



## E-mobility in Europe

### EVUE II Advisory Notes for City Implementation

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/evue2](http://www.urbact.eu/evue2)

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## EUVE PARTNERS

### Lessons from the EVUE II pilot for e-mobility

Electric vehicles in urban Europe pilot delivery network

The EVUE project is led by Cross River Partnership, London UK, on behalf of Westminster City Council and has partners from:

- » Frankfurt (Germany)
- » Katowice (Poland)
- » Oslo (Norway)
- » Suceava (Romania)

## INTRODUCTION

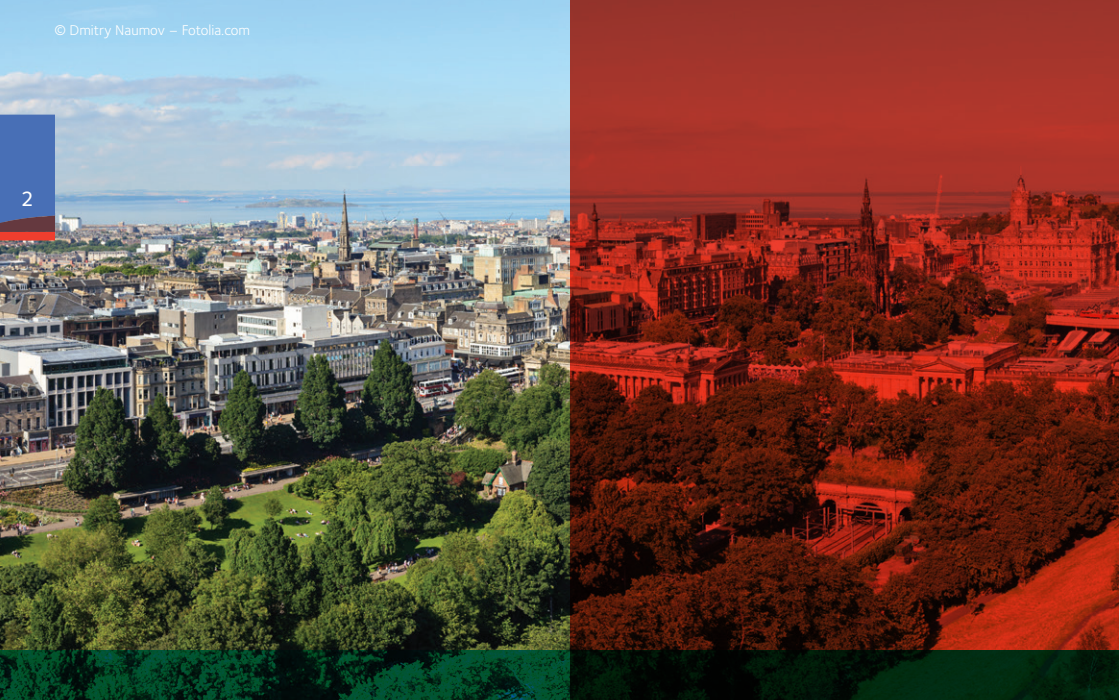
The challenges facing cities throughout Europe on climate change, air and noise emissions are substantial. European and National government policies and objectives are setting increasingly stringent environmental standards and it is the responsibility of local and regional authorities to achieve these limits.

The transport sector is one of the biggest contributors to these problems while at the same time being essential for the effective and efficient functioning of cities.

E-mobility and electric vehicles (EVs) provide a significant opportunity to address the negative externalities associated with the internal combustion engine (ICE) without constraining the vital role vehicles play.

While some questions do get asked about the overall benefit compared to the ICE vehicle, in terms of solving the air and noise pollution issues facing our cities the potential benefits are substantial for our health, quality of life and economic development.





## BACKGROUND

### EVUE II

Ten cities began working together in 2010 to help explore common issues and address problems related to achieving e-mobility at the local authority level. The EVUE (Electric Vehicles in Urban Europe) project, funded under the European Commission's URBACT II programme, sought to address the common barriers being experienced by municipal authorities supporting the transition and uptake of EVs and propose solutions to overcome these.

As part of this project, partner cities developed Local Action Plans (LAPs) that would take the knowledge and experiences gained from the transnational exchange and, combined with local approaches, identify actions to address the specific local challenges.

To assess the effectiveness of the implementation of these plans, the URBACT programme provided funding for a sub-set of EVUE cities to engage further on the common challenges still being faced.

