

## Electric Vehicles in Urban Europe

# Madrid Network Meeting and Study Visit



**November 2010**

## 1. EVUE Network Meeting

The third transnational meeting of the Electric Vehicles in Urban Europe URBACT II network took place in Madrid on November 22-23 2010, hosted by Fundacion Movilidad. The focus of the meeting was an exploration of the business models that could underpin the roll out of electric vehicle strategies in European cities. The first part of the meeting was an update on project progress.

### 1.1 Suceava Expert Seminar report

Narcisa Nenec reported on the first EVUE Expert Seminar that took place in October in Romania. Hans Kvisle of Norstart and Ole Henrik Hannisdahl from Greencar in Norway facilitated the seminar. They created and introduced an Electric Vehicle (EV) Readiness Index to help cities understand, measure and develop the relevant drivers for the electrification of mobility. EVUE cities will trial and adapt the Readiness Index in the next year, with a view to refining it for wider use in European cities.

The seminar had helped the city of Suceava to learn how to approach Urbact Local Support Group (ULSG) members, to raise awareness of EVUE objectives and to reinforce the city's commitment to introducing EVs.

*"It is a difficult time for us to talk about such a bold initiative. But the future is green, the technology will become cheaper, it will become possible."*

### 1.2 EVUE city partner news

**Stockholm** is making progress in its bulk procurement initiative. The goal is to reach an interest from at least 150 organisations with a total volume of 6000 EVs, (both EVs and PHEVs) as passenger cars and delivery vans. A national grant has been awarded to support the costs of the first 1000 vehicles at 25% of the cost or a maximum of 5000 Euros per unit. Most of the interest in buying has come from municipal fleets but also from companies all over the country. The procurement has an option for a 4<sup>th</sup> year and the aim is still 12,000 EVs.

**Fundacion Movilidad, Madrid** was awarded a 1.1 m euro loan from the European Investment Bank (EIB) loan fund ELENA to prepare investment in EV.

**Katowice** has set a target of 55 charging points (CPs) by 2010. The location strategy and procurement is underway. An EV company near Warsaw is producing electric engines, and a 2<sup>nd</sup> car company ROMET, (motorbike producer), is working on a Polish prototype concept for mass market production. The cost of the prototype EV is estimated at 7000 Euros per unit.

**London** EV activities are driven primarily by the Mayor's Electrical Vehicle Strategy (see appendix). In addition, London has significant air quality issues that make it crucial to shift to low emission vehicles.

There are projections that a low carbon economy will provide 10 – 15,000 new jobs and potentially €650 million to the London economy by 2025.

The strategy originally envisaged £60million investment to deliver the Mayor's targets, equally funded by central and local government and the private sector. However, due to the financial crisis, the public contribution has been reduced to £7million. It is still on target to deliver 1,300 publically accessible charging points by 2013.

A new pan-London branding scheme has been introduced to simplify customer access to the network – Source London ([www.sourcelondon.net](http://www.sourcelondon.net)).

Two large scale research projects have been launched looking at the impact of EV adoption on the electricity distribution grid and at the development and testing of pathways to a self-sustaining mass market.

**Lisbon** The EVUE project was presented to the parking industry of Portugal and Spain in the 3rd Iberian Parking Seminar in Albufeira (Algarve), in October. Everybody reached the same conclusion: *The parking industry must be prepared for Electric Vehicles.*

Nissan chose the city of Lisbon for a communication event to familiarise journalists from all over the world with the fully electric car, the Nissan Leaf. At a press event, Nissan told reporters that the Infiniti car range line up will include a battery-electric delivery van and a battery-electric sporty subcompact by 2014, saying

*"This is only the starting signal for the manufacture of an entire electric-vehicle family"*

On November 15th, the first Lisbon ULSG meeting took place. All partners are deeply committed to developing the Local Action Plan. The first draft must be ready by June 2011. All participants were invited to a 'Business Drink' and round table about Sustainable Mobility and Electric Vehicles.

