

Planning for Low/Zero Carbon Transport and Electric Vehicle Charging Infrastructure Briefing Note

Purpose of this paper

This briefing paper provides an overview of the national policy initiatives relating to climate change and transport, summarises the findings of a recent study on carbon abatement measures available through transport planning in the North West and looks in detail at the potential role of electric vehicles and the role of planning authorities in promoting their use.

National policy objectives for transport and climate change

A fifth of the UK's greenhouse gas emissions come from transport and the *UK Low Carbon Transition Plan* seeks to cut emissions from transport by 14% on 2008 levels.¹ The national strategy for low carbon transport is set out in *Low Carbon Transport: a Greener Future*² which prioritises:

- Cutting average carbon dioxide emissions from new cars.
- Providing investment in low carbon buses.
- Increased electrification of the rail network.
- Adopting a Renewable Transport Fuel Obligation and funding research and take up of sustainable bio fuels.
- Committing to source 10% of UK transport energy from sustainable renewable sources by 2020.
- Using demonstration vehicles to promote take up of new electric and lower carbon cars.
- Offering grants to support the purchase cost of electric vehicles (EVs) of up to £5,000.
- Providing £30 million to support the installation of electric vehicle charging infrastructure in public places.
- Investing £140 million in promoting cycling in England (2008-11).
- Seeking international agreements on capping emissions from all flights arriving through the EU Emissions Trading System and introducing a target to limit UK aviation emissions to below 2005 levels by 2050.

Department of Transport Guidance for local authorities on delivering sustainable low carbon travel through the third round of Local Transport Plans (LTPs) emphasises the role of planning in helping to secure new infrastructure and behavioural changes to support the development of low carbon transport³.

National planning policy objectives to integrate transport and planning are set out in Planning Policy Guidance 13 which was amended in January 2011⁴. Annex B.15 (Alternative fuels and technologies) identifies the development of the recharging or refuelling infrastructure as a priority for encouraging clean road transport fuels and technologies: "*Subject to meeting relevant safety criteria, planning authorities, in liaison with environmental health officers, should look favourably at proposals to develop such infrastructure, in order to deliver wider environmental objectives. This will be particularly important in, or in the vicinity of, air quality management areas or other areas of poor air quality.*"

¹ http://www.decc.gov.uk/en/content/cms/what_we_do/lc_uk/lc_trans_plan/lc_trans_plan.aspx

² <http://www.official-documents.gov.uk/document/cm76/7682/7682.pdf>

³ <http://www2.dft.gov.uk/pgr/sustainable/guidelocalauth/>

⁴ <http://www.communities.gov.uk/publications/planningandbuilding/ppg13>

Encouraging sustainable transport in the North West

The DfT has adopted a programme of identifying and promoting ‘Smarter Choices’. These are techniques for influencing people’s travel behaviour towards more sustainable options⁵. A recent study has reviewed the delivery of Smarter Choices in the North West⁶, and set out a series of recommendations that focus on achieving mode shift away from single occupancy car use and also balancing the need for more effective reduction in transport-related carbon emissions.

Significantly, the study comments that whilst carbon emissions reductions will be achieved through technological advancements in vehicle technology (estimated to be potentially 14% reduction in emissions by 2020), these reductions will be offset by any increases in local populations and trip lengths. Hence, Smarter Choices interventions are also required to meet any shortfall in transport emissions targets.

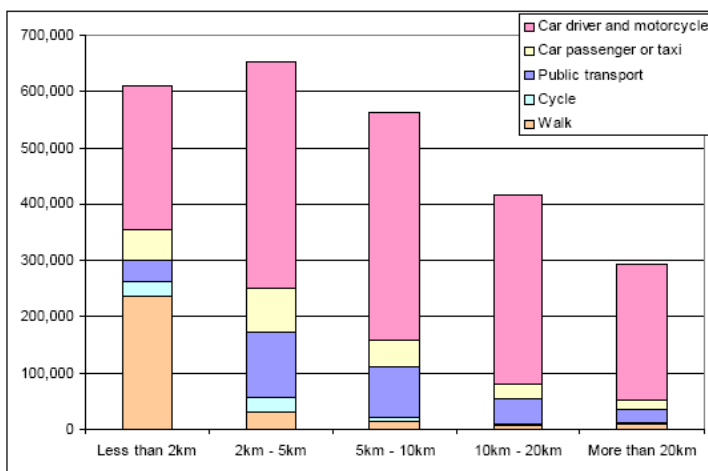


Figure 1. Number of trips by distance in the North West (source Mott MacDonald/Aberdeen University/Colin Buchanan)

