

Frankfurt Network Meeting and Study Visit September 2011



1 Introduction

From the 18th -20th of September 2011, the URBACT EVUE partnership held its fifth transnational meeting in Frankfurt, Germany. Participants spent the first day visiting the Frankfurt Motor Show, ahead of an intensive two day meeting focusing on best practice related to e-mobility, and in particular infrastructure development, across Europe.

2. Frankfurt Motor Show

Dr Johannes Theissen (TraffiQ) and Mr Ansgar Roese (Frankfurt Economic Development Centre of Logistics and Mobility) organized for a representative of the Verband der Automobilindustrie (German Car Association) to give the EVUE partners a guided tour of the Electro-mobility Hall in the Frankfurt Motor Show. Some of the highlights are reported here.

Mitsubishi

The iMiEV on show at the Mitsubishi stand has been on sale since November 2010 in Europe (2008 in Japan) and costs €34,390. The car is made in Japan with a current delivery time of 2-4 weeks. There is a 5 year warranty on the battery.

The vehicle has 2 possible charging options:

- normal charging, with a type 1 connector, provided with car. A type 2 connector can also be used with an adapter
- fast charging through a 50kW DC link which provides for an 80% charge within 30 minutes.

Mitsubishi has sold around 3,000 iMiEVs in Europe. Peugeot and Citroen have also rebadged the vehicle as the Ion and C-Zero respectively and this accounts for a further 2,000 European vehicle sales. The main markets are currently Norway, Switzerland, Germany, Estonia and Australia.

Mainova (Frankfurt Energy Company) and Lufthansa

Mainova demonstrated the integrated charging and parking posts being used on the streets of the city (seen during the Site Visits Section 5.1.3).

Together with Lufthansa they also have started a 3 month, trial for inductive charging with one car in non-public areas at Frankfurt airport. The trial will monitor, amongst other things, energy efficiency. The charging time increases by approximately 30 minutes on an 8 hour charge, compared to a standard charge using plug and cable. So far rain and snow have not been a problem.



TUM Technical University of Munich students had developed a two seater e-car with 400 L boot space, weighing 500 kg. This prototype has been designed as part of their studies for the younger market segment. There are no plans for commercialisation.

Siemens

Siemens had a large stand called 'Avenue of the Future' showcasing new ICT products for urban mobility management. Siemens is preparing for the EV market with several charging points solutions as well as 'mobility software' to organise travel, book charging points (CPs), decide on best transport modes (tube, car etc) to get from A to B, for car sharing etc

Siemens representatives reported that the company sees fast charging points as being commercially viable- like petrol stations- straight away and that public CPs in car parks are already a valid business model with 3-5 year pay back.

German E- Cars



German E-cars is converting traditional internal combustion vehicles to produce EVs and utility vans, some of which are used by the City of Frankfurt.

3 International Conference

On 19 September Frankfurt Economic Development hosted an International Forum on Electro-Mobility in the HOLM Forum at the airport, in conjunction with the EVUE partnership.

Robert Stüssi, Mobility Consultant and former President of AVERE, gave the keynote speech: "EVs in Europe "Why does Europe need a change to a carbon free mobility?"

After introductions on EVUE: "Bringing E-mobility to European cities – what are the main challenges to be successful?" a number of city partners presented their strategies as follows.



- The Stockholm clean vehicle program
- Turning London electric
- The national Portuguese MOBI.E program and its local implementation in the City of Lisbon
- Oslo – successful example of an early adaptor of E-mobility

- Different kinds of E-mobility in the Frankfurt/Rhein-Main region



All presentations are available at <http://www.frankfurtemobil.de>

The Frankfurter Neue Presse published a news report on the conference with the title "Oslo is the benchmark for EVs" http://www.fnp.de/fnp/region/lokales/frankfurt/oslo-als-leuchtturm-fuer-elektroautomobile_rmn01.c.9221211.de.html

4 Presentation of the Opel Ampere

Gerrit Riemer, Director of Future Mobility at Adam Opel AG presented the concept of the new Opel Ampere. EVUE partners were then able to test drive the vehicle.

The Opel Ampere (also known as the Chevrolet Volt) is a range extender EV that targets a gap in the market for a versatile EV that reduces the need for a second car. It has 40-80 km of e -range and a total range of approximately 610 km when supported by the internal combustion engine. The battery is guaranteed for 8 years / 160,000 km. It takes 4 hours to recharge the battery.

