

Deliverable 2.2

Successes encountered in the Electromobility policy making process

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List of Abbreviations

CA	Consortium Agreement
CP	Charging Point
DoW	Description of Work (Annex I of Grant Agreement)
DR	Demo Region
DNO	Distribution Network Operator
EROI	Energy Return on Investment
EV	Electric vehicle
WP	Work Package
ITS	Intelligent Transport Systems and Services
BEV	Battery Electric vehicle
E-Bike	Electric Bike/Pedelec
E-scooter	Electric Scooter
Pedelec	Pedal electric cycle
PT	Public Transport
HEV	Hybrid electric vehicle
ICE	Internal Combustion Engine
HEV	Hybrid Electric Vehicle: Parallel configuration
HEV	Hybrid Electric Vehicle: Series configuration
PHEV	Plug-in Hybrid Electric vehicle
VRT	Vehicle Registration Tax
WHO	World Health Organisation
ZEV	Zero emission vehicle

Glossary of Terms & Definitions

Electric vehicle (EV) or Battery (BEV): An EV is defined as any road vehicle exclusively with an electric drive, and without any on-board electric generation capacity.

Electric Bike/E-bike: With an E-bike riding a bicycle is possible without pedalling. The motor output of an E-bike is activated and controlled by using a throttle or button. Human power and the electric motor are independent systems. This means that the throttle and the pedals can be used at the same time or separately. This contrasts with the Pedelec which requires that the throttle and pedals must always be used at the same time. As a result, an E-bike is more or less used in the same way as a scooter or motorcycle rather than a bicycle. UK, Swiss and Italian regulations define the maximum power that can be used for an E-bike. More power makes it an electric scooter.

Pedelec: Pedelec stands for “pedal electric cycle”. While pedalling the cyclist gets additional power from the electric drive system. The control of the motor output of a pedelec is linked to the cyclist’s pedalling contribution by means of a movement or power sensor.

Electric Scooter or E-scooter: Small electric sit-down or stand-up vehicles ranging from motorised kick boards to electric mini motorcycles. Differences between the two types of small electric scooters are as follows: Stand-up scooters, instead of pushing the scooter forward with one leg, the rider simply turns the throttle on the handlebar and rides electrically. In contrast, sit-down scooters are small electric vehicles with a seat and are used much the same way as gasoline or petrol powered scooters. A throttle on the handlebar regulates the acceleration.

Hybrid vehicle: UN Definition: A vehicle with at least two different energy converters and two different energy storage systems for the purpose of vehicle propulsion.

Hybrid electric vehicle (HEV): The 1990s definition of IA-HEA Annex 1 was “a hybrid electric vehicle (HEV) is a hybrid road vehicle in which at least one of the energy stores, sources or converters delivers electric energy”. The International Society of Automotive Engineers (SAE) defines a hybrid as “a vehicle with two or more energy storage systems, both of which provide propulsion power, either together or independently”. Normally, the energy converters in a HEV are a battery pack, an electric machine or machines, and internal combustion engine, ICE. However, fuel cells may be used instead of an ICE. In a hybrid, only one fuel ultimately provides motive power. One final definition is from the UN, which defines a HEV as “a vehicle that, for the purpose of mechanical propulsion, draws energy from both of the following on-vehicle sources of stored energy/power: a consumable fuel, and an electrical energy/power storage device(e.g.: battery, capacitor, flywheel/generator, etc.).”

Hybrid Electric Vehicle (HEV): - Parallel configuration: A parallel hybrid is a HEV in which both an electric machine and engine can provide final propulsion power.

Hybrid Electric Vehicle (HEV): - Series configuration: A series hybrid is a HEV in which only the electric machine can provide final propulsion power.

Internal Combustion Engine (ICE): Historically the most common means of converting fuel energy to mechanical power in conventional road vehicles. Air and fuel are compressed in cylinders and ignited intermittently. The resulting expansion of hot gasses in the cylinders creates a reciprocal motion that is transferred to the wheels via a drive shaft or shafts.

PHEV Plug-in: A HEV with a battery pack with a relatively large amount of kWh of storage capability, with the ability to charge the battery by plugging into the electricity grid. This allows more than two fuels to provide the propulsion energy.

Intelligent transport systems (ITS) are advanced applications which, without embodying intelligence as such, aim to provide innovative services relating to different modes of transport and traffic management and enable various users to be better informed and make safer, more coordinated, and 'smarter' use of transport networks.

Although ITS may refer to all modes of transport, EU Directive 2010/40/EU of 7 July 2010 on the framework for the deployment of intelligent transport systems in the field of road transport and for interfaces with other modes of transport defines ITS as systems in which information and communication technologies are applied in the field of road transport, including infrastructure, vehicles and users, and in traffic management and mobility management, as well as for interfaces with other modes of transport.

Zero emission vehicle (ZEV): A vehicle that has no regulated emissions from the exhaust pipe or tailpipe.

ZEV is one of the most important definitions from the point of view of developing enabling measures and legislation to support the uptake of EVs. Both Climate Change strategies and the need to provide healthy cities for the future require reductions in CO₂ and Noise. Measures to address Noise in cities are now being regulated by European Directive which has been transposed into national legislation throughout the EU.

Executive Summary

This report undertaken as Deliverable Task 2.2 on Work Package 2 incorporated a comprehensive survey in 2012 of partners participating on WP2 and subsequently another survey circulated more widely in 2014. The surveys were undertaken to acquire up-to-date information with regard to “Successes encountered in the Electromobility policy making process” with reference to the Green eMotion project.

The following key aspects can be considered as being representative findings as identified in this report:

- To date, the policies that contribute most in terms of EV uptake are those that have delivered a seamless series benefits or package of measures for EV owners to include significant financial incentives as a result of national, regional and local political commitments to more sustainable development
- Policies must be formulated to ensure that incentives are provided to the extent that the sum of all the benefits meet or exceed the additional capital cost for the purchaser of the EV and the need, to retain the financial incentives until such time as the 2020 targets for EV uptake are achieved, is highlighted
- The potential of EVs to enhance and support the implementation of Low Emission Zones or City Clean Zones, Noise Free Zones, Pedestrian Priority Zones and World Health Organisation (WHO) Healthy Cities Initiative and support commitments on the binding Climate Change Strategies demonstrates that Electromobility is key to securing EU policy objectives in energy and transport
- The potential to use EV commercial vans is emphasised to the extent that they should be regarded as the vehicle type of choice as service vehicles and for goods deliveries given the beneficial characteristics of EVs being able to deal with congestion and short stay parking associated with urban centres

- Public Authorities, local governments and municipalities have a crucial role as regards the procurement of low or zero emissions vehicles, such as EVs, for their own vehicle fleets, which should reflect a commitment to 2020 targets, thereby showing leadership and helping develop a market for Electromobility
- Multi-modal travel planning is seen as key to improving transport operations and to gaining improved health benefits through active travel using more sustainable modes which the deployment of EVs and Pedelecs can support and enhance
- Measures to promote the deployment of EV Taxis are particularly successful in demonstrating significant overall reductions in fuel costs for the operator and in presenting the experience of a trip by EV to such a large potential audience
- Comprehensive engagement with stakeholders in relation to EVs at local, regional and national level, establishing commitments on Electromobility at each stage, set in the context of Climate Change Strategies, are delivering the most successful policy processes
- One of the key policy processes delivering ‘Successes’ relates to the initiatives that have led to the setting of mandatory targets for the deployment of EVs by public authorities and the consistent monitoring of progress in achieving targets was regarded as essential by a majority of respondents on the 2014 Survey
- Policy processes leading to collaboration between key public and private stakeholders, offering innovative mobility solutions and incentives to members of the public based on EVs, are proving to be amongst the most successful electro mobility initiatives
- The perceived risks and concerns about electromobility have been mitigated on collaborative projects, especially those facilitated by EU Framework programmes, as a result of the policy processes that had to be undertaken to deliver the Co-ordination Agreements between partner organisations and the

availability of co-funding can then be focused on supporting the EV roll-out to deliver very successful outcomes

- Initiatives focused on the promotion and deployment of EVs that incorporate social marketing to support more sustainable mobility, leading to long-lasting behaviour change, have the potential to deliver much more successful outcomes in electromobility

2.0 Introduction

The intention of this document is to present the survey results of partners, participating on Work Package 2, and other stakeholders which was undertaken to acquire up-to-date information with regard to 'Successes' been achieved on the roll-out of electromobility and the deployment of EVs.

