cities accessible on the website. Similarly EVUE will ensure that appropriate links to the other networks and projects listed in Section 2.4 are well managed to maximise information flow. In particular EVA and POLIS will be channels for information and influence, through EVUE partners in both networks.

To raise URBACT and EVUE's profile at European level partners intend to be present at European and international conferences. The following activities are planned:

- *ECOMM 2011/2012.* The Lead Partner and Lead Expert attended ECOMM 2010 in Graz and will propose formal input during the next two years.
- *Eurocities.* A meeting has been held with the Eurocities Mobility Working Group officer and EVUE will present itself to the next meeting in Copenhagen in June 2010.
- *European Mobility Week*. September 2010
- *International Mobility Congress Madrid*, November 2010
- *International motor shows* in Frankfurt, Madrid, Geneva
- *European Parliament* EVUE will propose a dialogue with the URBAN intergroup
- *Mayoral Summit* for EVUE cities to sign an accord demonstrating electric vehicles commitment.
- *Active Travel URBACT* network information exchange
- *Low Carbon Cities URBACT Thematic Pole* participation and case study input

EVUE will participate in programme level activities and contribute to the newly formed URBACT Low Carbon Cities Thematic Pole. At programme level during the Implementation Phase EVUE will produce

- 5 in-depth case studies (process and thematic)

- 5 project outputs of relevance to the low carbon pole, such as site visit reports, discussion pieces
- Contribution to a joint Citylab event with other transport or environment networks

In addition the EVUE website will be animated and joint working with other URBACT networks initiated.

4.3.6 Outputs

The results of EVUE will be incorporated in outputs to be shared within the city network.

- EVUE brochure
- Transnational meeting host guidance
- A standard Powerpoint presentation for use by partner cities, updated every quarter.
- Mayors Accord on electric vehicles to be formally agreed in a transnational meeting in Oslo
- A comprehensive final report with policy recommendations 'The business case for city promotion of electric vehicles' documenting the various strategies and models studied in EVUE.
- A Toolkit of ideas for working with children and young people to promote electric vehicles
- 'Why buy and drive an electric vehicle?' brochure, including case study profiles of fleet and individual drivers, and Frequently Asked Questions on the costs and benefits.
- A study on the business and job creation opportunities in electric vehicle value chains
- Summary reports of every transnational meeting
- 5 Thematic case studies
- 10 x LAPs
- 10 x City Banners

4.4 Conclusions

Electric vehicles will contribute to a greener, cleaner Europe. Cities have a vital role to play. They need to take the lead in incentivising the use of electric vehicles by citizens and businesses, and lead by example in converting their own fleets. It is clear that this process is underway and irreversible. It is equally clear that it is a complex innovation process, that requires high levels of investment, active participation of all agencies in the value chain, and an integrated, strategic approach.

EVUE will provide a platform for the rapid exchange and diffusion of up to date knowledge on urban electric vehicles strategies. It will help cities to create economies of scale and avoid costly mistakes. URBACT will be supporting the creation of a knowledge base in a new area of urban mobility policy, about which relatively little is known or tested. Through generating awareness and building capacity the results of EVUE can be mainstreamed into city policymaking to inform the design of future strategies delivering low carbon cities.

"In the EVUE network we will be able to test and correct our ideas and plans, get a multi-level vision about electric vehicles strategies"

Glossary

ACRONYMS

ARRA	American Recovery and Reinvestment Act	HEV	Hybrid Electric Vehicles
AVERE	European Association for Battery, Hybrid and Fuel Cell electric vehicles	ICE	Internal Combustion Engines
BEV	Battery Electric Vehicles	JOULES	European Commission Research Programme
CENEX	Standards body	METI	Ministry of Economy, Trade and Industry, in Japan.
CNG	Compressed Natural Gas	MIRACLES	CIVITAS project
CO_2	Carbon dioxide	MM	Mobility Management
DOE	Department of Energy	NOX	Nitrous Oxides, such as Nitrogen dioxide (NO_2)
E3Car	Energy efficient car	OEM	original equipment manufacturer
ELCIDIS	Electric vehicle city distribution systems	PHEV	Plug in Hybrid Electric Vehicle
EPOMM	European Platform on Mobility Management	RES	Renewable Energy Sources
EuroNCAP	Europe New Car Assessment Programme	TELLUS	CIVITAS project
EV	Electric Vehicles	UNECE	Economic Commission for Europe of the United Nations
EVA	Electric Vehicles for Advanced Cities (Green Car Initiative)	UNMC	Ultra Narrow Car
EVUE	Electric Vehicles in Urban Europe	USUC	Ultra Small Urban Car
G-WIZ	Electric car	VIVALDI	CIVITAS project

Annexes

National electromobility initiatives

In many European countries, the recent trend towards electromobility is complemented and supported by national initiatives or funding schemes which aim at an accelerated development of the electromobility market. The most relevant national initiatives in the EVUE countries are as follows:

Germany: The Federal Government adopted the National Electromobility Development Plan in August 2009. It sets the course for the mobility of the future. The Federal Government's aim is to see one million electric vehicles on Germany's roads by 2020. The selected regions cooperate with the Federal ministry to develop infrastructure, standards, and knowledge to prepare cities for electric vehicle deployment.

