

PLUGGING IN TO GO GREEN

A REVOLUTION IN ELECTRIC MOBILITY

BY SALLY KNEESHAW

LEAD EXPERT OF THE EVUE THEMATIC NETWORK

Across the globe a revolution is underway. Vehicles powered by electricity are hitting the roads as the environmental and economic benefits they bring are increasingly recognised. National and local policy-makers are seeking ways to make it easier for citizens and businesses to drive cleaner vehicles. The technology is improving rapidly and car, energy and infrastructure industry players are gearing up their efforts to win market share.

There is no doubt that electric cars can help to make our city streets cleaner, quieter and more attractive. Transport accounts for around 25% of CO₂ emissions across the European Union, and it is the only sector where they are still rising. All electric powered vehicles are zero emission at point of use, so there are no harmful gases or pollutants when they are driven. Electric cars can be up to five times more energy efficient than traditional internal combustion engines, which means the total carbon consumption is lower per mile. And the potential for electric vehicles to harness clean energy creates real opportunities for more sustainable city living.

“We have a ‘practice before rules’ approach. We want to avoid making expensive mistakes. 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.”

Sergio Fernández, Balaguer Manager of the MOVELE project, Madrid





Launch of the Frankfurter Modell, part of the German Elektromobilität programme

Importantly for city planners, electric cars are ideally suited to driving patterns in urban areas. Around 50% of car trips in cities are less than 6 km in length.¹ Electric vehicles' current limited battery range of anywhere between 40 and 160 km, depending on the model, does not represent a problem for the short distances involved and will only continue to improve. In fact, the stop start rhythm of urban driving actually contributes to the electric car's operation, as they can convert braking energy to new electricity.

Many mobility experts now agree that electric cars could and should be part of future urban mobility solutions. The question is how can cities realise the potential benefits, without making costly errors, in a new and fast moving area of policy? What are the most efficient ways to implement strategies that maximise public investment in infrastructure and generate driver confidence?

URBACT contributes

EVUE – Electric Vehicles in Urban Europe – is a newly approved URBACT thematic network of 10 cities, led by Westminster City Council in London.² Its aim is to explore, exchange and implement ideas on how cities can develop integrated and sustainable strategies to increase the use of electric vehicles. Over the next two years the lessons learnt about the very real challenges outlined here will be identified and transferred to EU networks, such as Eurocities Mobility Forum and POLIS.

For cities that are yet to begin the journey, EVUE will provide the opportunity to assess realistically the steps needed to prepare for electric vehicles in the longer term, as lower costs and the increased availability of cars will make them more viable.

Who is in the driving seat?

In order for electric vehicle strategies to succeed and contribute to meeting ambitious

CO₂ targets in Europe a new set of pioneering partnerships are required.

The automotive industry's investment in electric vehicles is in part a response to tough EU targets, which set emission performance standards. New passenger car fleets produced will need to have an average of 95gms/km CO₂ emissions by 2020.³ Economic stimulus packages have been introduced to re-orient car makers to cleaner technologies and encourage investment in green car production. Globally millions of dollars are being invested in R&D on battery technology and new materials with a number of joint initiatives to share development costs and risks, such as the Nissan Renault joint venture to develop and manufacture cars and the Toyota EDF energy tie in for trials of the Prius Hybrid Plug in. The range of models coming to the market include hybrid electric, plug in hybrids and battery



electric. Industry experts forecast that electric vehicles could represent 10% of the global market by 2010.⁴ Car retailers are now looking for ways to accelerate the commercialisation of sustainable technologies. This crucially includes partnerships with public sector bodies as a way to test the markets, build consumer confidence and guarantee orders.

Energy and infrastructure suppliers see new market opportunities and supply chains around electric vehicles. Many European cities are already running pilots and trials in cooperation with energy companies, for instance incorporating carsharing schemes powered by solar charging points in new housing developments. New companies are popping up to sell and install charging points on the streets. Smart grids, which balance energy supply and demand, are under development. In convergence regions with less developed infrastructure, the electrification of mobility could bring opportunities to focus more on domestic and cleaner energy sources.