The Green eMotion project is being implemented in the context of commitments related to Climate Change and steadily rising fuel prices in the longer term. On the basis of the survey, strategies for the promotion of electric vehicles (EVs) in European cities were reported in detail, and 'Successes' identified.

This document has been compiled with information provided by various individuals and organizations who submitted input and provided detailed responses as listed in the Annex to this report. The respondents included partners of the Green eMotion project which is to enable the mass deployment of electromobility in Europe. In identifying some of the key 'Successes', we hope to inspire others who are considering the promotion and the increased use of EVs.

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2.1 Presentation

These surveys were created for the purpose of harvesting information about the knowledge acquired by the partners as to the 'Successes' on Green eMotion project. The survey has a complementary document in the form of 'Hurdles' encountered survey, and together they are going to define strategies in order to overcome these hurdles, taking advantage of the successes.

3.0 Survey Input and Comments

This chapter is intended to unify the information obtained through the survey “T2.2 Template_Successes_v2_2.docx” and the subsequent 2014 Survey into a comprehensive text and to get an overview of the particular measures being implemented and Business Models under consideration.

The structure of the ‘Successes’ Survey document was set out to reflect the various aspects to be considered comprising a) Infrastructure, b) Vehicles, c) Incentives, Marketing & Communications and d) Policies. The 2014 Electromobility Survey was developed to glean more detailed data from a more representative selection of respondents.

3.1 Infrastructure

In order to reach a large scale deployment of EVs, the cities have cooperated with private operators to develop a rollout of charging infrastructure. While most vehicle drivers are expected to charge their EV at home, the majority of owners in cities will require overnight charging on-street. However, there will still be a need for charging points in the public realm or in public spaces with ITS support to advise on availability for top-up charging.

3.1.1 Selection of Business Models on Infrastructure for EVs

The ‘Hurdles’ document D2.3¹ sets out a very useful approach developed by EURELECTRIC, in “Electric Vehicles: Implementation Challenges Move into Top Gear” and the same approach has been adopted on the ‘Successes’ survey.

In the first model the current electricity supply market structure is kept in place, i.e. the charging infrastructure is fully integrated into the Distribution System Operators, DSO’s assets. The EV charging stations are therefore considered as distribution assets. The

¹ <http://www.greenemotion-project.eu/dissemination/deliverables-urban-concepts.php>

commercial relationship for the supply of electricity is conducted, as is usual in the electricity market, between the users and the retailers. Under this model the deployment of the charging infrastructure is collectively financed.

The second model, the EV infrastructure is conceived as a new, separate and independent step in the value chain for e-mobility, with the creation of the new role of charging infrastructure operator. The infrastructure however still falls under the rules concerning the unbundling of infrastructure and retail, and therefore all retailers have access to all EV charging sockets of all charging infrastructure operators. Under this model the charging infrastructure is financed by the “user pays” principle.

In the third model there is a new role for an independent e-mobility provider that installs a proprietary network of EV charging sockets and provides electricity bundled with other services, including the charging. There is a variation whereby the “spot operator” does not directly take ownership of the spot but rather has the right to license or operate the spot or charge point. Under both of these arrangements the charging infrastructure is financed by the “user pays” principle.

3.1.2 Measures to Support the Rollout of Infrastructure

Citizens living in apartment blocks without private parking facilities must have access to charging points. The provision of these charging points will also provide assurance to people who normally charge their EV at home that they can also charge it on public spaces if the need arises.

In Copenhagen, Berlin, Malmö and Rome charging infrastructure for EVs on public spaces will be paid for solely by private operators. In Copenhagen, private operators are even permitted to set up more charging points than are actually needed.

In Copenhagen, Barcelona and Malaga parking spaces with charging facilities are reserved for EVs. In Ireland, the introduction of the Road Traffic Bill 2013 under national legislation, to reserve spaces for EV charging, is in progress. It is expected that these

arrangements will encourage citizens and commuters to replace their conventional car with an EV as it can be difficult to find a free parking space in the city centre.

Many partners are engaged in the development of policies and have introduced legislation to get the necessary powers to demand that a number of parking spaces will be equipped with charging facilities and reserved for EVs when new parking facilities are built on private property

The City of Strasbourg will pay for the provision of a number of charging points in the public realm. The City will promote installation of charging points inside parking lots close to the tram network in order to encourage the use of inter modality.

The City of Malaga will pay for the provision of a number of charging points on public spaces in the city. Charging points on private property will be financed by private operators or projects. The majority of the charging points in Barcelona will be part-funded through a national programme.

In Ireland, the country's largest energy provider the Electricity Supply Board (ESB) has initiated the roll-out of a national infrastructure for Ireland. Fast chargers are now being installed across Ireland's motorways to create "electric highways" between major urban centres. Numerous charging points are being installed at supermarkets, hotels and shopping centres etc. This large scale public network will supplement thousands of home charging points. The ESB has also implemented various measures to develop an ITS based solution and has deployed communications systems to support the nationwide infrastructure for EVs.

3.1.3 Intelligent Transport Systems to Support Electromobility

Most Cities require all privately owned EVs to have equal access to charging points on public spaces and the application of ITS based solutions to manage the infrastructure is going to cater for these objectives.

IBM and ESB, as the Distribution Network Operator, DNO are partnering on the development of an integrated charging IT system for EVs in Ireland. The initiative aims to enable drivers to access the 1,000 or so charging points across the country with an ID card. ESB Networks, which is currently rolling out the public charge points around Ireland, will use IBM's 'Intelligent Electric Vehicle Enablement Platform' to operate and manage these charge points. Ireland is aiming for one in ten of all cars on the road to be electric by 2020 and this application of ITS to support electromobility is key to achieving such an ambitious uptake of EVs and interoperability as between Northern Ireland and the Republic of Ireland is being implemented.

The development of payment systems for the electric power purchased by EV drivers at Charge Points which are independent of the particular energy supplier are emerging as one of the unique 'Successes' of the Green eMotion Project. Seamless payment systems, supported by ITS as identified by Green eMotion partners at the outset for implementation throughout Europe, will provide the interoperability to allow drivers access any Charge Point.

As proposed in Green eMotion, the user will be able to process payments through their own domestic or business energy supplier, irrespective of the ownership or operation of the Charge Point. User friendly charging infrastructure incorporating Intelligent Transport Systems, ITS is recognised as a key to delivering 'Successes' on Green eMotion and is seen as essential in attracting new users to commit to Electromobility.

3.2 Vehicles

With partners drawn from seven countries and numerous demonstration regions, Green eMotion is evaluating and demonstrating a comprehensive range and variety of types of Electric Vehicle. Every vehicle type from Pedelects to cars, buses and Trucks are represented in the fleets being evaluated by Green eMotion partners in Denmark, France, Germany, Ireland, Italy, Spain and Sweden.