EVUE II, involving the cities of Frankfurt, Katowice, London, Oslo and Suceava, focused on tackling the key areas of difficulty which the cities have faced whilst implementing their action plans:

- » Environmental pressures
- » Regulatory environment
- » Technical challenges
- » Financial issues
- » Communication approaches

These five thematic strands reflect the principal issues that have impacted on partners' capacity to fully implement their action plans. EVUE II cities have reviewed and discussed these challenges with the aim of improving their own methods and procedures, drawing on this experience to produce suggestions for other cities seeking to implement e-mobility.

The purpose of this summary is to share this learning and enable proponents of e-mobility to better understand the approaches that can be taken locally to achieve the goal of emission free urban transport. The aim is to provide practical support, while not being highly technical or prescriptive, to increase the reader's understanding and suggest possible interventions to assist cities in their drive towards mainstreaming e-mobility.

### Policy Framework

Current European (and by extension national) policy has recognised the impact of transport and sought to mitigate its negative effect and balance the move towards sustainable development through a variety of approaches including:

- » Consumer access to energy sources for affordable and stable prices
- » Sustainable production
- » Transport and energy consumption
- » Energy supply safety
- » Reduced greenhouse gas and vehicle emissions

Key documents and directives, *inter alia*, pertaining to this that it is recommended to consult include:

- » The 2020 Climate and Energy Package<sup>1</sup> (20-20-20 targets)
- » Europe 2020 Strategy priorities for Smart, Sustainable and Inclusive Growth
- » Directive 2009/33/EC of the European Parliament and Council promoting non-polluting and energy efficient road transport vehicles
- » 2011 WHITE PAPER – *Roadmap to a Single European Transport Area*, which establishes that, by 2050, only clean, non-polluting vehicles will be allowed in European cities (2030 for logistics vehicles)

Taken together the direction of travel is quite clear, public authorities at all levels must reduce the negative environmental impacts of transport.

In addition, failure to adopt, implement and/or achieve these policies and targets can also leave member states vulnerable to enforcement action. While this has never been employed at the European level, recent court rulings have confirmed that national governments are liable. This has introduced the possibility of claims being lodged by individuals or lobby groups seeking governmental action.

Responding to these EU and national policy initiatives, combined with a review of their local experiences and ambitions, the EVUE II partners bring together five advisory notes on the core issues identified.

1. [http://ec.europa.eu/clima/policies/package/index\\_en.htm](http://ec.europa.eu/clima/policies/package/index_en.htm)



## ENVIRONMENTAL

While society has long recognised the negative impacts that the internal combustion engine has had on our cities, the social and economic case for personal mobility has been such, that without a viable alternative, no significant change has occurred in the last 100 years. On-going research however, has shifted the environmental case from generalised air and noise pollution to specific clinical evidence on the impacts affecting each individual exposed to conventional vehicle emissions.

### Emissions and Health Impacts

The World Health Organisation (WHO) has identified air pollution as the world's single biggest environmental health risk<sup>2</sup>. According to their estimates, approximately 7 million deaths in 2012 were due to air pollution, with the causes being traffic fumes and combustion sources – this is more than smoking, road deaths and diabetes combined.

The pollutants of concern for urban air quality are primarily: particulate matter (PM) and oxides of nitrogen (NOX). Health impacts from exposure to these pollutants can range from cardio-pulmonary disease and respiratory illness through to effects on the brain and cognitive development. This is of particular concern to children, the elderly and vulnerable individuals, such as asthma sufferers.

### Air quality action in London

Air quality in London is some of the worst in Europe. The highlighted areas in yellow and red in figure 1 are above show that pollution levels exceed recommended health exposure levels (note that this corresponds with the London road network). The Mayor of London has proposed the world's first Ultra Low Emission Zone (ULEZ) to reduce vehicle emissions and the resultant harmful pollutants. EVs with their zero tailpipe emissions provide a significant opportunity to achieve this and can be introduced across all modes – cars, buses, vans and trucks almost immediately. Providing a quick and effective response to this growing health issue without constraining vehicle usage.