Another vital piece of this jigsaw puzzle is drivers themselves. Who will buy and drive electric cars? Although public opinion is changing,



Electricity company Fortum charging point in central Stockholm

Electric cars convert electricity to motion around three times more efficiently than cars with internal combustion engines. They also emit no CO exhaust, NO_x (nitrogen oxides) NMHC (non-methane-hydrocarbons) or PM (particulate matter) in operation.

Source: European Commission Directorate General for Energy and Transport

as evidenced in numerous surveys, there are still real and perceived barriers of cost, performance and range, and a lack of charging infrastructure. Public information and financial incentives will be needed to encourage citizens and businesses to swap their gas guzzlers for more environmentally friendly options. The 2010 Annual Report of the Royal Automobile Club on Motoring in the UK states that seven out of ten drivers consider electric vehicles as a viable alternative. www.rac.co.uk

On the move?

So what does this mean for European cities? Electric vehicles can be considered part of the solution to a number of common issues. The obvious advantages are that they are well

Norway has introduced a range of incentives to create a favourable market for electric vehicles.

They include exemptions from road, tunnel, and bridge tolls, one off duties and VAT. Public parking and inland ferries are free. Electric cars can use the bus lanes on urban roads. They are subject to 50% less tax than internal combustion equivalents. There are currently 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.

can be to set an example by converting their own fleets. Many mobile municipal functions, such as community nurses, delivery and refuse trucks, are suited to electric vehicles. Lisbon has set itself a target that 20% of its fleet renewal each year will be electric vehicles. Public procurement can be used as leverage to encourage companies in the municipal supply chain to do the same.

Establishing a network of city wide charging points will help drivers feel confident in using electric cars. Charging points can be included as a planning requirement for new building and developments. Cities can make information publically available for drivers on the costs and benefits of electric vehicles. Marketing and incentivising them will help build citizen confidence.



suited to urban mobility patterns, decrease CO₂ emissions and harness renewable energy. They can also play a part in reducing noise and improving air quality. Strategies need to be careful not to incentivise a negative modal shift away from public transport, walking and cycling to electric vehicles. This is not so easy to monitor or achieve, and represents a significant challenge.

Cities could also see benefits from the business and job growth linked to the electric car market. Transport and energy are considered to be key sectors for the emergence of green jobs⁵. As the market takes off new skills will be required and new jobs created in R&D, manufacturing, construction and maintenance of vehicles, systems and infrastructure.

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, to pilot local electromobility programmes and

“I will set ambitious targets - learnt from London. It is a process that won't go backwards. Beja must be in the first phase [...] In Beja it must also be about business and job creation and the strategy to develop tourism in the region.” Jorge Pulido Valente, Mayor of Beja

develop new business models. Incentives, such as subsidies and tax relief, free parking and charging, have been introduced, in many regions to kick start the market. But they are not sustainable in the long term, and plans to taper them off in future have to be carefully thought through. Clearly there is a need to make wise choices at a time when the public purse is under pressure.

A cornerstone of these electric vehicle programmes is multi-stakeholder partnerships, bringing together the key players described above. So the gauntlet is laid down for policy makers and urban planners to prepare for electric vehicles. Part of a city's leadership role

The Electric Vehicle Clinton Climate Initiative is a programme of the C40⁶ and the Clinton Foundation. It has launched a number of pilot projects worldwide and provided guidelines for cities to get it right from the start to send a clear message to the market.

Charging Ahead?

There are still some doubts whether electric cars can deliver their promise. Battery technology has to improve significantly to be able to minimise charging times, and allow vehicles to take greater loads. The whole life cycle of electric cars must be cleaner and greener than the one it replaces. This includes manufacturing

Summary of city responsibilities

INFRASTRUCTURE

Facilitate the planning and deployment of charging infrastructure and related electricity supply systems

PERMITTING AND PROCESS

Help streamline permitting for charging

DEMAND PROJECTIONS

Mobilise demand for EVs in city fleets and rally private fleets

COORDINATION OF INCENTIVES

Help coordinate incentives and contribute to the package

www.clintonfoundation.org

vehicles may have a role to play. Concerns that cars would overload the electricity network are without foundation. Energy company Enxsis has predicted that if all 7 million passenger cars in the Netherlands were to become electric it would only lead to 20 % higher electricity consumption.⁷

In order to deliver promised benefits in CO₂ reduction the solutions will need to make use of mobile smart grids that balance out peaks and troughs in the power supply. Smart charging could allow remote control of car charging to support an optimal balance of the electricity supply grid, managing and controlling charging patterns, and incentivising overnight charging.