3.2.1 Initiative: EVs for the Public

The relatively high price of EVs inhibits many people from buying one. In Barcelona and Malaga, citizens and businesses do not have to buy an EV. In the period 2012-2013, they can rent one in Barcelona – not just electric cars but also electric mopeds and electric bikes. Charging points will be sited next to public transport hubs in order to encourage the use of inter modality. In Malaga, citizens and businesses can rent an EV in the period 2012-2015. In Malmö, a number of households have the opportunity to test an EV for a three month period till the end of 2012.

3.2.2 Initiative: Municipality owned EVs

To stimulate the market for sustainable transport solutions and to set a good example the City of Copenhagen, the City of Malmö and Rome Municipality will purchase EVs for their own fleet. From January 2011, all passenger cars bought by the City of Copenhagen will be either electric or hydrogen cars. By 2015 all passenger cars owned by the City of Malmö will be “clean vehicles” and at least 20% of new vehicles purchased by the Rome Municipality will be EVs. The Fire Department of Cork City Council purchased an EV van with the support of Green eMotion and fitted out the vehicle for use as a ‘Cardiac First Responder’. The EV is marked up in the distinctive Fire Brigade Livery with Emergency Blue Lights and is regarded as ideally suited to this niche application. The unique profile has highlighted the viability of EVs for robust operations in the urban environment.

3.2.3 Fleet Manager’s and the Benefit of EVs

From a fleet point of view, the Green eMotion Project is focused on the deployment and use of both Plug-in Hybrid and Battery Electric Vehicles collectively referred to as EVs, across the full range of types or vehicle classes. The use of Hybrid Electric Vehicles that do not cater for plug-in charging from the grid doesn’t form part of the Green eMotion fleet as these vehicles do not require electrification of the transport infrastructure and more crucially would not contribute the quanta of energy savings being sought by 2020.

Typically, ICE powered vehicles consume more energy based on the full life cycle when manufacture, fuel consumption and disposal of the vehicle is calculated as compared to Plug-in hybrid and Battery EVs.

3.2.4 EVs for Goods Deliveries in Cities & Urban Areas

The use of EVs as for goods delivery in city centres and urban areas is one of the most attractive options, in terms of cost reduction, from a fleet manager's point of view. Firstly, given the duty cycle and range associated with goods deliveries EVs are inherently more efficient in dealing with traffic congestion, stopping and starting and with the short term parking associated with loading and unloading. As with private users of EVs, a capital grant or a refund is available to the purchaser of a new vehicle. However, in many jurisdictions an Accelerated Capital Allowance or write off in one year is available to the business investing in the purchase of an EV or EVs for the vehicle fleet.

The implementation of the Cargohopper service in Utrecht, performing the consolidated consignment of goods within restricted access pedestrianised streets, is an excellent example of an EV utility vehicle goods delivery measure. The policy process required to regulate licence and operate such a service by a private operator in the city centre represents of the most interesting examples of the 'Successes' possible in the urban space for the deployment of EVs.

3.2.5 Green eMotion Project & Fleet Managers

Fleet Manager's need to be appraised of the savings and benefits of a transition to EVs in the vehicle fleet and the Green eMotion project should consider a special marketing and promotional initiative to highlight the potential savings and benefits with reference to actual Case Studies on Goods Deliveries with EVs.

3.2.6 Electric Bikes or Pedelec 'Electric Assisted' Bicycles

The use of Pedelecs or electric bikes as a new intermediate or distinct transport mode has been identified as an emerging 'Success' on Green eMotion. The new generation of Pedelecs are being used to extend the range of travel and to deal with gradients but they are also being used to substitute for trips that were previously made by car. And, this is the crucial aspect, the Pedelecs are being used for trips that would not be undertaken using a standard bicycle. For example, 310,000 e-bikes were sold in Germany in 2011 representing up to 8% of the market and a total of more than 700,000 e-bikes were sold in Europe according to the Association of the European Bicycle Industry. Not only do Pedelecs or electric bikes have potential to contribute to improved energy efficiency for the future but their implementation as an enhanced measure supports multimodal trips. The specific needs of users of Pedelecs with regard to the provision of secure storage in the work place or in cycle parking garages and the availability of charging needs to be advocated.

3.3 Incentives, Marketing and Communications

The energy savings associated with the full life cycle of EVs is not as yet fully reflected in projected cost of ownership, as is always the case, with an emerging technology and the associated market conditions. However, the incentives and benefits on offer to the purchasers of EVs seek to offset the initial capital cost for the early adopter.

Today, it is more expensive to purchase an EV than a conventional ICE car. Therefore financial incentives are being used to stimulate the EV market and cross subsidise the early adopters of the emerging technologies.

3.3.1 Financial Incentives

In Denmark, EVs are exempt from a vehicle registration tax (VRT) which is from 105% to 180% of the dutiable value on new cars. VRT is calculated as 105% of the part of the dutiable value under EUR 10,000 and 180% on the part of the dutiable value exceeding EUR 10,000. This means that the price gap between electric cars and conventional cars

in Denmark is not as big as it is in many other countries. EVs are also exempt from tax on motor vehicles according to weight and from green taxes.

In Ireland, vehicles with CO₂ emissions less than 75 grams per kilometre, e.g. EVs, are exempted from VRT which normally ranges from 14% to 36% of vehicle price. The City of Barcelona gives a 75% reduction on VRT to EVs.

In Ireland, a grant of EUR 5,000 is available to motorists who buy a vehicle with CO₂ emissions of less than 75 grams per kilometre. Ireland's road tax system is also based on CO₂ emission levels, meaning that EVs fall into the lowest tax bracket. Furthermore, the first 2,000 private consumers who buy an EV will have a charging point installed for free at their homes by ESB eCars. In Sweden, a grant of EUR 4,285 is given to the first 5,000 citizens or companies who buy an EV in the period 2012-2014. The City of Barcelona plans to give a subvention of 15% of EV acquisition cost.

In Rome, EVs can access the limited traffic zone in central Rome for free. Other vehicles pay up to EUR 600 annually. The City of Barcelona plans to let EVs access restricted environmental zones in Barcelona. Toll reductions are also planned.

EVs can park free of charge on Bornholm, a Danish island in the Baltic Sea. The City of Barcelona allows free parking on-street at the parking spaces with charging points as long as the EV is recharging. EVs were allowed to park for free in Copenhagen in the pay-and-display zones until December 1st 2011. However this practice was stopped because the Minister for Transport stated that the law does not give the City the necessary powers to exempt EVs from parking charges. The City of Copenhagen believes that this was a step backwards. Since December 2011, the City has repeatedly approached the Minister of Transport with a request for an amendment to The Road Legislation Act. In 2015, it is expected that the Danish Parliament will pass an amendment to the Act which will give municipalities the necessary powers to reduce parking charges for environmentally friendly cars in public payment zones. Whether the City will do so depends on a political decision from the Technical and

Environmental Committee. The City of Malmö and Rome Municipality are considering introducing free or reduced parking charges for EVs.

In France, it has been announced that a grant of up to €10,000 for an EV and €6,500 for a Plug-in Hybrid may be available during 2015 as an incentive for owners to replace older diesel fuelled cars that were manufactured prior to 2005.

3.3.2 Green Energy Incentive

The City of Copenhagen and Ireland will continue to install wind farms so that EVs can be fuelled by wind energy. The Irish government aim to have one in every ten vehicles powered by renewable energy by 2020. The City of Malaga has installed photovoltaic systems on the roof of municipal buildings and it will now let private companies use its roofs for this purpose. Also Bornholm will produce renewable energy for the island's EVs.