## 2. Seminar on Business Models

The main part of the network meeting was an exploration of business models for electrification of mobility. Stakeholders from central and local government, energy and infrastructure companies, NGOs and car makers explained their approaches. Some of the key points from each of the presentations are reported here. Full presentations are available from your local EVUE partners.

### 2.1 Introduction to Business Models

#### A global perspective

##### Robert Stüssi, President of AVERE

(European Association for Battery, Hybrid and Fuel Cell Electric Vehicles) Vice President of WEVA (World Electric Vehicle Association)

Robert gave a fascinating overview of the development and potential future of the electrification of mobility. He urged cities to include electrification in all modes of transport, such as boats, vans, buses, two and four wheelers, and vehicles for disabled people. Spain has 5 categories of incentives, for motorbikes, pedelecs, microbus, hybrids and pure electric.

*"Why should tax money just be spent on regular cars?"*

E-mobility has to involve all actors. Not top down, or bottom up but sideways. The URBACT Local

Support Group is a great model to support this collaboration.

Electro-mobility has been propelled initially by cities and they will lead its implementation. The Portuguese national programme has signed contracts with 25 cities which include an obligation to produce an electric mobility plan.

Car-makers want cities to work with them in developing conditions that create markets, such as CPs and after sales.

In Japan, recent studies suggest that the fast charging points are not being used. They create public confidence, but are only used when they give access to downtown free parking. Home charging will be the norm. Some cities are at the point of removing CPs.

Paris is about to introduce a pioneering 4000 car sharing scheme, including EVs.

This is a key moment in EV market development. There is a risk of getting stuck in 'the valley of death' in the sharp innovation adoption curve.

There has been a massive change in the perception of EVs from the 'green fringe' to the mainstream at motor shows. Electric buses feature prominently now at the shows.

### 2.2 The Spanish National Model (and Madrid model with ULSG)

#### Mr. Timoteo de la Fuente (Assistant Director General of National Sectoral Industrial Policy)

National government has to develop mobility solutions that are industrial and economic as well as environmental. The regulatory framework has several strands.

##### For manufacturers:

- Regulation (EC) 443/2009 of CO2 emissions
- 130 g/km by 2015
- 95 g/km by 2020
- Pollutant emission restrictions EURO 6

##### For cities:



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- Meeting the requirements of Directive 2008/50/EC air quality (clean mobility).

#### For energy providers:

- Climate and Energy package 20/20/20

These challenges give rise to opportunities to develop new technological products and services.

EVs require high value-added systems, such as new vehicle models and architecture. Business opportunities exist for industries such as power distribution, data communication, telecom, fleet and others. There is a need to coordinate EV and energy strategies to plan investments well. Public-private partnership will be needed to reach the objectives of the Spanish EV vision.

Spain is allocating 70 million Euros to encourage EV ownership in fleets- beyond the MOVELE national programme- using credits not grants. 480,000 Euros is allocated to support 16 R&D projects. Spain has a target of 80% EVs in fleets by 2014, and this sends strong signals to the market.

Spanish policy favours off-street over on-street CPs because of the risk of vandalism and damage to cars.

### **2.3 Mr. Emilio Asensio (ACS)**

ACS is a construction company working in the infrastructure and energy sectors. ACS is a member of the Madrid ULSG steering the MOVELE project.

ACS believes that adequate charging infrastructure is as a prerequisite for the development of the EV business. A buyer cannot have doubts about where to plug-in a car before buying it. Original Equipment Manufacturers are unlikely to be able to create compelling value propositions for EVs on their own. Governments must provide incentives to other stakeholders – principally infrastructure promoters and consumers – to help create the necessary infrastructure and viable business models.

ACS believes that 6 million EVs in Spain is quite possible.

It is hard to make a business case for CP infrastructure. The added revenue to service providers is limited, and the investment is high with substantial risk.

It is a challenge to provide CPs for those without a garage. Fast charging could render the regular CPs obsolete in time.