A particularly innovative aspect of the vehicle is that it comes with 4 driving modes:

- ECO
- SPORT
- HILLS: both ICE and motor are driving the car
- HOLD: no use of the battery, to save the e-range for later, e.g. driving in city

It is a plug in hybrid, and there is no direct charging of the battery from the ICE. However, the HOLD function will enable it to

be battery driven when desired e.g., in urban areas, before reverting to ICE mode for longer distances.



Its electronic control unit also manages the charge depletion mode to charge sustaining mode to get ICE working at optimum efficiency value.

It is currently not eligible for some EV incentive schemes e.g. in Norway, because it is not possible for a city to be sure that it is driving at zero emissions, at a given moment.

5 City of Frankfurt Reception

Councillor Markus Frank welcomed the EVUE partners to Frankfurt City Hall. He gave a speech on the city's history and hosted a civic dinner for EVUE city representatives and local stakeholders.

6 EV Infrastructure

The EVUE theme for the Frankfurt Study Visit and discussion was EV infrastructure. Frankfurt faces the daily challenge of 300,000 people commuting by car from outside the city, giving rise to congestion, high levels of CO2 emissions and poor air quality. Part of the city's solution is an e-mobility programme branded as Frankfurtemobil. (See EVUE Baseline)¹

6.1 Site visits

EVUE visitors were shown three different models for charging infrastructure in Frankfurt.

6.1.1 Underground car park

¹ <http://urbact.eu/en/header-main/documents-and-resources/documents/?project=1799>

In a centrally located underground car park the electricity company Mainova has set up a dedicated place for EVs to charge, in a very visible spot by the pedestrian exit. The car park charges 1 euro per hour for access to the plug (as it is illegal to charge for electricity) and 2 euros per hour for parking.



Cars must be plugged in to charge when parked in these places. Private car parks are concerned about the loss of space (and revenue), so a balance has to be struck when reserving places for EVs only. If there are not enough

EVs they will lose money.

The cost of a CP is around €3,000. Each city in Germany has its own energy company, which complicates regional and national integration. Each area develops its own infrastructure, sometimes without regard for interoperability, and a more integrated framework will be needed in future.



6.1.2 Parking and charging bay sponsored by the bank Sparkasse in a collaborative venture with an Environmental NGO



The 'Strom Tankstelle' or 'Electricity pump' is a CP installed with two dedicated EV parking places, and further two for e-bikes, on the forecourt of the Sparkasse (Savings bank) office building. They are very simple charging points, with a 220 Volt plug, designed to be highly visible to support early EV adopters. The CP draws on renewable hydro electric energy from the Main River.

These CPs can be used free of charge by anyone needing to charge their EV. The forecourt is controlled by a barrier so access to the parking bay and charging is authorised by Sparkasse.

This is a good Public Relations activity for the bank as part of its Corporate Social Responsibility profile, with joint branding on the CP of the bank and the environmental NGO.

6.1.3 On street parking bay with charging

On street CP solutions are more complex. This charging facility, combined with the parking system, prints a ticket with a barcode that is then used to open the lid to the socket.



There is some RFID technology that enables remote control, combined with simple operation. The costs for parking and charging are the same as in the underground car park.

Reserved parking for EVs on street is not legally possible yet, and, again, the city fears losing income from parking revenue, if the EV only spots are mostly empty.

The advantage of this on street charging is that adding something new to the old system generates public acceptance and gets people used to EVs.

6.2 Infrastructure Market Development at Fortum

Emilia Käck is the Nordic Operations Manager of Charge and Drive for the Swedish energy company Fortum, that owns the grid in Stockholm. Fortum is a member of Stockholm ULSSG. She presented Fortum's approach to the EV infrastructure market in 3 countries (Norway, Sweden, Finland).

Fortum is responding to demand for a full-service solution. They received a lot of requests for installation and maintenance of CPs so decided to add this to their offer, to integrate IT, infrastructure, maintenance and operations and customer service. The ICT solution developed by Fortum handles user information, identification, payment and monitoring. The system makes it possible to remotely handle the charging stations and provides the foundation for future development of client oriented solutions.

Mobile phone technology is key for future infrastructure solutions, not just on smart phones. Using their mobile phones drivers can find the location of a charging point, see if it is free or busy, identify themselves to open the pole and start and stop the

charging. There are several payment possibilities connected to mobile phones.



Fortum develops charging stations that are smart and communicative, with lids that are lockable for secure and safe charging and to avoid vandalism. They use a local CP manufacturer, experienced in vehicle engine heater chargers. The Fortum customer service centre monitors the poles 24/7/365 and the client can always call if there are any problems.