3.3.3 Marketing & Communications - Conference

Fully Charged 2012 was a one-day satellite event of the prestigious EuroScience Open Forum 2012 and both were highlight events in the 2012 calendar as Dublin played host to the City of Science. At this Summit a panel of high profile speakers provided delegates with an insight into the latest developments in electric vehicles and provided a platform to communicate the progress and highlight successes being made across the electric vehicle spectrum. Emerging technologies and innovations in new product development, as well as the latest electric vehicles, were showcased. As a Green eMotion event, it was extremely successful in bringing together many of the 43 partners who are involved in this four year, Europe-wide project. The Fully Charged Conference brought all of the best minds together to give an in-depth view of how Europe, US and China is embracing the transition to electric transport.

3.3.4 Accelerated Capital Allowances for Electric Vehicles

Capital Allowances allow a business to gain relief from Corporation Tax on money spent on capital equipment purchases such as vehicles. The relief is received by allowing the company to reduce its taxable income by an amount equal to the pre-tax value of the asset. The company therefore “writes down” the asset against profits. They normally must do this over an 8 year period so 1/8th or 12.5% of the capital value of the asset is written down each year until 100% write down has been achieved at the end of year 8.

Under Accelerated Capital Allowance (ACA) schemes, 100% asset write down is permitted in year 1 allowing the full value of the tax relief benefit to be received in year 1 thus helping to stimulate a greater cash flow for the business. ACA is intended to stimulate businesses to buy more energy efficient products which include Electric Vehicles and their associated charging infrastructure.

3.4 Policies

Due to climate change and the increasing scarcity and cost of energy resources, European cities are trying hard to reduce CO₂ emissions. Road transport is responsible for a large share of CO₂ emissions and the number of vehicles is set to rise. Therefore it is vital that we adopt sustainable transport solutions – e.g. EVs. EVs not only have zero tail-pipe emissions while driving – significantly improving local air quality – they can also be manufactured close to CO₂-free depending on the primary energy source used.

European cities have a variety of ‘Toolkits’ available when it comes to regulation and the implementation of control measures to support the economic development of city centres. However, the potential enhancement offered by more widespread deployment of EVs has yet to be exploited in support of declared objectives. The availability of a variety of Zero Emissions Vehicles across the range of vehicle types opens up a Virtuous Cycle as between the deployment of EVs in fleets and Climate Change Strategies especially for cities.

3.4.1 Virtuous Sustainable EV Cycle for Cities:

Climate Change Strategies – Reduction in CO₂ emissions & Noise - EVs in fleets – Liveable Urban Centres – WHO Healthy Cities initiative – The benefit of a transition to widespread deployment of EVs in fleets needs to be highlighted as a Virtuous Cycle for Cities.

Green eMotion is demonstrating the viability and economic costs associated with the deployment of EVs in fleets which can be seen to support the viability of City centre strategies based on Pedestrian Priority Zones, Restricted Access, Zero Emissions Zones, Low Emissions Zone, Clean Zones, Quiet Night-time Deliveries and Clean Air strategies as implemented throughout European cities. The need to extend these measures both in terms of range and impact requires a comprehensive deployment of EVs in both public and private fleets. A strategy of undertaking commitments by cities on CO₂ emissions and Noise reduction would contribute to the uptake and deployment of EVs to a very significant extent.

The more sustainable modes of transport comprising walking, cycling, Public Transport (PT) and EVs are essential to secure liveable and healthy cities for the future. If cities begin to commit to Climate Change reductions in CO₂ combined with reductions in Noise, the deployment and uptake of EVs will increase in the manner envisaged by policy makers to deliver reduced unit costs for vehicle fleets.

The widespread deployment of EVs in vehicle fleets is an essential prerequisite to the establishment and maintenance of healthy cities for the future in Europe and globally. The electrification of transport infrastructure as reflected in the term 'electromobility' is key to a sustainable future in Europe as demonstrated by partners on Green eMotion.

3.4.2 Policies – Climate Change Strategies

Given the urgent need for cities to respond to binding Climate Change Strategies the EU and national governments should consider making available special grants to Cities

which commit to the implementation of Low Emission Zones or City Clean Zones and Noise Free Zones as essential policy initiatives. The existing EU Directive 2009/33/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of clean and energy-efficient road transport vehicles is of particular interest regarding policy implementation by public bodies and local authorities.

3.4.3 Policies – EU Directive – Energy Efficiency & Procurement of Fleet Vehicles

The EU Directive 2009/33/EC on the promotion of clean and energy efficient vehicles was adopted at the Transport Council in March 2009. Its stated aim is to promote and stimulate the market for clean and energy efficient vehicles and to improve the contribution of the transport sector to the environment, climate and energy policies of the European Union.

The Directive introduces a requirement for contracting authorities, contracting entities and certain public passenger transport service operators to take into account energy and environmental impacts, including energy consumption and emissions of carbon dioxide (CO₂) and certain pollutants, when procuring road transport vehicles.

As the EU Directive was transposed into National Law within individual states, specific thresholds were established to ensure that contracting parties complied with the code of practice whereby energy efficient vehicles will be procured. EVs would tend to be favourably ranked given their overall efficiency. However, in many instances the thresholds were set at much too high a monetary value thereby exempting many public authorities in the application of in the Directive. In addition to directly procured vehicles, all vehicles leased under contract where the EU Procurement Directives apply are also covered.

The partnerships and local collaboration between very diverse interests and stakeholders established in the preparation and implementation of Green eMotion measures are in themselves unique 'Successes' in every Demo Region.



The application of EU Directive 2009/33/EC on the promotion of clean and energy efficient vehicles should be highlighted. It should be emphasised that individual member states revisit threshold values with a view to bringing the procurement of energy efficient vehicles, such as EVs, by public authorities operating captive fleets into line with declared targets as between now and 2020.

4.0 Evaluation of the outcomes as ‘Successes’ being achieved on the roll out of Electromobility and deployment of EVs

The ‘Successes’ identified in Green eMotion Stakeholder surveys are the outcomes of various policies and initiatives. A consolidation of the catalogue of measures, initiatives and policies identified as successes on the survey is undertaken in this chapter as being the basis to develop an insight into the policies that best support the Green eMotion objectives:

4.1.1 Infrastructure

Collaboration by Green eMotion partners and external stakeholders to develop Quick Chargers or Fast Charging Infrastructure with deployment in cities, public entities and private companies has been a particular ‘Success’. Fast Charging technology has reduced the cost of a 50 kW DC Fast Charger by a factor of 3 times in a period of 18 months.