The report’s recommendations to address carbon abatement include:

1. Analysis of carbon emissions by journey distance shows that there should be more of an emphasis on the trips between 2 and 25 miles. Appropriate measures that optimise carbon emission reductions could include:
 - Cycling projects between 2-10 miles.
 - Car sharing, public transport (including bus and local rail) and technology based solutions for journeys between 5-20 miles.
 - Beyond 20 miles, projects should also include low carbon vehicle incentives and demand suppression (for example, video conferencing).
2. The best returns on investment in terms of carbon are likely to be measures focusing on parking, freight, technology and destination-based travel plan interventions. Cycling, walking and bus measures will generally score poorly in carbon value for money as they target short trips, although they have wider socioeconomic benefits.
3. Training needs to be provided for Elected Members, land use planners and transport planners in understanding which Smarter Choices schemes have the highest carbon abatement potential.

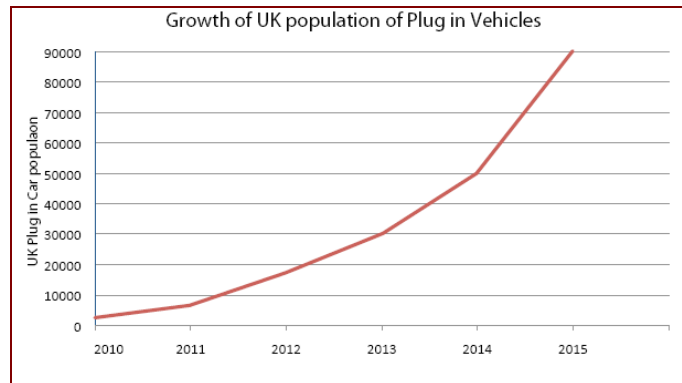
⁵ <http://www.dft.gov.uk/topics/sustainable/smarter-choices/>

⁶ DaSTS Project Management Group: North West Behavioural Change Study, May 2011 (Contact ColinBuchanan.com)

Electric Vehicles (EVs)

The promotion of EVs as an alternative to diesel and petrol engine vehicles will require a major shift in vehicle technology, sales and new electricity charging infrastructure. There are currently 4,500 EVs in the UK, but this figure is predicted to grow rapidly with the introduction of models by most major car manufacturers underway and some estimates predicting it will reach 2 million by 2020. In addition to private cars, growth is also expected in electric buses, commercial vehicles, scooters and bicycles.

Figure 2. Growth in plug in EVs based on UK Government and industry forecasts (source Chargemaster Plc).



A number of alternative technologies exist and are being brought to market, with initial dominance of hybrid vehicles (such as those produced by Lexus and Toyota) using internal combustion engines to charge batteries. However, a rapid growth in plug-in electric vehicles is expected as major manufacturers respond to the anticipated increase in carbon taxes and fossil fuel prices. Over the next 2-3 years plug-in electric vehicles will be introduced across product ranges from small 'city cars', through family sized vehicles to luxury and sport models. Further developments are expected to include range extending technologies that combine plug-in charging of batteries with efficient internal combustion engines. Commercial EVs including vans and goods vehicles are already in production⁷ and new models of electric bikes, scooters and motorbikes are coming onto the market⁸.

Environmental benefits of EVs

EVs provide a number of environmental benefits:

- Reduced emissions of greenhouse gases.
- Improvements in air quality (especially the pollutants that are commonly found at elevated levels within Air Quality Management Areas such as nitrogen dioxide and particulates).
- Reduced noise.