As a result of the EVUE project, Cross River Partnership secured substantial European funding for the implementation and monitoring of more than 120 electric freight vehicles (EFVs) in eight cities across Europe, including London, to address urban air pollution. For more information on the FREVUE project, please visit the website: [www.frevue.eu](http://www.frevue.eu)

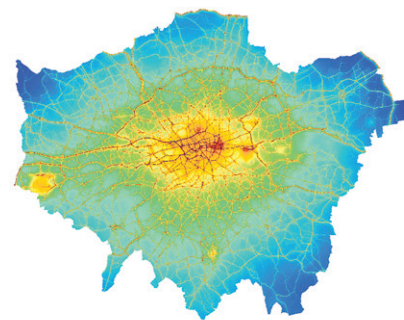


Figure 1: Modelled annual mean NO2 air pollution, based on measurements made during 2010<sup>3</sup>

### Suggestions for Action

With this growing understanding and the strengthening of policy at the global, EU and national levels, what can cities do to reduce and ultimately eliminate harmful emissions caused by traffic? Road transport is clearly a leading source of air pollution and public authorities, businesses and individuals all have a role to play in addressing this.

Whilst it may be difficult to remove all pollution sources, city authorities should seek to minimise the instances and impacts of harmful pollutants and keep reducing the levels of air pollution.

Establish baseline situation and existing policy and practice:

- » Check location of monitoring stations and establish local levels of pollution, e.g. NOx & PM
- » Review existing national, regional and local policy guidelines on pollution levels and emission standards
- » Speak to local environmental or political groups if no policy exists

Construct local policy to guide development:

- » Adapt local transport/mobility and air quality plans, i.e. through the introduction of sustainable urban mobility plans
- » Introduce monitoring stations to record emission levels if not already in place. Consider enforcement or remediation activity if emission standards are exceeded
- » Use EU emission standards as a basis to introduce low emission zones favouring the use of alternative fuelled vehicles.

2. [http://www.who.int/phe/health\\_topics/outdoorair/databases/FINAL\\_HAP\\_AAP\\_BoD\\_24March2014.pdf?ua=1](http://www.who.int/phe/health_topics/outdoorair/databases/FINAL_HAP_AAP_BoD_24March2014.pdf?ua=1)

3. <http://www.londonair.org.uk/london/asp/annualmaps.asp>



## REGULATION

European, national, regional or local regulations encompass everything from electrical safety, vehicle registration and operation, standardisation of infrastructure, down to air quality and environmental zones. While most of these are outside the scope of the municipal authorities, and by extension this report, there are a variety of ways local authorities can utilise existing regulatory powers to support e-mobility.

### Impact of Regulations

Regulations can impact e-mobility activity in two key areas:

**Legal requirements** – particularly where regulations may now be inconsistent or contradictory due to changing technology or approaches no longer reflect the ‘old’ reality, e.g. prohibiting of large EVs in areas due to air quality regulations based on vehicle size rather than emissions.

**Procedural barriers** – while occurring in all jurisdictions, this is best exemplified in more centralised bureaucracies where excessive regulation can hinder responsive decision making and meeting customer demand, e.g. when connecting charging infrastructure to the grid, the technical complexity may be overshadowed by the procedural requirements and any permissions for access etc.

With consistent regulations concerning charging infrastructure at national and local level for example, it will be possible to have a flexible approach to optimise the advantages of new operating models:

- » EVs may provide energy storage opportunities from renewable generation, e.g. for municipal companies producing biogas from communal waste
- » Provide grid reinforcement through enabling vehicle (battery) owners to sell energy back into the grid (other customers)

### Cross-border cooperation

Katowice is one of the first cities in Poland to prepare and plan to implement the Low Emission Economy Plan. The aim of the initiative is to cut energy consumption and reduce greenhouse gas emission (including CO<sub>2</sub>) by 7% with regard to the forecast emissions in 2020.

In 20 March 2014, the Mayor of Katowice Mr. Piotr Uszok and the Mayor of Ostrava (Czech Republic) signed a Memorandum concerning the mutual actions to support air quality improvement in both cities by transferring information on all planned initiatives in order to gradually improve the air quality on the Czech-Polish border region regardless of the international level actions.

This innovative approach is an example of how harmonisation of regulation and policies may be realised at a local level to support environmental improvements without being constrained by unnecessary bureaucracy.

## Suggestions for Action

Operating within legislative frameworks at EU or national level, regulation is an important tool providing a structure for incentive as well as enforcement. Whilst some regulatory options occupy a long term perspective, others require regular review and adaptation, as is also the case regarding the adoption of financial incentives.