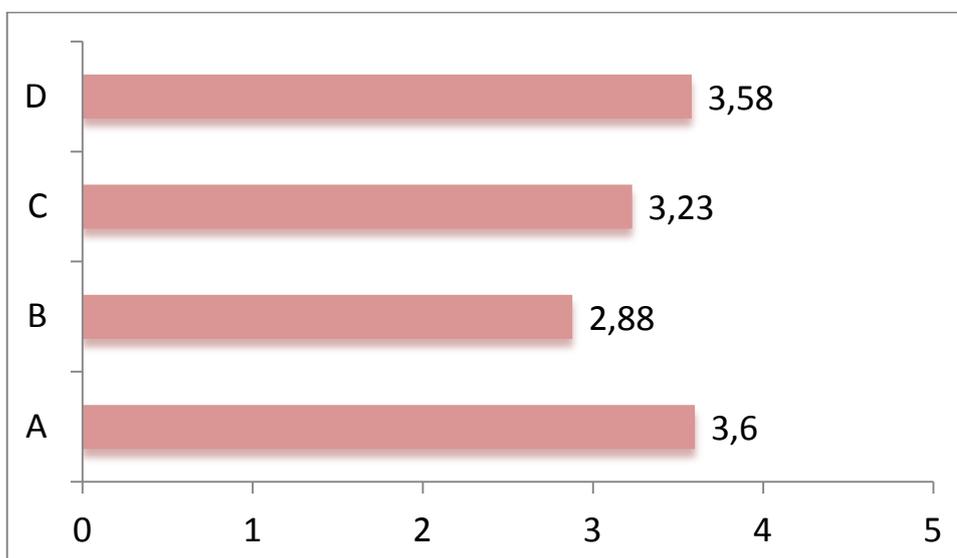
The unique rollout of Charging Infrastructure by Green eMotion Partners supported by Intelligent Transport Systems, ITS is delivering an overall ‘Success’ which is being undertaken to ensure that range anxiety would not deter vehicle users from making trips to town and within the city in each of the regions. The public charging points of Barcelona have been managed from a Network Operations Centre, NOC and the growth in provision of infrastructure is presented as an example of the measures being implemented by Green eMotion partners in each of the Demo Regions.

The implementation of charging infrastructure in Strasbourg has proven to be very reliable with successful monitoring and has been well received by both users and the community. The deployment to cater specifically for plug-in hybrid EVs has demonstrated the early collaboration with the local authorities as one of the potential means to deliver sustainable ‘Successes’ for Green eMotion. However, Green eMotion

delivering ‘Successes’ on a similar citywide scale with all the added benefits of more energy efficient EVs as against plug-in hybrids only.

The cost associated with the provision of charging infrastructure was viewed as an issue to be addressed on the 2014 Questionnaire and the Purchase Tax Exemption /Reduction was selected as was Prioritisation in Urban Planning above the other options.

Effectiveness of Policy Incentives at Regional Level supporting Deployment Charging Infrastructure



Policy Incentives at Regional Level for supporting Deployment of Charging Infrastructure	
Financial Support at Purchase (once only)	
A	Purchase Tax Exemption/Reduction
B	Co-Funding for Purchase by Authorities
No Financial Policy Measures	
C	Reserved Urban Space
D	Prioritisation in Urban Planning

Table 4.1

The preferences selected reflect the range of options being developed at a regional level and the fact that the need for the policy incentives being considered at the planning stage is noteworthy.

The development of payment systems for the electric power purchased by EV drivers at Charge Points which are independent of the particular energy supplier are proposed as one of the unique 'Successes' of the Green eMotion Project. Seamless payment systems, supported by Intelligent Transport Systems, ITS as identified by Green eMotion partners at the outset, provides the interoperability to allow drivers access any Charge Point.

User friendly charging infrastructure incorporating Intelligent Transport Systems, ITS being developed throughout Europe is recognised as a key to delivering 'Successes' on Green eMotion and is seen as essential in attracting new users to commit to Electromobility.

4.1.2 Vehicles

The procurement of full production EVs by partners, as against conversions from ICE based vehicles, has been a particular 'Success' and in a number of instances has been delivered during the initial phase of Green eMotion.

Users of the Plug-in Hybrid Electric Vehicles, PHEV trial in Strasbourg appreciated the lack of range anxiety, the reduction in Noise and a majority of drivers adopted a more eco-friendly driving style which highlights a "Success" that is being replicated in terms of scale by Green eMotion with all the added benefits of EVs as against plug-in hybrid.

The use of Pedelects or electric bikes, e-bikes as a new intermediate or distinct transport mode has been identified as an emerging 'Success' on Green eMotion. The new generation of Pedelects are being used to substitute for trips that were previously made by car and that users would not undertake using a standard bicycle. Sales of electric bikes now amount to as much as 8% of sales of all bicycles in some European member states as reported by the Association of the European Bicycle Industry.

The replacement of vehicles in fleets with EVs has been undertaken by a number of partners such as the investment programme by La Poste in France and ESB in Ireland which demonstrate a series of very substantial 'Successes' with regard to the variety of vehicle types utilised in very diverse conditions.

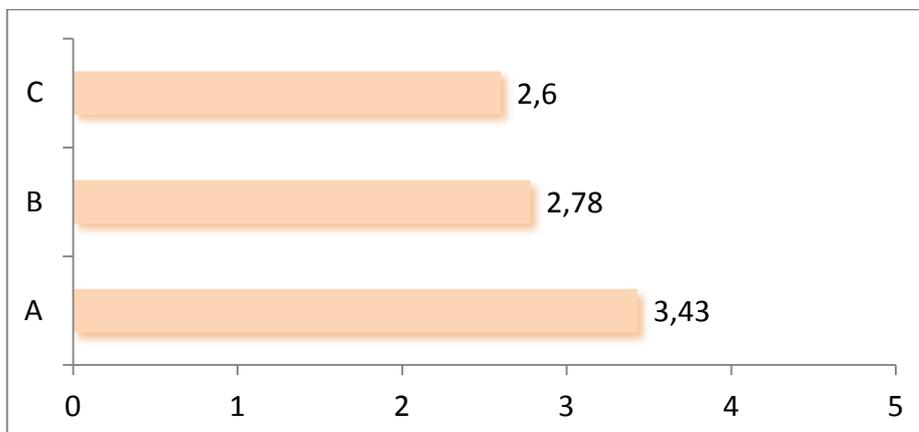
4.1.3 Incentives, Marketing & Communications

The Fully Charged 2012 International EV Summit, July 11th 2012, in Dublin hosted by ESB eCars was a Green eMotion 'Success'. The summit and associated exhibition gave an in-depth view of how Europe, US and China is embracing the transition to electric transport. The presentations by speakers were inspiring and represented a major contribution to the promotion of EVs with participation from every relevant sector from energy production right through to driver experience reviews of particular EVs.

Throughout Europe financial incentives of between €2,500 and €7,500 are offered as rebates on VRT or similar to purchasers of EVs and such initiatives supported by Climate Change Strategies have been crucial to the delivery of 'Successes' in each of the Demo Regions on Green eMotion. It is imperative that Financial Incentives are maintained in each individual EU member state until such time as the 2020 targets are achieved.

The response to the 2014 Questionnaire highlighted a significant preference in relation to providing *Financial Incentives for EV's* which reflects the concern as to the relative cost of initial purchase.

Effectiveness of Supporting Policy Strategies



Policy Statement	
A	Financial Incentives for EV's
B	Financial incentives for charging infrastructure
C	Non financial incentives for EV's

Table 4.2

The integrated cross subsidisation of EV sales by purchasers of less efficient ICE based technologies must continue as an explicit financial support to deliver Electromobility in Europe which is justified in terms of the long term strategy to secure energy security, improved health for all in the urban environment and better efficiencies in the transportation network.