Norway: the National Transport Plan 2010 – 2019 places great emphasis on limiting the negative impacts of transport on the environment. Stimulating the entry of low and zero emissions vehicles is stated as one of the ways in which the Government will try to meet national and international targets on greenhouse gas emissions[xxi].

Portugal: Lisbon is the national pilot city within the "Portuguese Electric Mobility Programme - Infrastructures for EV" involving all the stakeholders at the national and local level. Within this framework it is essential to define an innovative model for the Lisbon experience which will be reproduced at the national level.

Romania An Inter-ministries Commission has recently been created to work on elaborating Romania's Strategy for Electric Vehicles. The ministries involved in that Commission are: the Ministry of Economy, the Ministry of Finance, the Ministry of Environment and the Ministry of Transport.

Another Commission was nominated to work on finding feasible solutions for tax levels for the low emission vehicles, which brings together at the round table the representatives from the private sector.

Renault Dacia has in store an initiative for the end of 2010 to offer (for testing) electric cars to urban local authorities to persuade them to invest in energy charging points infrastructure. The result is envisaged as a Study for implementing a national network for charging points.

Spain: The Energy Saving and Efficiency Strategy of Spain (E4), and the Energy Saving and Efficiency Activation Plan 2008-2011 are providing for a pilot project for the introduction of electric vehicles, in order to demonstrate their technique, energetic and economic feasibility. The MOVELE Project is the result of the Energy Saving and Efficiency Activation Plan. It aims to test electric mobility in the urban context.

Sweden: The Swedish Energy Agency has recommended that the Government establishes a four-year programme to increase the use of electric and plug-in hybrid vehicles. This recommendation is based on the findings of a report prepared by the Swedish Energy Agency together with

the Swedish Energy Markets Inspectorate, the Swedish Transport Agency, the Swedish Road Administration and in consultation with municipalities, the vehicle industry, electricity producers and distributors and consumer groups.

United Kingdom: There are at least four UK Ministries which have an interest in the promotion of Electric Vehicles: Business, Transport, Environment and Energy. At the time of the proposal, there are two UK Transport Ministry grant schemes to encourage local authorities to develop electric vehicle charging infrastructure: Plugged in Places and CENEX, whilst the Ministry for Business and Skills has plans to provide grants of up to €5,000 in 2010 to purchasers of Electric Vehicles. The UK government has earmarked £400m to support research, manufacturing and use of low and zero-emission vehicles nationally. It argues that EV are environmentally attractive because they save up to 40 per cent of carbon dioxide emissions compared to conventional petrol vehicles. While they require electricity to charge them, it says power generation will progressively become less carbon-intensive due to the shift towards renewables.

National Electric Vehicle Incentives

Country	Tax Incentives
Austria	A fuel consumption tax (Normverbrauchsabsage or NoVA) is levied upon the first registration of a passenger car. It is calculated as follows: - Petrol cars: 2% of the purchase price x (fuel consumption in litres – 3 litres) - Diesel cars: 2% of the purchase price x (fuel consumption in litres – 2 litres) Under a bonus-malus system, cars emitting less than 120g/km receive a maximum bonus of € 300. Alternative fuel vehicles including hybrid electric vehicles attract an additional bonus of maximum € 500. This bonus regime is valid from 1 July 2008 until 31 August 2012. Electric vehicles are exempt from the fuel consumption tax and from the monthly vehicle tax. The Austrian automobile club ÖAMTC publishes the incentives granted by local authorities on its website (www.oeamtc.at/elektrofahrzeuge).
Belgium	Purchasers of electric cars receive a personal income tax reduction of 30% of the purchase price (with a maximum of €9,000).
Cyprus	A premium of €700 is granted for the purchase of an electric car (maximum 7 cars per company/person).
Czech Republic	Electric, hybrid and other alternative fuel vehicles are exempt from the road tax (this tax applies to cars used for business purposes only).
Denmark	Electric vehicles weighing less than 2,000 kg are exempt from the registration tax. This exemption does not apply to hybrid vehicles. The registration tax is based on the price of the vehicle. It is calculated as follows: (105% x vehicle price up to DKK 79,000) + (180% x vehicle price above DKK 79,000).
Germany	Electric vehicles are exempt from the annual circulation tax for a period of five years from the date of their first registration. Subsequently, they will pay a tax amounting to € 11.25 (up to 2,000 kg), € 12.02 (up to 3,000 kg) or € 12.78 (up to 3,500 kg) per 200 kg of weight or part thereof.
Spain	Various regional governments grant tax incentives for the purchase of alternative fuel vehicles including

