Improving the uptake of electric vehicles in urban areas

In a nutshell

SUMMARY
It is best practice to introduce integrated ticketing in the form of a smart system with the capability of identifying and charging for trips which use multiple modes of transport. If the public administration acts as a public transport operator (e.g. through a city-owned subsidiary company) it can implement the integrated ticketing itself. In cases where the municipality awards public transport services to private companies, the integrated ticketing solutions can be required in the tender.
Target group
Public administrations responsible for mobility and/or public transport in their territory
Applicability
This best practice is applicable to all public administrations responsible for public transport. However, below a certain critical mass of users and annual transactions, it can be challenging to recoup the initial investments in terms of the time and finances needed to implement a smart integrated ticketing system.
Environmental performance indicators
• Percentage of trips paid for by the integrated ticket (%) • Number of public transport users who would have used private motorised transportation in the absence of an integrated ticketing system (normalised by total population in the catchment area)
Benchmarks of excellence
• At least 75 % of trips are paid for by the integrated ticket

Description

The environmental and health impact of conventional private vehicles coupled with annually increasing maintenance and fuel costs has led many cities to turn away from the internal combustion engine and search for a more environmentally friendly replacement. Electric vehicles (EVs) are the frontrunner sustainable alternative, providing tangible environmental benefits as well as energy security and health benefits.

Instead of an internal combustion engine, which converts refined fossil fuels to mechanical energy, electric cars store energy in a rechargeable battery. These batteries can be charged at any electric outlet plug.

Electric vehicles have improved rapidly over the last number of years, and new-generation electric vehicles offer similar comforts to their fossil fuel counterparts. Thanks to both legislation and increased consumer demand, motor vehicle manufacturers are increasing their efforts within the electric vehicle market. As the number of manufacturers grows and EU and national legislation enforces stricter emissions standards, the availability and choice of electric vehicles is set to increase. This coupled with improvements in battery technology will see the price of the vehicles fall. Already the vehicles are far more cost effective than traditional vehicles when considered in terms of their life cycle.

Public administrations can directly purchase electric vehicles for the mobility needs of their staff, additionally, schemes that support the purchase of electric vehicles by residents can also be put in place, devoting some budget or reaching agreements with local banks at reduced interest rates. Moreover, public administration can support the uptake of electric vehicles allowing their circulation in restricted traffic areas or on preferential lanes, increasing the number of public charging points, reducing EV taxation, introducing or supporting private EV car sharing schemes and finally advertising to residents the support measures for EVs.

Environmental benefits

Electric cars hold significant environmental benefits over their fossil-fuel counterparts. The only emissions caused by the vehicles are generated in the production of electricity - the cars themselves emit nothing. As electricity generation from clean sources increases, the carbon footprint of electric cars correlatively drops. As such the vehicles play a role in curbing GHG emissions. It is important to emphasise that the emission benefits of electric vehicles are only fully applicable if the energy being generated is from renewable sources.

EVs are far more efficient than internal combustion engine vehicles in terms of energy use. 75% of the chemical energy from the batteries in EVs is converted to power the wheels, while internal combustion engines convert only 20% of the energy stored in gasoline. EVs do not consume any power when stopped in traffic and have the ability to recover energy normally lost during braking (the kinetic energy used in breaking further charges the car's battery).

As a result of the increased efficiency, EVs are far quieter than internal combustion engine vehicles and contribute significantly to reducing noise pollution, particularly in congested urban areas. This however has been cited as a safety concern for pedestrians, cyclists and the site impaired, and may lead to an increase in collisions.

When used in place of conventional vehicles, EV's have the potential to greatly improve air quality. A wide-scale changeover to electric vehicle use would reduce atmospheric pollutants such as NO_x, CO and Particulate matter, which can be harmful to human health, overtime causing respiratory illness and heart disease.

Side effects

E-mobility retains some of the drawbacks associated with conventional private vehicles. Land use is a "non-achieved" benefit, as e-mobility does not reduce pressure on land-use for transportation infrastructure. Electric cars also facilitate urban sprawl in the same manner as conventional vehicles and do not address congestion and other traffic problems.

Applicability

EV's are suited to city mobility patterns, as traffic congestion requires frequent stopping and starting. Therefore EV schemes are most successful in cities in which short driving distances are the norm. As EVs can be charged by any source of electricity, an electric vehicle scheme is replicable in almost all European urban settings.

When implementing an electric vehicle scheme, a strong communications strategy is necessary. Dissemination means include a dedicated website, citizen workshops, broadcast advertisements, brochures, etc. Without this citizens may not be aware of the strong benefits that EV's possess.

Public authorities incorporating electric vehicles into their public fleet is a good way for authorities to boost uptake immediately. As stated above, London aims to have 1,000 EVs in its public fleet by 2015. Adjusting procurement policy to favour electric vehicles is a positive step in realising a functioning EV scheme.

Economics

It is estimated in London that the plan has required £60 million. This includes installation of the 25,000 charging points and conversion of the GLA fleet. The GLA, central Government and private sector will each contribute equally. The funding breaks down as 50% from the government sector and 50% from the private sector. The payback period for the scheme is hard to estimate, though in London it is envisaged that once fully operational the scheme will be transferred to the private

sector, or be run through a public-private partnership. Market forces will then set the price of the scheme for consumers.

In the case of London, the city has been criticised for using public money to fund a means of transport that is not public but rather individual. However this can be justified as the scheme provides benefits in terms of the wider public good.

Backing from the private sector is a good way to reduce the financial burden on local authorities. Many private companies see this as a good public relations exercise and so are willing to provide time and funding.

Driving forces for implementation

As electricity can be generated by numerous sources, electric cars bypass concerns associated with fossil-fuels, such as peak oil availability and major price fluctuations.

As well as environmental and consumer cost benefits (over an extended period), the energy required for electric vehicles can be produced domestically, stimulating the domestic economy.

Electric vehicles are also much quieter than internal combustion engine vehicles. A large scale changeover would significantly reduce noise pollution.

Another major driving force is electric vehicles ability to improve the economy. As well as the obvious jobs created in construction by internal infrastructure projects, electric vehicles can also support a low carbon economy and economic growth through stimulating the car manufacturing industry.

Reference organisations

- City of London, UK
- Rotterdam, the Netherlands

Literature

City of London, available from New York City Global Partners Innovative Exchange, http://www.nyc.gov/html/unccp/gprb/downloads/pdf/London_ElectricVehicles.pdf

LG Action (n.d.) ROTTERDAM, The Netherlands: Surging ahead with electric vehicles. Retrieved from: http://www.lg-action.eu/fileadmin/template/projects/lg-action/files/it/Country_Profiles/LG_Action_case_Rotterdam.pdf