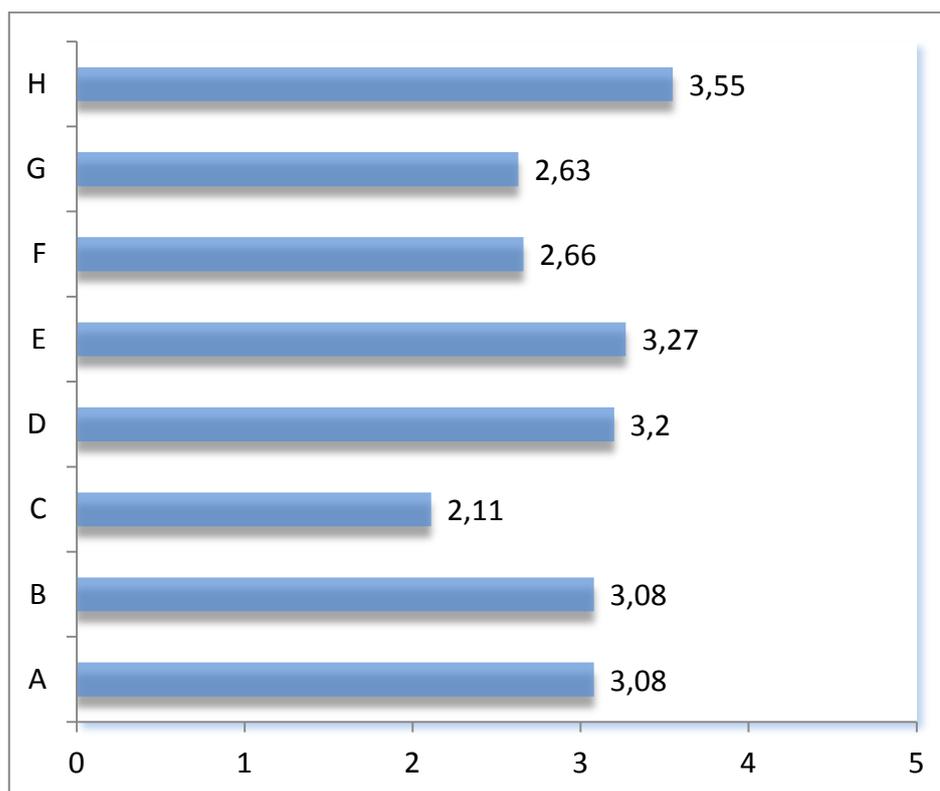
The launch of the Green eMotion Project by way of a series of Region Official launches has been a 'Success' on Green eMotion which generated more widespread awareness at a local level of some as to the key objectives of stakeholders in promoting the uptake of EVs.

4.1.4 Policies

Policy processes leading to collaboration between key public and private stakeholders, offering innovative mobility solutions and incentives to members of the public based on EVs, are proving to be amongst the most successful electro mobility initiatives. The

significance of these processes were reflected in responses to the questionnaire as was the need to have *Consistent monitoring of progress in achieving targets*.

Effectiveness of Co-Ordination Policy Strategies



Policy Statement	
A	Co-Operation between involved policy area and own Government
B	Co-Operation with similar Governments
C	Cooperation with other policy levels
D	Cooperation / coordination with stakeholders
E	Connecting different stakeholders
F	Setting targets for EVs
G	Setting targets for charging infrastructure
H	Consistent monitoring of progress in achieving targets

Table 4.3

The perceived risks and concerns about electromobility have been mitigated on collaborative projects, especially those facilitated by EU Framework programmes, as a result of the policy processes that had to be undertaken to deliver the Co-ordination Agreements between partner organisations and the availability of co-funding can then be focused on supporting the EV roll-out to deliver very successful outcomes.

Initiatives focused on the promotion and deployment of EVs that incorporate social marketing to support more sustainable mobility, leading to long-lasting behaviour change, have the potential to deliver much more successful outcomes in electromobility.

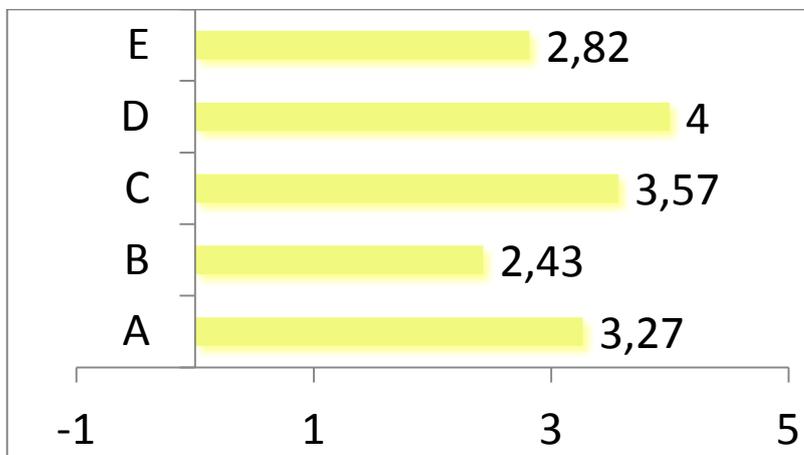
Promoting the use of EVs as a mode on multimodal trips is key to improving the uptake of more sustainable travel which represents a series of distinctive ‘Successes’ by various partners. Various multimodal concepts have been developed by many partners including the City of Rome as a service which integrates EVs with PT. In Barcelona and Malaga, citizens and businesses do not have to buy an EV. EVs can be rented and in Barcelona – not just electric cars but also electric mopeds and electric bikes. Charging points are being sited next to public transport hubs in Ireland and Grenoble, France, for example, in order to encourage the use of intermodal travel and multimodal trips.

Innovative EV based pilots focused on multi-modal travel options such as the deployment of the unique i-Road EV fleet in Grenoble and Tokyo and similar schemes using Renault Twizys are validating actual use by members of the respective car sharing clubs and demonstrating the viability of cleaner, greener and smarter EVs to the general public. Such car sharing schemes are illustrating that multi-modal travel to address ‘the last mile’ in the city can be so engaging and a positive experience.

Policies which support the effort to secure public and private space for the installation of Charge Points or Charging Infrastructure is key to delivering ‘Successes’ on Green eMotion which will enhance more sustainable travel in cities throughout Europe.

The high preference as reflected in responses to the 2014 Questionnaire emphasising the value of participation on EV projects acknowledges the value of pilot measures and opportunities for organisations or authorities to minimise risk.

Effectiveness of Promotion Policy Strategies



Policy Statement	
A	Electrification of own vehicle fleet
B	Request certain share of EV in tender or service contracts
C	Realization of charging infrastructure by government
D	Participation in EV projects
E	Provide information and awareness raising actions

Table 4.4

The Questionnaire identified *Electrification of own vehicle fleet* as measure to be considered and the survey data would support this feature as being key strategy.

The partnerships and local collaboration established between very diverse interests and stakeholders to plan and implement the Green eMotion measures are in themselves unique ‘Successes’ in every Demo Region in Europe. The collaboration between Distribution Network Operators, public bodies and local authorities is very significant. The commitments as between a number of partners and the vehicle manufacturers has been established as a unique undertaking to support the roll-out of electromobility and to put the selection of EVs on a secure path for the future.