Baseline situation and existing policy and practice:

- » Research and assess local barriers to EV uptake
- » Assess existing (if any) policies and plans that support or hinder e-mobility

Construct local policy to guide development:

- » Identify incentives to encourage EV uptake:
  - » Parking privileges, e.g. access or discounts
  - » Regulations for new buildings and renovations to be e-mobility ready
  - » Relief from local vehicle taxes or charges
- » Engage with local policy officers and elected representatives

Implementation considerations:

- » Have regular stakeholder meetings to create the e-mobility readiness plan, and check-in on implementation
- » Encourage logistic companies to use clean vehicles e.g. through incentives such as no congestion charge during the transition phase



## TECHNICAL

Although many technical requirements will be city specific and often determined by local regulatory frameworks, a comprehensive and considered approach is required to mitigate against problematic issues such as grid capacity and siting of charge points, through to daily system management and administration. Of particular note are the principal technical constraints identified by the EVUE cities which concerned the areas of charging infrastructure and energy supply.

### Grid Capacity

From a municipal authority perspective, consideration needs to be given to the electrical distribution grid capacity within the target area. While in most circumstances, this would not be a factor of concern for the local authority, increasing energy demands being placed on older utility infrastructure are leading to supply constraints.

Grid capacity will affect the rate of charging that is possible, as higher speeds have a greater electricity requirement. It also impacts on the wider question of location and installation where different agencies ideally need to coordinate a strategy which is capable of servicing real EV needs in the future, i.e. a mix of work place, destination, on-street and off street charging.

### On or Off-street?

For many cities, the question of guiding or managing the development of an effective network of charging facilities represents a new and demanding challenge. During the initial stages of EV adoption, limited public on street charging may be advised to assist with promotion and marketing, although long term implications should always be considered. When the transition to EVs fully occurs, the business case for charging stations, similar to existing petrol stations, will be strong. However, the widespread proliferation of public on-street charging may act as a disincentive to market development.

### Charging Point Type

When it comes to charging equipment, it is necessary to consider the desired charging speed. It may be preferable to only provide slower charging rates so as not to affect the development of a private market with regard to fast and rapid chargers, which can achieve an 80% battery recharge in as little as 30 minutes.





### Suceava charging network

Under the Swiss-Romanian Cooperation Programme, EVUE II partner Suceava secured funding for its 'Electro-mobility – electric vehicles for a green city' programme. Suceava will become the first city in Romania to add EVs to their fleet.

To support the operation of 15 EVs, Suceava will install 28 (14 fast and 14 standard) smart charging points which are publicly funded through the scheme. A feasibility study was commissioned and the following locations were identified as suitable for siting charge points: underground and open air public car parks, municipality car parks and in the vicinity of main municipality buildings, on-street near shopping centres and selected apartment buildings. The charging points will be established in both on and off-street locations to raise awareness through visibility, as well as provide both municipal and public access.

### Suggestions for Action

Baseline situation and existing policy and practice:

- » Given the rapid development in this area, review the various guidance documents and other sources of information regarding the technical processes and challenges, e.g. European Network of Electric Vehicles and Transferring Expertise

Construct local policy to guide development:

- » Consider approach to be taken with charging facilities – on or off-street, standard or rapid etc.
- » Build knowledge by conducting a feasibility survey of identified charging point locations. A forecast of likely neighbourhood 'hotspots' of EV take-up could help prioritise locations

Implementation considerations:

- » How will access to charging points be provided?
- » Will the system be free to use or will payment be required? If charged, how will money be collected?
- » How will the charging points be maintained?
- » How will the system be monitored, including demand and energy consumption?
- » How will the operation adapt to changing conditions or external pressures?

For full technical best practice guidelines, please refer to the extended EVUE2 Advisory Notes: [www.urbact.eu/evue2](http://www.urbact.eu/evue2)





## FINANCIAL

E-mobility is a necessity if we are to meet the ambitious environmental goals that have been set, as well as reduce the significant costs imposed by transport on society. While the costs required to deliver this mindset and behavioural change may be substantial, particularly during the initial set up, the cost of inaction will be far greater.

### Cost of Air Pollution

Transport derived air pollution is imposing billions in costs on our health and the wider environment, with consequential effects on the economy and our quality of life. The European Environmental Agency (EEA) calculates the cost of air pollution from

road transport to be €100 billion per year due to worker absenteeism (sick days) and premature deaths<sup>4</sup>.

For PM alone, the damage in inner London has been calculated at €240,000 per tonne<sup>5</sup> (2010). The Greater London Authority has estimated over 4,000 deaths are attributable to particulate matter alone per year<sup>6</sup>.

Following a European Court of Justice (ECJ) ruling<sup>7</sup> the responsibility of member states to achieve the air quality standards has been confirmed. Failure to comply opens the way for infractions to be levied with potentially heavy financial penalties.