- ▶ 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.

EU programmes such as the CIVITAS Initiative and Intelligent Energy Europe (IEE) have supported the testing of innovative and integrated sustainable urban transport strategies and energy efficiency in transport. There have been a number of projects to facilitate the market introduction of lower and zero emission vehicles and alternative fuels, aiming to reduce dependency on fossil fuels. In the framework of the European Economic



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methods, battery disposal and, crucially, the electricity coming from sustainable sources in the context of the EU 2008 Directive, which requires 10% of energy for transport to come from renewable sources by 2020.

Is it the right technology? Other green technologies such as bio fuels and hydrogen cell

The European view

The reduction in CO₂ and other emissions that electric vehicles can deliver, and the potential to harness renewable energy sources and smart grids are important for cities in the context of the EU Climate and Energy Package⁸ and the 20:20:20 targets:

Recovery Plan, the Commission has launched the European Green Cars Initiative. It funds new projects related to electric vehicles, which will cover batteries, electric power trains and auxiliaries, information and communication technologies and an electro mobility demonstration project.

URBACT co-finances projects that allow cities to work together to find sustainable solutions. Within this framework the EVUE project will contribute to understanding of how electrification of mobility could be a tool for low carbon city strategies.

Although there is no framework for the electrification of cars at EU level, in the last year the Commission has produced a Green Car Communication and a Discussion Paper on Electric Vehicles and the Future of Transport. EU policy is technology neutral. It does not favor one technology over another, but the importance of electric cars is acknowledged. In the coming years there will be a need for



Tokyo has more taxis than London, Paris, and New York combined, with approximately 60,000 vehicles. They account for 2% of vehicles in the city, but are responsible for 20% of its CO₂ emissions. The Tokyo Electric Taxi Project was launched in April 2010 as a pilot to demonstrate the advantages of switching to electrical power. The three vehicles provided by Nissan have removable lithium-ion batteries, which are changed by a robot arm in quick change stations. The fully automated operation takes between three and five minutes, and so far, the pilot drivers report that Japanese customers prefer to remain seated in the car to watch, fascinated by the process. The pilot is run by Better Place, an American supplier of electric car networks and services. By using taxis as demonstration vehicles every day around 30 different people in each car get to experience how the cars operate and to talk to the driver about it. www.betterplace.com



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“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.”

CLlr Connell, Westminster Council.

European standardisation for infrastructure, one solution for socket-connector-charging point, for grid-vehicles connections, as well as metering protocols. These steps are considered key for a functional market and consumer confidence.

Conclusion

Electric vehicles do not represent the total solution to greening transport. Multi-modal strategies are needed that encourage all forms of cleaner mobility and that reduce congestion and the need to travel. But electric cars have the potential to form a vital component. They can help cities hit clean air and CO₂ reduction targets and ultimately become more attractive places to live.

By creating effective new partnerships, in the case of EVUE through URBACT Local Support Groups, cities, together with carmakers, car lease and hire companies, energy suppliers, infrastructure companies, businesses and civil society can develop a better understanding of the practical challenges. With a

joined up approach it should be possible to catalyse the move towards electrification of mobility and capture regional benefit in the de-carbonisation of transport and sustainable economic growth. ●

- (1) Clean Urban Transport Report of DG Energy and Transport EXTRA consortium
- (2) www.urbact.eu/evue
- (3) Regulation (EC) 443/2009 of 23 April 2009
- (4) Source: JD Power
- (5) Putting in place jobs which last: A Guide to Re building sustainable employment at local level ©2009 OECD
- (6) C40 is a group of large cities committed to tackling climate change
- (7) www.enexis.nl The Parliament magazine June 2010
- (8) The EU climate and energy package http://ec.europa.eu/environment/climat/climate_action.htm

+ MORE INFORMATION
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