The larger corporate members and stakeholders have demonstrated that very considerable ‘Successes’ can be delivered as a result of the targeted implementation of

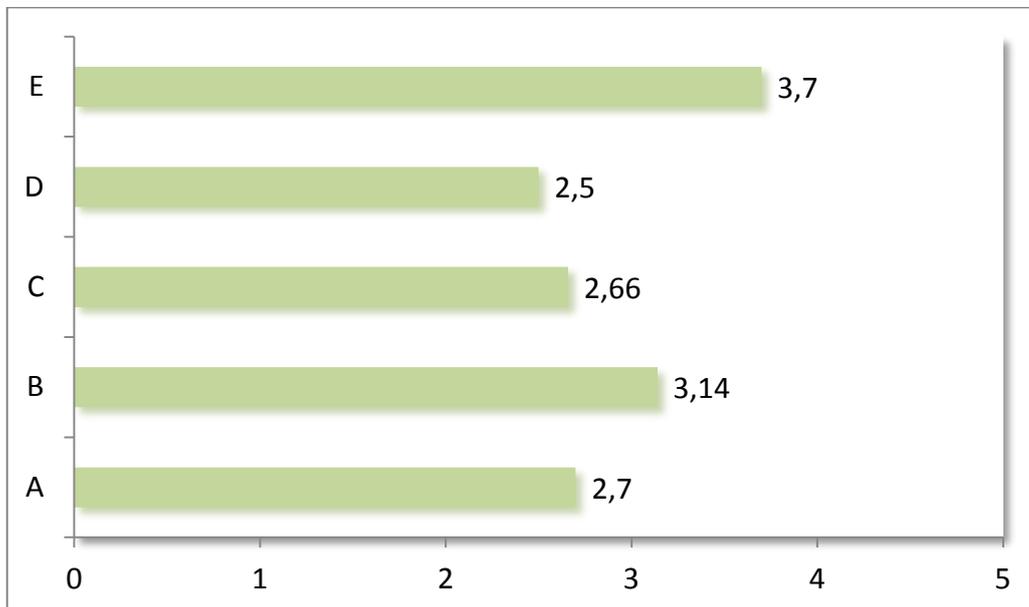
'Corporate Policy' geared towards managing change with the selection of replacement vehicles by EVs. Fleet Managers for public authorities in Green eMotion partner cities and regions have addressed key objectives to deliver energy efficiency and specified the procurement of EVs, as against allowing individual departments or drivers decide on the selection of vehicles, which would otherwise be a direct replacement with another ICE type.

The more detailed understanding of the full life cycle cost in terms of the total energy cost which includes manufacture, operation and disposal of EVs, as against ICE vehicles, is important. This knowledge is contributing to the realisation that our strategic and energy security interests can only be achieved with widespread adoption of electromobility and EVs, to comply with 2020 objectives, as the vehicle technology for the future especially in city centres.

In each of the surveys one of the 'Successes' being delivered relates to the policy processes implemented in Copenhagen whereby EV initiatives have been addressed in the context of longstanding emphasis on the development of Climate Change Strategies. These strategies are systematically developed in collaboration with key stakeholders.

Respondents on the 2014 Questionnaire were asked to rate the relative effectiveness of various regulatory strategies and the provision of charging infrastructure received the highest preference as indicated below. However, for a cities point of view the development of strategies on the regulation for access to restricted areas might offer the best result in the context of exploiting established Environmental Zones and Pedestrian Priority Zones.

Effectiveness of Regulatory Policy Strategies



Policy Statements	
A	Regulations for installing of charging infrastructure in public
B	Adapting existing local regulation for purpose of public charging
C	Regulations for access to restricted areas
D	Regulations for the use of special lanes
E	Regulations for reservation of parking space for EV

Table 4.5

Cities must commit to the implementation of Low Emission Zones or City Clean Zones and Noise Free Zones as essential policy initiatives to support commitments on the binding Climate Change Strategies. The provision of Charging Infrastructure and deployment of EVs in both fleets and by individual users would then represent key enabling measures for cities throughout Europe seeking to comply with Climate Change Strategies.

Multi-modal travel planning is seen as key to improving transport operations and to gaining improved health benefits through active travel using more sustainable modes. The use of EVs for such journeys or for part of the trip, such as an EV Taxi, is an ideal match. The need to address the 'last mile' has to be addressed in city centres and the use of Pedelecs or electric bikes as a new intermediate, unique and distinctive transport mode has been identified as an emerging 'Success' on Green eMotion. For some partners such as in Ireland, where the use of Pedelecs has not been on the same scale as elsewhere, the combination of providing both EVs and Pedelecs on the same fleet has been a very successful strategy. The specific needs of users of Pedelecs with regard to the provision of secure storage in the work place or in cycle parking garages and the availability of charging needs to be in the context of promoting EVs.

The EU energy policy puts an emphasis on the development of alternative sources as against oil and coal to enhance energy security and address Climate Change. In the context of oil production the associated energy cost of production has been clearly illustrated by a recent article in Scientific American describing the decline in the Energy Return of Investment, EROI. This reflects an energy cost of extracting the fuel or the usable energy for each distinct source which is incurred prior to the delivery of usable energy such as oil or gas, for instance, at the fuel station. The EU policy of promoting the electrification of transport, including Electromobility and deployment of EVs, is established on a fundamentally sound basis when viewed in the context of the economic impacts of such assessments as EROI and the need to address Climate Change Strategies.

An assessment of the distance travelled by equivalent vehicles, ICE and EV respectively for a given input of energy deployed to produce either fuel oil for the vehicle or the generation of electricity, according to the EROI for a typical national grid, illustrates a very significant benefit to using EVs.



As partners strive to deliver Electromobility and deploy more EVs, the fact that the initiatives are being promoted as a European wide venture with funding by the European Commission adds a significant impetus and potential for further 'Successes'.

5.0 Conclusions & Recommendations

Illustrating the Most Successful Outcomes of the Policy Process - Strategies to develop on the ‘Successes’ being achieved

To date, the policies that contribute most in terms of EV uptake are those that have delivered a seamless series benefits or package of measures for EV owners as a result of national, regional and local political commitment to more sustainable development. Those regions and cities that have systematically implemented programmes over a period of years to improve the environment with long term policy perspectives on the need for improved energy efficiency and reductions in CO₂ emissions have been the most successful.

The comparative assessment regarding the different strategy types considered on the 2014 Questionnaire indicate similar preferences with promotion being somewhat ahead. However, the detail in relation to the more successful levels of EV uptake would emphasise the relative financial costs in addition to the incentives and other benefits available.