### City Perspective

In recognising current market failures inhibiting the wider adoption of EVs among

potential users, some cities have taken a 'driving seat', while others rely heavily on new market solutions. In most areas however there are financial incentives to kick-start the adoption of EVs, and to make their purchase and usage more attractive, such as incentives and benefits on the use of EVs and to develop the necessary charging infrastructure.

Some cities have established on-street charging points, including free parking and electricity. In others, EV users must pay for parking, but receive the electricity for free. This is often combined with regulatory means, like prioritising parking places for EVs in central areas of the city where parking is at a premium.

### Oslo – victim of own success?

Oslo is widely recognised as one of the leading cities for EV sales, with 15% of new cars purchased now being electric. The city has implemented a range of incentives such as: discounts on EV purchase (no registration tax or VAT) and EV usage (free parking, free access to bus lanes and free use of toll roads).

Access to the bus lanes has proven to be a very popular and can reduce commuting times in Oslo by hours per week. As more EVs hit the roads however, their cumulative impact on bus lane operations is reducing the effectiveness of the lanes by delaying public transport and is counter to wider sustainable transport policies.

Oslo must now consider how these incentives should be phased out or managed so as to not inhibit future uptake of EVs in the city.

## Suggestions for Action

EVUE cities and stakeholders have wrestled with the problem of understanding and defining an acceptable and functioning business model(s). There is consensus that EV changeover depends on initial financial support from the public sector. However it is generally recognised that the desired transformation cannot be subsidised indefinitely.

Baseline situation and existing policy and practice:

- » Consider business models adopted elsewhere

Construct local policy to guide development:

- » Introduce the most appropriate support to kick-start EV momentum – targeted, short to medium term incentives
- » Public procurement measures should encourage public authorities, individual departments and agencies to use EVs

Implementation considerations:

- » Approach should be proactive, intensive, coordinated and involve private stakeholders
- » Seek external funding sources for development phase pilot initiatives
- » Monitor closely the cost-benefit equation and take steps when the balance hits pre-set threshold values, e.g. loss of parking revenue against benefit of growth in EV numbers.

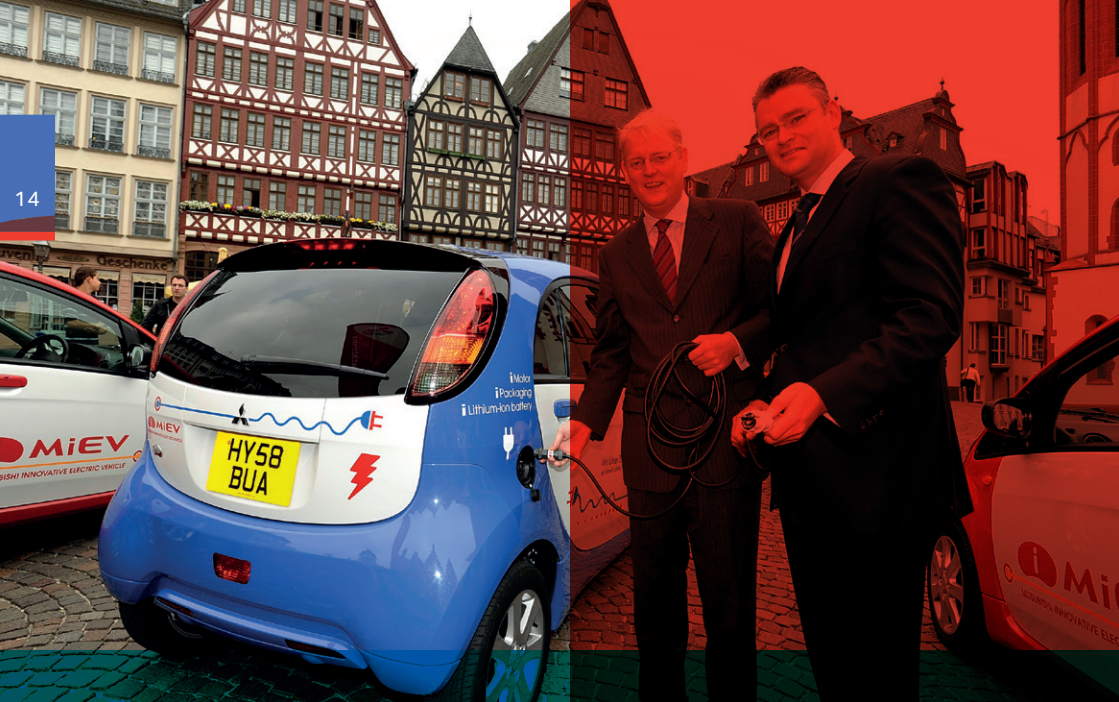
4. <http://www.eea.europa.eu/media/newsreleases/reducing-the-20ac-45-billion>