### **2.4 Mr Ricardo Perez ENDESA**

ENDESA is the leading utility company in the Spanish electricity market and the number one private electricity company in Latin America. ENDESA is a member of the Madrid ULSG steering the MOVELE project. ENDESA is also involved in a smart grid project in Malaga.

ENDESA is looking at business models that package products and services within the value chain. For example, bundling could be for

- Vehicle supply package
- Power supply package
- Mobility packages that incorporate different transport modes

They will also explore the potential to send energy from the batteries back into the network.

The return on CPs won't cover the investment in installing them. The real business models are not yet known. The challenges are:

- Where are the vehicles?
- What is the business case?
- Where is the Return on Investment?

Policy frameworks need to send a signal to market, to speed up adoption and market growth.

### **2.5 Mr. Carlos Bergera (Iberdrola)**

Iberdrola is the top wind energy producer in Spain, and is also in the UK and US markets. Its power has the lowest CO<sub>2</sub> mix in Spain. It is a member of the Madrid ULSG steering the MOVELE project.

# IBERDROLA: first Spanish operator to offer integral solution for EM users



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Costs and performance are key factors for Electro Mobility success. Car and component makers have to play their part to improve performance and lower costs. Therefore, efficient regulation and incentives are essential for the implementation of the EV at its first stage.

E-mobility (EM) is not a big challenge from the point of view of electrical system needs. It will be possible to have 10 million EVs charging with the same systems as now in Spain. That would represent 10% of total demand.

Iberdrola is developing the following green packages:

- Night time slow charging promotion
- Electro Mobility (EM) products and services
- Smart grid Vehicle 2 Grid and other new technologies.

The IBERDROLA Green Mobility Plan pictured here pulls together EV+Charging Infrastructure +Financing+ zero emission energy.

The market model is liberalized with free competition among EM and charge services. In order to have a level playing field there has to be access to grid infrastructure for all operators.

A Living Lab approach is required to learn how to sell these services. Cities can act as test -beds for exploration, experimentation and evaluation of innovative ideas using real life cases. Iberdrola takes a market oriented approach, with R&D looking at future scenarios.

## 2.6 The German Energy Market Model

**Mrs Carolin Reichert, Head of E-Mobility, RWE Germany**

RWE is developing E Mobility services both to end customers and to businesses. Its business model takes a whole system approach.

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RWE believes that EV fleets will be the first market, ahead of a mass market of individual drivers.

For End customers RWE aims to be a "Marketmaker" in Europe's metropolitan areas – rolling-out the first public charging infrastructure, strategic fleet tests and innovative end-customer products.

For Infrastructure RWE offers customised and economic infrastructure solutions covering the creation of value based all-inclusive service.

In Technology/products RWE aims to be an innovation leader in close cooperation with car industry partners, establishing standards and creating optimum interfaces to e-vehicle.

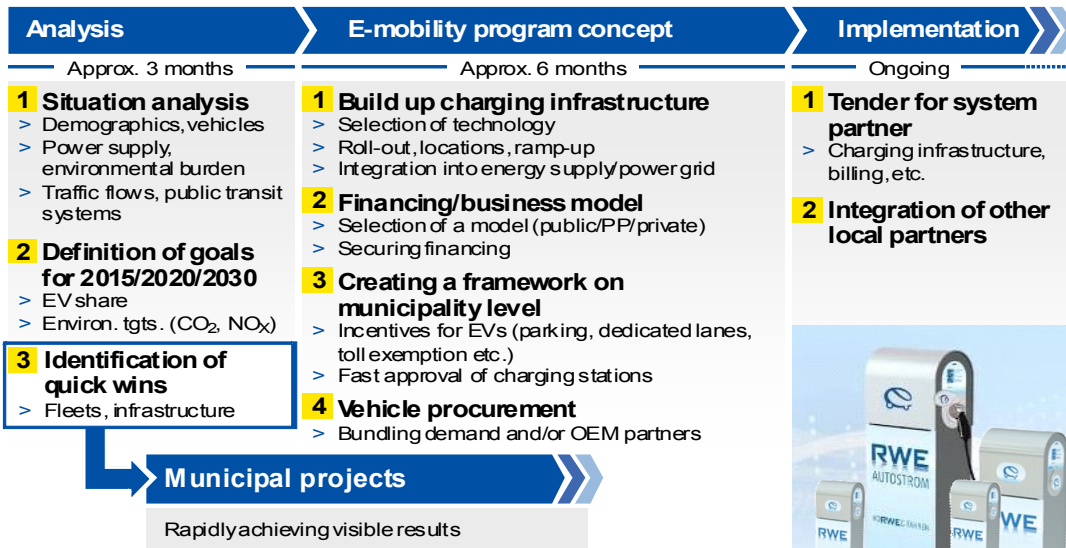
Integration with renewable energy and the grid will