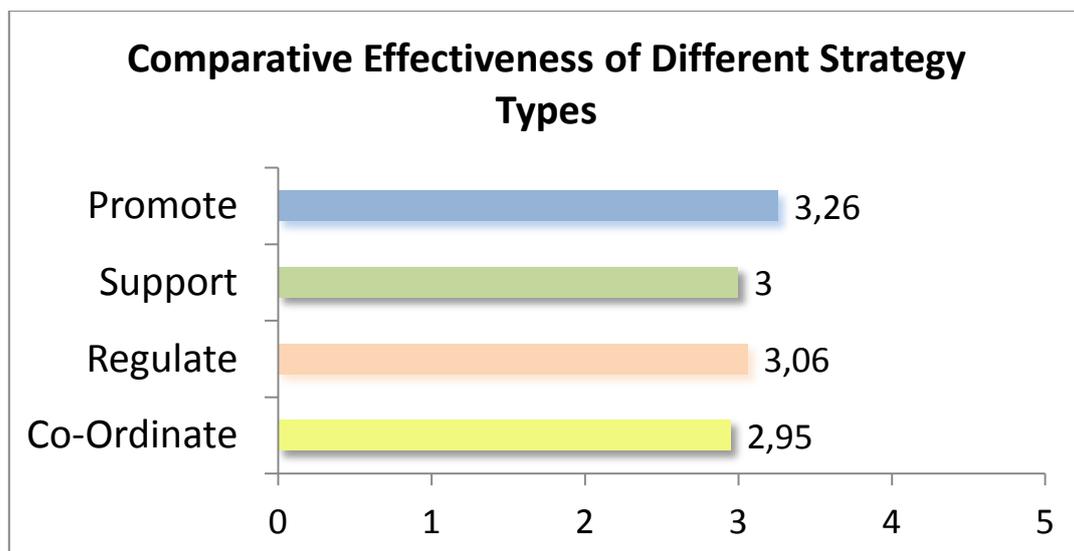


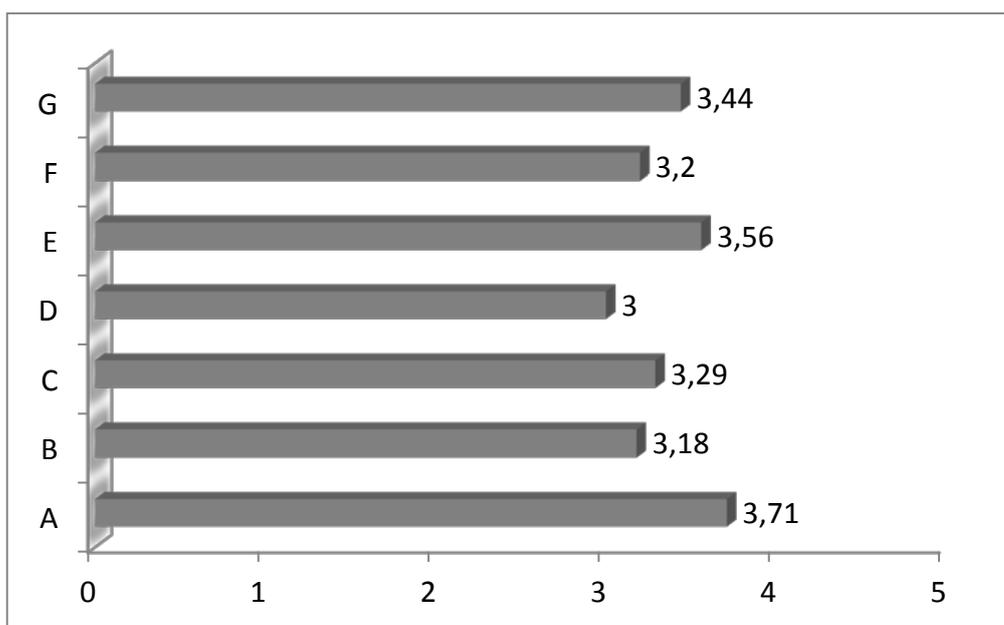
Table 5.1

Successful outcomes result when support has been provided to the extent that the sum of benefits meet or exceed the additional capital cost for the purchaser of the EV.

The examples of policy initiatives in Norway for instance, have been referred to by a number of survey respondents. The comprehensive benefits offered for drivers selecting an EV are particularly attractive as the purchase of conventionally fuelled cars in Norway attract very substantial taxes but EVs are exempt.

The focus on the need for comprehensive package of such benefits and financial incentives is reflected in responses to the 2014 Questionnaire topics on policy incentives.

Effectiveness of Policy Incentives at Regional Level supporting Deployment Passenger Cars



Policy Incentives at Regional Level supporting deployment passenger cars	
Financial Support at Purchase (once only)	
A	Purchase Tax Exemption/Reduction
B	Co-Funding for Purchase by Authorities
Financial Support (Annual Payments)	
C	Yearly Tax Exemption
D	Reduced Electricity costs and free charging
Other Financial Incentives	
E	Free Parking
F	Exemption(Reduced tolls/Congestion Taxes)
Non- Financial	
G	Supporting Consultancy

Table 5.2

Each of the sites including Denmark and France in addition to Barcelona, Berlin, Madrid, Malaga, Malmo, London, Rome, and Ireland are demonstrating good examples of particular policy processes undertake to decide on the incentives put in place. The EU should consider promoting the benefit of policy processes involving key stakeholders focused on electromobility to deliver a packet of measures enabled by national legislation, with centrally funded incentives supported by local measures to include:

- Financial incentives of at least €5,000 should continue to offered as rebates on VRT or similar to purchasers of EVs, until the 2020 targets for EV uptake is achieved. France has recently announced an increased offer of up to €10,000 to purchasers of EVs
- Exemption on parking charges in city centres – Free Parking for EVs – 5 Year period - in all publicly owned or managed facilities and on-street irrespective of whether the vehicle is being charged or not. EVs should still comply with all other

restrictions such the duration of parking on the street or parking in a particular zone but the payment of a fee would be exempt

- EVs can be exempt from Benefit-in-Kind, BIK charges for a period of 5 years thus making option of an EV a very attractive option for the employee selecting a company car
- The opportunities for the use of EV commercial vans requires a special focus given the inherent beneficial characteristics of EVs being able to deal with all the stop/starting, delays due to congestion and short stay parking associated with service vehicles and goods deliveries to the extent they should be regarded as the vehicle type of choice in urban centres
- The annual motor tax applied to commercial EVs needs to be reviewed in each member state to ensure that the lowest appropriate annual fee can be applied for the lifetime of the vehicle. This measure would represent a significant incentive to operators of vehicle fleets in both the private and public sector, especially, for the deployment of EVs used for goods distribution and services in the urban area
- Public Authorities, local governments and municipalities have in a number of exemplary cases committed to change out entire vehicle fleets to low or zero emissions vehicles such as EVs thereby showing leadership and helping develop a market for Electromobility
- EVs should be allowed use Bus Priority Lanes – Free access to drive EVs on Bus Priority Lanes for a period of 5 years as is the case in Norway
- EVs being offered an exemption on Toll Roads - Free Tolls are offered to EV owners for a 5 Year period in some jurisdictions

- Measures to promote the deployment of EV Taxis are particularly successful in demonstrating significant overall reductions in fuel costs for the operator and in presenting the experience of a trip by EV to such a large potential audience
- Initiatives set up to allow potential purchasers of EVs undertake a trial of various manufacturers vehicles at a dedicated facility contributes to improved understanding of all the issues associated with Electromobility by members of the public on the basis of direct hands-on exposure to a new driving experience
- Congestion Charging being implemented in Low Emission Zone City Centres – in Stockholm and London, for example, EVs are free to enter the Low Emission Zone without having to pay the access permit fee
- Proposals could be developed to give advance notice that that as and from a particular start date, 1st January 2020 for instance, onwards all vehicles entering a Low Emission Zone or Clean Zone during particular times of the day must be extra low or zero emissions vehicles such as EVs. Such a long period of notice is needed to allow fleets be upgraded to EVs or plug-in hybrids

Fleet Managers need to be appraised of the savings and benefits of implementing a transition to EVs in the vehicle fleet with special marketing and promotional initiatives to highlight the potential benefits and energy savings.

The benefit of the successes in the policy process, as highlighted above, is that the particular measures can be modified or enhanced to ensure that the uptake of EVs begins to match initial expectations and that the trend becomes focused towards the 2020 targets.

The EU could consider the promotion of EVs under the banner “Cleaner, Greener, Smarter: Electromobility and EVs support more sustainable cities in Europe” to reflect the really significant potential being offered by EU policy in the energy and transport

sector. As is being demonstrated on Green eMotion, the use of EVs actually supports the key initiatives that have already been developed and that would need to be implemented more extensively in all European cities to support Climate Change Strategies and improve energy security for individual member states.

Electromobility and more widespread use of EVs can be seen as a key enabler to support the implementation of Air Quality Zones, Quiet Night-time Deliveries, Low Emission Zones, Car-free city centres, Pedestrian Priority Zones, Clean City Centres, Multi-modal Travel policies and the WHO Healthy Cities Initiative among other more sustainable transport initiatives and energy saving programmes.

More widespread deployment of EVs will help address the extensive air pollution, due to transport related emissions in cities and the consequent health impacts, as well as contribute to the essential reduction in noise pollution in urban centres that has been the focus of mandatory EU Directives.

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