5. <https://www.gov.uk/air-quality-economic-analysis>

6. [http://www.london.gov.uk/sites/default/files/Air%20pollution%20issues%20paper%20pdf\\_0.pdf](http://www.london.gov.uk/sites/default/files/Air%20pollution%20issues%20paper%20pdf_0.pdf)

7. <http://curia.europa.eu/jcms/upload/docs/application/pdf/2014-11/cp140153en.pdf>





## COMMUNICATION

While the case for e-mobility is very strong, unless the message is clearly communicated, the wider public support for EVs (and their benefits) will be lacking and this will result in insufficient political support. By identifying the key messages related to improved air quality and the best ways that these should be communicated, it will be possible to mobilise the support to ensure the regulatory (and political) framework is conducive for the achievement of an alternative, sustainable urban transportation system.

### Identification of Key Messages

The internal combustion engine will no longer be the exclusive method of vehicle propulsion and increasing market share will go to alternative fuelled vehicles. While distribution and market acceptance is highly dependent on technical development as well as purchase prices, improvements in battery technology (range) and falling prices are positive factors leading to a growing acceptance of electric vehicles. This provides a real opportunity to change our thinking on mobility and transport

The communication methods and messages employed must take advantage of this social change. For example, young people who want to take advantage of mobility and for whom the ownership of a car is not a priority – this target group must be

specifically addressed. There is a greater openness to innovation and willingness to become a first adopter.

### The Right Approach

Communication methods typically focus on the demand for efficient and environmentally friendly vehicles, particularly in urban environments, however there is great diversity in the approach taken across European cities. Terms such as smog, noise pollution, or particulate pollution are now part of the day-to-day vocabulary shaping the work of every municipality.

Upon closer inspection, the specific city particularities quickly make the different motives for use of e-mobility clear. In London, the key messaging focuses on the improvement of air and quality of life in the city for the protection of one's own health. By comparison, Norway sees e-mobility as a way to secure energy independence; particularly as almost 100% of its electricity is produced by hydro generation.

### Environmental Messaging

Although environmental performance plays an important role in the marketing of e-mobility, caution is required to ensure that messaging is consistent with the operational reality. The environmental performance of an electric car does not just relate to the tailpipe emissions, or lack thereof, but also the energy sources used to power the EV.

Communication strategies should emphasise the use of renewable energy sources. With a long-term focus that EVs should not only be free of emissions, but that the same applies to the electricity sourced.

## Suggestions for Action

Construct local policy to guide development:

- » Engage with public relations companies or dedicate your own staff to design the campaign
- » The city authority should lead by example – add EVs to your fleet and make these highly visible
- » Place innovation and technical evolution into context – who would still want to use a 1990's mobile phone? Why would you still want to use an engine developed in the 1900's?

Implementation considerations:

- » Identify the most appropriate media channels, e.g. social media, dynamic city websites, and mobilise the local press
- » The value of people's direct experience cannot be understated – get people test driving an EV
- » Demonstrate the range of uses for EVs across public transport and freight/logistics sectors as well as for private vehicles.



## SUMMARY

Over a 14 month period, the EVUE II partners assessed the implementation of their e-mobility action plans and identified the key messages associated with the thematic areas of: regulation, finance, communication, the environment and technology. Whilst we have divided the challenges into five thematic areas, they are all closely related. Introduction of a low emission zone for example requires careful preparation where all five aspects need to be addressed. As such we recommend that the reader review and reflect on all of the issues raised to ensure integrated implementation can occur.

The relative importance of these areas will alter depending on the local context; however when combined, they provide a powerful framework around which the drivers supporting the transition to e-mobility can be identified.

These advisory notes have been designed to share this learning to enable proponents of e-mobility to better understand the approaches that can be taken locally to achieve the goal of emission free urban transport.

As noted earlier, this is not intended as a fully detailed manual indicating all the different approaches that may be taken with regards to e-mobility. Within each country, region and city there are a myriad of rules, regulations and conditions which would not make this appropriate. It will hopefully however, provide you with a range of different ways to think about the challenges and make your outcomes more successful.

For more detailed information and examples on all the thematic areas, please refer to the extended EVUE2 Advisory Notes: [www.urbact.eu/evue2](http://www.urbact.eu/evue2)