go from the basic communication today to bidirectional integration with the distribution grid and charging/re-feeding of renewable energies depending on supply and demand in 2025.

An example was given of Madrid as a mega city.

## Successful implementation requires an individual approach in each megacity

POSSIBLE APPROACH TO IMPLEMENTING E-MOBILITY IN MEGACITIES



EV: Electric vehicle

## Example: Madrid – Some EUR 115 m needed in public investments by 2015

INVESTMENT NEEDS FOR E-MOBILITY DEVELOPMENT (POPULATION: 6.3 MILLION)

	2011	2012	2013	2015	2020
Number of private cars [mio.]	3.07	3.11	3.15	3.23	3.41
Number of EVs [no.]	<1%: 750	<1%: 5,500	<1%: 14,550	2%: 64,300	11%: 364,500
<b>Estimated charging points [no.]</b>					
Public	200	590	1,330	5,275	30,000
At home/business	850	6,450	17,000	75,000	425,000
Ultra-fast charging <sup>1)</sup>	10	20	35	290	900
<b>Public budget (cumulative) [EUR m]</b>	<b>8.8</b>	<b>17.5</b>	<b>34.4</b>	<b>115</b>	<b>880</b>
Invest public IS <sup>2)</sup>	1.3	4.8	12.5	56	455
Invest IS at home/business <sup>12)</sup>	2.0	13.7	42.2	224	1,918
IS system, set-up, operations <sup>3)</sup>	3.4	7.9	15.1	49	377
Vehicles (incl. financing) <sup>6)</sup>	4.1	4.1	5.2	7 <sup>6)</sup>	38 <sup>6)</sup>
<b>Operating costs (without electricity)<sup>5)</sup></b>					
Public	100-300 ct/kWh				
At home/business	5-40 ct/kWh				
<b>CO<sub>2</sub> potential<sup>4)</sup> [t/a]</b>	<b>990</b>	<b>7,250</b>	<b>19,000</b>	<b>85,000</b>	<b>480,000</b>

Illustrative and est'd numbers – detailed analysis required

2011 might deviate depending on pilot project

IS: Charging infrastructure

1) Incl. ultra-fast chargers, of which public in 2011/2012/2013/2014 only: 5/10/20/35 units; investment ~ EUR 45,000 per charging point

2) Est'd investment (hardware, installation, grid connection) per intelligent charging station: at home/business EUR 1,250; public EUR 6,350 (5% decline p.a.)

3) Operating costs at home/business EUR/yr. 150; public EUR/yr. 500; no cost decline, no parking costs; further costs from organization

4) 100% clean energy at 10,000 km/yr. vs. g CO<sub>2</sub>/km 75% x passenger cars: 109, 25% x LCV (light commercial vehicles): 200

5) Approx. 1,900 kWh/charger p.a.; depreciation 7.5 years

6) As of 2014, only cost difference vs. conventional cars

Market development is at the 'chicken and egg' stage. CPs have to be installed to stop EVs staying a niche product.

Incentives in cost price and packages will be the way to close the gap between Internal Combustion Engine cars and EVs.

Cities can identify quick wins. 'Lighthouse' projects such as clean taxis and green fleets can persuade the public to use EVs.