Fortum has installed 3 fast charging facilities: 2 CHAdeMo and one 250 kW charger. In terms of regular CPs Fortum has installed around 30 with C&D intelligence and around 100 without. Of the four ways for fast charging the standard CHAdeMO² connector is the most common. At the moment it takes 20 to 30 minutes at 50 kWh. The aim is to get it safely down to 5 to 10 minutes. The cable is included in the station with a sophisticated plug and the circuit breaker in the post.

Fortum is involved in a trial with the University of Helsinki and a special car. They are testing 250 kW charger – with a car fitted with lithium titanate cells of 32kWh, with a range of 200km, and a 5-10 min charge.

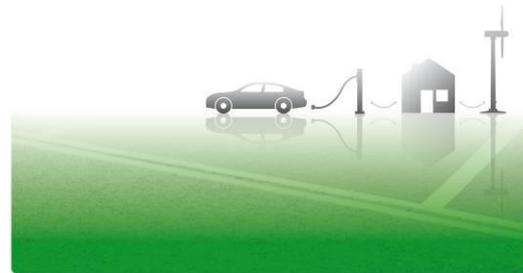
There is a need to see which are the most successful CPs, including this ultrafast testing, and what impact there is on the grid.

Fortum's vision of the future has the EV as part of the smart eco grid system. Introducing electric cars will change how consumers think about electricity.

² Interesting fact: CHAdeMO is an abbreviation of "CHARge de MOve", equivalent to "charge for moving", and is a pun for "O cha demo ikaga desuka" in Japanese, meaning "Let's have a tea while charging" in English.

Real-time pricing is a pre-requisite for a customer oriented smart grid. Customers will charge the battery when energy is cheap. Policies are needed to increase efforts to produce CO2 free electricity. Micro electricity production in the home will be the "oil pump in the back yard". Interest is high in micro scale generation with storage systems.

Governments are likely to look for some compensation for the loss of fuel tax revenue, perhaps with taxes on kilometre not kilowatt hour.



6.3 Discussion and conclusions

As evidenced during previous EVUE site visits and exchange, there is clearly significant variation across EVUE cities in EV infrastructure implementation: location, (off street, on street, public/private land), charging speed, payment rates and mechanisms, designs, energy and pole providers. There are many factors to consider, on which to base city strategies.

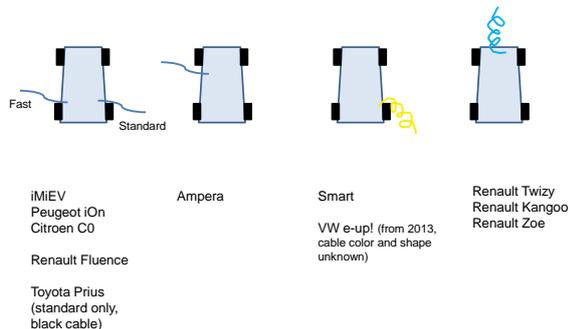
For instance, inductive charging holds significant potential to reduce street clutter and associated risks, but there are still barriers related to higher installation costs and lower energy efficiency.

Fast charging may be more convenient, but has higher costs, more health and safety constraints, and can only go up to 80% of battery capacity with the cooling and heating issues.

Maintaining consumer confidence is imperative. In Stockholm they re-named *slow* charging *normal* charging' to avoid any negative connotations.

Some cities start with simple, key operated systems like Oslo. Others have sophisticated, integrated and intelligent systems from the outset, like MOBI.E in Portugal

The location of the charging sockets on the vehicle also has an impact on the design of charging posts.



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The Fraunhofer Institute has published some research on the rate or pace at which systems could become more intelligent, sophisticated and interoperable. <http://www.fraunhofer.de/en/>

It is important for cities to make decisions about infrastructure strategy based on good information, adaptation to local conditions, and importantly with a focus on generating consumer confidence through ease of use at early market stages. A strategic approach is also required to ensure integration with surrounding regions.

The infrastructure survey and report will be debated further at the London EVUE Expert Seminar in November 2011.

7 Partner updates

Katowice announced the purchase of an electric vehicle for the city (Municipal Guard) and a hybrid bus for the Municipal Communication Company. The city has decided to allow free parking for EVs.

Frankfurt: The German state has announced funding for e-mobility showcases in five regions. The State of Hessen has applied to be one of the showcases.

Lisbon is launching a survey to monitor the use of EVs in regular daily public / municipal fleet operations, to understand the performance of electric vehicles and driver behaviour in working conditions (goods

delivery, urban maintenance, parking enforcement, etc.)

Stockholm: Johan Seuffert presented the results of a survey of EV drivers in the 50 vehicles in the Swedish pre- fleet project.