In addition, battery powered vehicles can provide an effective way of storing surplus electrical energy generated at times of low demand (such as night time production of renewable energy from wind). EVs produce zero 'tailpipe' emissions but when average emissions from grid electricity generation are taken into account ('well-to-wheel' emissions) an electric vehicle's typical emissions will be 80g CO₂/km, compared with approximately 140g CO₂/km well-to-wheel

⁷ <http://www.smithelectricvehicles.com/index.asp>

⁸ <http://www.greencarsite.co.uk>

emissions for a new small family car⁹. As the carbon intensity of grid electricity is reduced the emissions levels of EVs will fall further.

Providing vehicle charging infrastructure

A major hurdle facing greater take up of EVs is the need to overcome ‘range anxiety’ - the fear that a vehicle has insufficient range to reach its destination and would leave the occupants stranded. Improvements in vehicle technology are seeking to help address this but greater provision of charging infrastructure is also vital. Recent data on the distribution of EV charging points across the UK shows marked variations in the number of public charging points available, with a low level of provision in the North West.

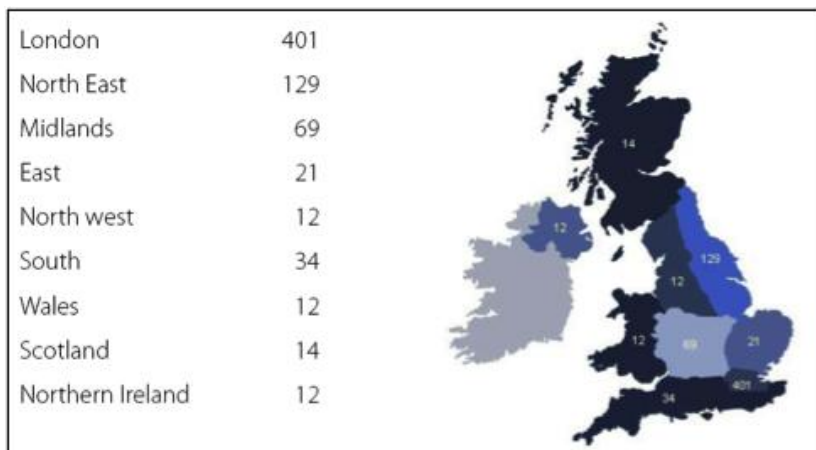


Figure 3. EV charging point availability March 2011 (Image courtesy of National Charge Point Index)

Paradoxically, for the majority of private car journeys, ‘range anxiety’ should not be a major concern as one third of all car trips are between 2 and 5 miles. However, short car journeys are a major contributor to CO2 emissions, with over two thirds of carbon emissions from household car journeys arising from trips of under 25 miles.



Figure 4 Dedicated EV Charging points (image courtesy of Chargemaster Plc)

Charging infrastructure varies from the basic ‘3 pin plug’ facility suitable for home charging to more sophisticated charge points that can be located in domestic and public realm locations and provide facilities such as metering and payments, connections to low cost electricity tariffs and timers. Installation costs range from a few hundred pounds for a basic domestic unit to £20,000 for the most rapid charge units which can fully re-charge a vehicle in 30 minutes. Wireless charging systems are currently being trialled which re-charge the vehicle whilst parked

⁹ Electric Car Guide: <http://www.smmmt.co.uk/reports-publications/environment/>

or driven over transmitter pads buried into the ground. Typical costs for fully re-charging a vehicle are £1.50.

High visibility of charging points is vital to build awareness of the availability of charging infrastructure. This means both providing clear roadside marking and signage, and ensuring information about charging points is made available via web portals and live communication systems such as phone apps.

Promoting EVs in Greater Manchester

Greater Manchester has been awarded £3.6 million funding through the Plugged in Places programme, with a further £3.6 million available through match funding to be provided by a consortium of private sector partners. The funding bid was led by Transport for Greater Manchester and sought to encourage take up of EVs through focusing on the public and private sector fleet operators.