## 2.7 The Portuguese model

**Rui Filipe Marques, Head of Innovation  
Department from EDP**

EDP is an international energy company, a major wind power provider, and is involved in E Mobility projects. EDP is a member of Lisbon ULSC.

The business model is complicated by the fact that there are several operators along the distribution system chain and in e-mobility. The Portuguese national model is already defined in law. The Distribution System Operator (DSO) manages the grids. The retailers sell the power. This separation of infrastructure and retail avoids a monopoly controlling access and creates the universal and easy access needed for non discriminatory conditions. The DSO charges a fee of x per kilo watt hour for using the infrastructure.

There can be no dilution, or sharing of cost. Only EV users, not all consumers, should pay for the energy they consume. Planning for fast charging is totally different than for slow charging e.g. for use on motorways.

Eurelectric, the European Association of the electricity sector, has published a study on market models for public charging. EDP is a partner in a FP7 funded study of all grid impact issues, called G4V.

EDP has also started to promote home and office charging to customers. Showing how easy it is to charge the vehicle at home is paramount for the success of electric vehicles. Proof of concept pilots such as the first CPs in Lisbon, are important.



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## 2.8 The German Electromobility model

**Dr Johannes Theissen**

The German Electromobility programme key priorities are:

1. Electromobility should make a significant contribution to reach German and EU climate targets.
2. Only renewable energies should deliver all energy for EVs to enforce the renewable energy market.
3. The electric power network in Germany should become more efficient by using modern IT and by integration of EVs.
4. The target is for one million EVs in Germany in 2020, 5 million EVs in 2030.
5. The Federal Government not only promotes the development of electric cars but also bicycles, lorries and buses should change to electromobility.
6. New Lithium Ion-batteries should be developed.
7. Charging stations should be designed and developed.

German public investment levels are high. Germany is producing the Stromos e-cars and importing Chinese E-buses.



Most German energy companies are owned by German cities, which has an impact on the business models.

Frankfurt's targets are:

- Installation of minimum 50 charging stations for public use (mostly in the streets or public parking facilities) based on the “Frankfurt Model E-Mobility”
- EV fleets for governmental uses
- First bus routes with electric buses

The main challenges are:

- Change public attitudes towards EVs
- EVs to be used in all city-owned companies
- A lot of EVs in use by the airport operator FRAPORT AG (buses, trucks etc.)

The Frankfurt LAP includes the introduction of an e-bus shuttle between the airport and the city by the end of 2011.

### 2.9 Car manufacturers and rentals

Mr. Ricardo de Lombas Peugeot Spain

Peugeot is moving from being a car-maker to a mobility supplier.

This new type of commercialisation (see slide) offers an “all inclusive” offer of less than 500 Euro per month for an electric car. The deal includes a 48 / 60 month rental contract with 10,000 Km per year and a ‘Buy Back ‘offer. Leasing will be also available.

Business models have to take account of the fact that EVs have different lifecycle and different long term uses.

The Mu model is a new mobility scheme. It is promoted by Peugeot, and is like an intermediate market between car hire and car sharing. It has been tested in six French medium sized cities.

It is a client centred, pre-paid rental service for the general public and companies.

## A new type of commercialisation

**■ An “all inclusive” offer in VN → less than 500€ per month**

A 48/ 60 month renting / 10,000 Km per year with By Back:

- Vehicle financing + battery
- 10,000 Km. included / year
- 2 year vehicle guarantee
- 5 year guarantee of the battery and electric motor
- Maintenance contract
- Peugeot Connect SOS
- Peugeot Connect Assistance

**ICE\***

**350€ + 120€**

**EV**

**450€ + 20€**

Once an account is opened the range of services includes:

- A triple mobility offer for ALL: automobiles, scooters, bikes
- Leisure vehicles: Peugeot RCZ, 308 CC, 207 CC, 3008, 5008
- Commercial vehicles
- Replacement vehicles
- Scooters: 50 and 125 cm3
- Bicycles, including electric ones
- Mobility accessories (GPS, roof case, ski racks, children's seats)

The Peugeot EV sales forecast is to have 5000 IONs cars in the EU within 5 years.