- 28 Mitsubishi iMiEV
- 14 Fiat 500 EV
- 3 Peugeot iOn
- 2 Citroën C Zero
- 2 Volvo C30

The cars were used in cities across the country by employees for work purposes, mainly for visits to urban areas or city outskirts.

The charging experience was:

- 90% of drivers charged the car themselves
- 84% are satisfied with how the charging works
- 62% are able to charge at home

The results were very positive with 78% more in favour of electric cars today than before they received their electric car and 85% would recommend others to drive electric cars!

Positive feedback related to benefits about energy efficiency, silence and ease of use. There were some negative comments about the time taken to charge, the range and road safety concerns arising from the lack of engine noise.

Eva Sunnerstedt shared her recent experience of renting a Mitsubishi iMiEV for a family holiday to test it under real world conditions. It had been very successful with no issues about range, charging or load capacity.



Suceava: There is a new government law about cars and CO₂, that provides financial incentives for renewing fleet vehicles, a scrappage of €1600, plus 4000€ subsidy for EVs.

Suceava colleagues attended a CIVITAS Vanguard and CIVITAS PLUS programme, in May 2011 in Bucharest.

The Managing Authority, the Ministry of Regional Development and Tourism, was among the organisers. Discussions were held on urban mobility planning and clean transport within overall strategy planning, and ideas were given using examples from European and US cities.

Several **ULSGs** have welcomed new members. In Lisbon- YOUMOVE consultancy and NCP (EC), in Beja -the new Office for Mobility Management and in Frankfurt- a radio station, and more politicians and councillors.

In other news **Estonia** has sold 10 million tons of carbon emissions rights to Mitsubishi Corporation (MC) in exchange for which MC will:

- Provide 507 iMiEV, to be used by social workers. (200 already delivered)
- Install 200 fast CP, CHAdeMO type
- Provide €18,000 x 500 of grant for 500 EV buyers from 2012

Also in Estonia there is an initiative to make it part of procurement obligations for drivers of publicly contracted fleets to have eco-driving certificates.

8 Presentation of UPS Electric Delivery Van

Patrick Wunderlin, Automotive Fleet Engineer at UPS showed EVUE partners their E-van. UPS purchased several Modec heavy duty electric vehicles between 2008 and 2010, with 3 years of full warranty. One is in operation in Frankfurt. Although Modec is now in financial difficulty there is still a service arm operating to take care of the fleets on the street.



The specification is

1.6 tonne pay load (UPS would prefer more)

200 horse power

100 km range

6-7 hours charging,

The van drives 50-60km per day and the drivers love it.

The price is twice that of the diesel version, and there is roughly a 20-25% saving in maintenance cost

UPS is very happy with the EV even though it will not break even in terms of costs.

9 Local Action Plans

Peer Reviews

9.1 Katowice

Sabina Denysenko presented progress on the Katowice Local Action Plan. Following the Project Cycle Management process introduced at the URBACT Summer University Katowice has developed a problem tree. The focal problem is defined as 'Too much congestion in the city' and the focus for the Plan is 'E-mobility development as part of a sustainable traffic system'. A stakeholder analysis has been completed and a stakeholder categorisation on an Influence/Importance grid. The next steps will be to define precise activities, funding sources, timetable and indicators. The full structure for the LAP is now agreed and this will be progressed at the next ULSG meetings.

Sabina also reported that politicians are showing interest in e-mobility and there are 'the first birds in the sky' for e-mobility in Katowice. ULSG members attended an Open day on E-mobility at the Silesian University of Technology in Gliwice.

CO2 energy intensity is a problem in Poland. Research evidence on CO2 and energy density and a comparison with clean energy/ICE is needed to justify the move to EVs. Legislative solutions will be needed to support the introduction of EVs.

Katowice believes that E-mobility can promote a good image of the city's environmental monitoring.

9.2 Beja

Marcos Nogueira presented the results of ULSG meetings so far in Beja on the Local Action Plan. Beja's focus is integrated planning, and in particular how electric mobility can be integrated into wider energy efficiency plans in a Sustainable Energy Action Plan, within the framework of the Covenants of Mayors. The Plan analyses energy sustainability measures by sector and sets out targets for investment, including private and public investment in e-mobility.

Beja is also developing virtual air quality measurement system tools, in order to be able to attribute improvement in air quality to electric mobility.

<http://ambiente.bejagolabl.net>

For smaller cities, with a lack of resources and scale, this integration is even more important. Beja could provide a useful reference case. The tools are available for EVUE cities to share.