Manchester Electric Car Company (MECC) has been set up as a delivery agency to operate the scheme which will provide a combination of over 300 on-street charge points across Greater Manchester and dedicated 'pods' where electric vehicles can be charged alongside EV supply chain operators, food and retail space and other attractions. The single point of service provided within the pods may also include access to electric scooters and bikes. MECC is working on a number of customer models including membership subscription, car club membership, pay-as-you-go and TfGM's 'System One' travel card. The roll out of the scheme will commence in 2012. More information is available from MECC (contact Lorna Pimlott, 07795 266773 lpimlott@uk.ey.com).

Planning regulations relating to vehicle charging infrastructure

There is some ambiguity regarding current planning regulations and the installation of charging points. Some points have been installed without the need for an application to the local planning authority where the following have applied:

- Charging points within a 'building' (which could be a multi-storey car park).
- An external plug (e.g. on the front face of a dwelling).
- Charging points that are provided and operated by the local planning authority as a public service.

However, the government has announced its intention to relax planning requirements for all electric vehicles charging infrastructure.¹⁰ In the meantime, the Greater Manchester planning authorities have agreed that charging points for electric vehicles (delivered by Manchester Electric Charging Company) should benefit from the same permitted development rights as those that apply to street furniture. A protocol has been drafted and signed by all ten planning authorities agreeing to this approach. As a safety net, local authorities are consulted on the proposed locations of charging points to ensure impacts on heritage features or designations are sufficiently addressed.

Using local Planning instruments to encourage take up of electric vehicles

To date, most dedicated charging points have been installed on an ad hoc basis with local authorities responsible for their introduction through ad-hoc projects. More co-ordinated approaches are now starting to emerge through schemes such as Plugged in Places.

¹⁰ <http://www.communities.gov.uk/news/corporate/1809234>

Policy 6.13 in Consultation Draft Replacement London Plan (2009) requires that developments must ensure that 1 in 5 spaces (both active and passive) provide an electrical charging point to encourage the uptake of electric vehicles.

Some local authorities (e.g. Woking Borough Council) have used planning conditions to require a percentage of parking bays to be fitted with EV charging points where they serve large commercial developments with a high level of visitor/employee parking on site and residential developments with on-site parking where it would be impractical for occupants to charge vehicles unless dedicated facilities are provided at the time of construction (e.g. apartment schemes).

Local authorities have been successful in encouraging the use of EVs and low emission vehicles in Travel Plans for major developments, and further innovation is likely to follow in this area.

Find out more about EVs and Vehicle Charging Infrastructure:

- The Office for Low Emission Vehicles (OLEV) provides information on government policy, funding and research relating to low emissions vehicles: <http://www.dft.gov.uk/topics/sustainable/olev>
- Information about Transport for London's Source London charging vehicle infrastructure - <https://www.sourcelondon.net/>
- DfT's Plugged in Places programme piloting the city-wide installation of electric vehicle charging infrastructure: <http://www.dft.gov.uk/pgr/sustainable/olev/infrastructure/>
- London's Electric Vehicle Infrastructure Strategy (draft) 2009: <http://tinyurl.com/62q976m>
- A Beginner's Guide to Electric Cars: <http://www.guardian.co.uk/electric-vehicle/beginners-guide-to-electric-cars>
- A more detailed buyers' guide to EVs: <https://www.smmmt.co.uk/shop/electric-car-guide-2010/>
- Guidance on EV Charging Infrastructure: <http://www.newride.org.uk/downloads/EVCP-Guidance-Apr10.pdf>
- For information on the growth in deployment of EV Charging infrastructure contact report@chargepointindex.co.uk

A report is to be published later this year on how local authorities can encourage the take-up of low and ultra-low carbon vehicles in the UK. For further information contact the RAC Foundation (www.racfoundation.org).

Acknowledgements

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- Transport for Greater Manchester (<http://www.tfgm.com>)
- Colin Buchanan (<http://www.colinbuchanan.com/>)