### 3. Summary of EVUE Learning Points and Transferability from the Madrid Network Meeting

To conclude the meeting, EVUE partners reflected on the key learning from the Madrid meeting, and ways in which they could immediately make use of it in their own city policy and practice. This is a summary of the immediate results.

*“Cities are like ‘candies’ to be used as **living labs**. We must take advantage of this to enable all partners in the business model to innovate and learn together.”*

There is no clear **business model** yet. E-mobility and sustainable mobility require investments. EV is not going to be a ‘good business’ in the short term. Market development may take the form of ‘bundling’ and packages which could potentially incorporate mobility and energy services and market research data. Cities want to lead but do not have all the data to construct THEIR business model.

We need good **arguments** and evidence to justify the necessary **public investment** in EV. Harnessing renewable energy is an important factor to maintain political and public support. Green NGOs are against the car in general including EVs. There is a view that NGO opposition has the capacity to kill EVs.

**Fast charging** is a risky part of strategies. Stockholm has had 3 fast CPs since 1990 for demonstration purposes only. The 300 EVs in the city don't use them. The big advantage of EVs is that you don't have to go to a specific place to fuel. Madrid is leaving the fast CPs to the private sector and these will mainly be located in petrol stations, with agreements with utility companies. In Oslo there are concerns about on-street safety. Fast Charging needs to have personnel on site. No one will ever make money from fast charging.

*“Stockholm has not paid for any Charging Points. I never saw a municipality paying for a gas station. That is the job of energy companies”*

In Beja some SMEs are investing in CPs as a marketing tool, not as a big business investment.

The discussions still centre on infrastructure. The cars and consumers are yet to emerge in volume. 2011 will be a slim year for testing. There will still not be enough cars. There is evidence that, in general, prices are coming down. The majority of first wave EV owners will be fleets. Leasing models need to take account of the residual price, and have a justification for the public purse.

In terms of communicating **sustainability** to users, the message is that local incentives are not permanent. They will last until a fixed date.

Beware the ‘valley of death’ in the sharp **innovation curve**. This is a risky moment to survive, encourage early adopters and achieve a critical mass of EV consumers and users.

We need to take a closer look at who the **potential users** of EVs are and understand their behaviour better.

EVs push other forms of transport to be low emission. The EV concept is making people **re-think** their own **mobility** necessities.

*“Without money nothing will happen. That is the point. E-mobility needs a lot of money. Who is willing to support customers and institutions? I don't see this commitment right now.”*

#### **Actions for EVUE partner cities:**

The charging process must be monitored to understand user patterns and grid needs.

Charging points at gas stations are an easy and good solution. Car drivers are familiar with gas stations.

PPP schemes are needed to avoid huge public investments.

Incorporating Charging Points into planning requirements for new construction sends a clear signal that cities support electromobility.

Do I need a better dialogue with the power company? What is my city's grid capacity?

Lighthouse projects, like EV taxis, provide high visibility and good PR.

The EV Readiness Index survey, possibly combined with the RWE forecasting tool, can support development of the Local Action Plans.

EVUE can help us to combine the different models to find the optimal solutions and implement them.

## **4. References and Links**

[www.urbact.eu/evue](http://www.urbact.eu/evue)

[www.mu.peugeot.es](http://www.mu.peugeot.es) (or .co.uk...)

<http://www.sonyclassics.com/whokilledtheelectriccar>

[www.peugeot.es](http://www.peugeot.es)

<http://dtea.ist.utl.pt>

[www.humanware.com](http://www.humanware.com)

[www.london.gov.uk/sites/default/files/uploads/electric-vehicles-plan.pdf](http://www.london.gov.uk/sites/default/files/uploads/electric-vehicles-plan.pdf)

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Sally Kneeshaw  
December 2010



URBACT II

**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 challenges. It helps them 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 181 cities, 29 countries, and 5,000 active participants

[www.urbact.eu/project](http://www.urbact.eu/project)