10 EVUE Planning

The next Expert Seminar will take place in London on 24-25 November 2011.

There will be a joint Stockholm/Oslo Study Visit and Network meeting in the week of 21-25 May 2012.

The EVUE Final Event will take place in London in the week of 24-28 September 2012.

An online survey collated evaluation and reflections from the meeting.

11 Learning and Reflections

Reflections from participants at the meetings:

On Infrastructure

* It is interesting to hear how Frankfurt will be testing inductive charging, and to see their on-street (non-inductive) charging points.

* We notice that cities have similar problems and that many have come to the conclusion that it is mainly at home and at work we will charge our electric cars.

* I liked the use of existing infrastructure (payment machines, signage) to implement new services (parking + C's). Germany, as the economic leader of Europe with a strong car manufacturing industry as well, has an advantage to implement these solutions.



* I noticed some similarities between Madrid and the Spanish system, as both are decentralized countries.

*One of the main impressions was the different ways to establish infrastructure and a payment structure. You can have different solutions for private, public and semi public market segments. The complexity in this area underlines the need to learn from each others' experiences and to try to standardize the solution for customers

*I learnt from hearing about Frankfurt's payment solutions. It seems that all countries have chosen different solutions when it comes to payment and charging.



*I appreciated the initiative to involve private companies to install charging points, using regular plug-in with the simulated petrol station as publicity. It is a cheap solution, but quite visible and replicable.

On business models

* It is hard to find a good business model for EVs and infrastructure. Are we involving the right stakeholders? How about economists? We are thinking hard about if and how to improve our group in Stockholm now!

* EV manufacturers are developing some of the best business models (like Renault and Opel).

* It brings insights to hear from the OEM, how they are developing and marketing their vehicles. Opel Ampere technology is completely new and innovative.

* From a complete starting point practically everything can be applied; I am impressed at the example given by Portugal, with the Mobi.E programme that paved the way for all major cities to become part of this project and to increase its general impact.

*We need to think differently with this new technology. The EVs might have to come in a package for car-sharing or some other business model. Possible ways to get things started: 1) Merchantainment - mix marketing and entertainment 2) Freemium & Premium - the customer gets something free, but get more if they pay..... 3) Gamification - games and competitions (win a weekend with an EV and that sort of events...) 4) Augmented reality - use ITS as a tool on reality and make the experience bigger/better/larger

*Northern countries (Sweden and Norway) are more advanced in public awareness activities and in promoting the regular use of EVs.

*The first actual examples of EVs in private use are popping-up throughout the participating cities.

*Further discussion and efforts shall be made to engage other partners at local level: banking and financial sector; universities and higher education institutions and research bodies.

*More cross exchange and mutual learning among Managing Authorities might be needed to adapt future programmes (even within the current ERDF scope) to be capable of financing EV programmes at urban and regional level.

*Hearing about each city background, current strategy and current results, offered such a diverse landscape it opens our mind to our own city situation. If there is no 'one size fits all' policy, as contexts vary across countries, there is much to learn about other cities' successes and challenges

EVUE partners will transfer the learning and ideas from the Frankfurt meeting in a number of ways:

+The air quality model-based monitoring can be used to assess and quantify urban environment benefits from EVs.

+We might look into the parking machine solution once more at Fortum



+EV use for freight and urban logistics. Seeing and hearing about the electric UPS van project was especially important as we are looking to do an EV-goods distribution project in Oslo. It is good to have a picture

and show there are actual vans driving around.

+ We will look at charging points linked to parking-meters and docking stations for E-Bikes.

+ One idea I was thinking about when I saw the charging units that Sparkasse had done was about the city bike system we have in Stockholm. The city has procured a city bike system. We let the winning company have access to areas where they can install bikes and racks and place advertisements. This is free for the city. It is also free for the winning company as long as they guarantee a certain amount of bikes and a maximum fee for the user. They finance it all mainly by selling advertisement space on bikes and posters by the bike racks. Perhaps we could apply the same thing with charging. A procurement where a company gets access to areas to put up charging AND advertisement in the same way as for the bicycles - this need to be thought over carefully!!

And finally....

The meeting was a very good combination of theoretical and practical work - you never got tired after 8 hours in the same room!....I really got a lot of new knowledge and was very happy to have the opportunity to participate - thank you for that!



The EVUE "spirit" is getting stronger every meeting. Really hard work is undertaken by cities to improve the EVs even in the face of this huge economic crisis. However it seems that EVUE has brought together an outstanding group of international experts in Electric Mobility. This value must be kept for the future.



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

www.urbact.eu/project