	electric and hybrid vehicles: - Aragon, Asturias, Baleares, Madrid, Navarra, Valencia, Castilla la Mancha, Murcia, Castilla y Léon: € 2,000 for hybrids, € 6,000 for electric vehicles - Andalucia: up to 70% of the investment
France	Under a bonus-malus system, a premium is granted for the purchase of a new car when its CO2 emissions are 125 g/km or less. The maximum premium is € 5,000 for vehicles emitting 60 g/km or less. This incentive will remain in place until 2012. For such vehicles, the amount of the incentive cannot exceed 20% of the vehicle purchase price including VAT, increased with the cost of the battery if this is rented. Hybrid vehicles emitting 135 g/km or less receive an incentive of € 2,000.
Greece	Electric and hybrid vehicles are exempt from the registration tax. If their engine capacity is 1929 cc or less, they are also totally exempt from the annual circulation tax. Above 1929 cc, the exemption is limited to 50%.
Ireland	Electric and hybrid vehicles benefit from a reduction of maximum € 2,500 of the registration tax. This benefit is valid from 1 July 2008 until 31 December 2010.
The Netherlands	Hybrid vehicles with an energy efficiency label A benefit from a maximum reduction of € 6,400 of the registration tax. For hybrid vehicles with a B label, the maximum bonus is € 3,200. These incentives will remain in place until 1 July 2010. The registration tax is based on price and CO2 emissions.
Portugal	Electric vehicles are totally exempt from the registration tax. Hybrid vehicles benefit from a 50% reduction of the registration tax. This registration tax is based on engine capacity and CO2 emissions.
Romania	Electric and hybrid cars are exempt from the special pollution tax (registration tax). This tax is based on CO 2 emissions, cylinder capacity and compliance with Euro emission standards.
Sweden	Hybrid vehicles with CO 2 emissions of 120 g/km or less and electric cars with an energy consumption of 37 kwh per 100 km or less are exempt from the annual circulation tax for a period of five years from the date of their first registration. For electric and hybrid vehicles, the taxable value of the car for the purposes of company car taxation is

	reduced by 40% compared with the corresponding or comparable petrol or diesel car. The maximum reduction of the taxable value is SEK 16,000 per year.
United Kingdom	Electric vehicles are exempt from the annual circulation tax. This tax is based on CO2 emissions and all vehicles with emissions below 100 g/km are exempt from it. As from 1 April 2010, electric cars receive a five-year exemption from company car tax and electric vans a five-year exemption from the van benefit charge (£ 3,000). As from 2011, purchasers of electric vehicles (including plug-in hybrids) will receive a discount of 25% of the vehicle's list price up to a maximum of £ 5,000. The government has set aside £ 230m for this incentive programme.

[i] Ministere de l'Ecologie, de l'Energie, du Developpement Durable et de la Mer, Lancement du Plan National pour le Developpement des Vehicules Electriques et Hybrides Rechargeables (2009).

[ii] Bundesregierung, Nationaler Entwicklungsplan Elektromobilität (2009).

[iii] EVS 24 held in Stavanger (Norway), 2009, organised by the European Association for Battery, Hybrid and Fuel Cell Electric Vehicles (AVERE) on behalf of the World Electric Vehicles Association.

[iv] U.S. Government, Public Law 111-5, American Recovery and Reinvestment Act (2009)

[v] David Howell, United States Department of Energy, EVS-24 Conference (2009).

[vi] List of funded projects: www1.eere.energy.gov/recovery/pdfs/battery_awardee_list.pdf.

[vii] Japanese Ministry of Economics, Trade and Industry and New Energy and Industrial Technology Development Organization, Research Program "Next Generation Batteries for the Commercialization of Plug-in HVs, FCVs, and EVs - FY2007-2011 (2007).

[viii] Pandit G. Patil, Developments in Lithium-Ion Battery Technology in The People's Republic of China, Argonne National Laboratory (2008).

[ix] European project ZEUS in 1999.

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[xi] Regulation (EC) No 443/2009 http://ec.europa.eu/environment/air/transport/co2/co2_home.htm

[xii] Future of transport Communication, available at http://ec.europa.eu/transport/strategies/2009_future_of_transport_en.htm

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[xv] www.going-electric.org

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http://ec.europa.eu/enterprise/sectors/automotive/competitiveness-cars21/energy-efficient/written_contributions_en.htm

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[xix] http://www.e3car.eu/

[xx] Lifecycle analysis

[xxi] Norwegian Ministry of Transport and Communications, 'National Transport Plan 2010-2019' http://www.regjeringen.no/upload/SD/Vedlegg/NTP/Binder1ntp_engNY.pdf

Other Web Links

Green Car initiative

http://ec.europa.eu/research/transport/info/green_cars_initiative_en.html

European Platform on Mobility Management

http://www.epomm.org/

http://ec.europa.eu/energy/intelligent/index_en.htm *http://www.betterplace.com/*

http://www.avere.org/www/index.php

p21 BEST Promoting Clean Cars – Case Study of Stockholm and Sweden February 2009

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www.polis-online.org

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