LONDONASSEMBLY

Environment Committee

Charging ahead?

An overview of progress in implementing the Mayor's Electric Vehicle Delivery Plan

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Contents

	Foreword	**7**
	Summary	**9**
1	**London the electric vehicle capital of Europe?** *The Mayor's vision for, and progress on, electric vehicle use in London*	**11**
2	**Weighing up the benefits** *The environmental impacts of electric vehicles*	**15**
3	**Plugging the gap** *Barriers to increasing electric vehicle use*	**22**
4	**Raising London's game** *The role of the Mayor*	**30**
	Appendix 1 Recommendations	**38**
	Appendix 2 Orders and translations	**400**

Foreword



The Mayor announced with much fanfare at the C40 Climate Change Summit 2009 in Seoul, how he was going to make London the "electric car capital of Europe". His aim was to get 100,000 electric vehicles (EVs) in use on London streets as soon as possible, served by 25,000 plug points and 1,000 electrical vehicles in the GLA fleet by 2015. Now almost at the end of this term, we examine how the Mayor is performing and whether London has succeeded in charging ahead with the electric vehicle revolution.

There are a number of worthy environmental benefits to be gained from having more electric vehicles on the road. They do not emit dangerous tailpipe pollutants and they produce much less noise on our roads. However, we do also need to look at the life-cycle carbon costs for an electric vehicle and ensure that the electricity powering them is derived from a renewable energy source. This would strengthen the environment case for electric vehicles significantly.

Yet, despite the obvious environmental benefits, generous government subsidies and perks such as free parking, we still only have 2,313 electric vehicles registered in London, a mere 0.08 per cent of London's 3 million fleet. This is way off the Mayor's original target of 100,000, and at the current rate could take centuries to reach.

So, the reality is that it's been much tougher to deliver than envisaged and lessons can certainly be learned from other cities and towns which are pushing on with their own electric vehicle revolution. We recently visited Paris and also Sunderland in the North East of England. What we learned was that a clear strategy is needed to ensure that the locations chosen for the charging points are appropriate for electric vehicle users. One particular area which was highlighted during the trip to Sunderland was their work to ensure there are sufficient rapid chargers available at key points on major roads to help ease drivers' "range anxiety". This would make electric vehicles much more appealing to longer distance drivers. The progress in the North East has also been helped by having a Nissan plant producing electric vehicles in Sunderland, although interestingly, they are designed in London. Nissan's presence and investment has done much to enhance the North East's Low Carbon Economic Area status. We also learned that, in both Paris and the North East, figures for EV charge points per population are better then London's, therefore, it is not surprising that both regions are making excellent progress with their own EV targets.

If EV ownership does not take-off soon, adopting the Parisian approach may be a good alternative. They recently launched their Autolib EV car hire scheme. This is designed to diversify the transport on offer in Paris and surrounding towns and it's estimated every 3,000 electric vehicles will see 22,500 polluting cars withdrawn from the roads. In the past, we've followed Paris with their Velib bike hire scheme with our very own version. We may do well to follow their lead again but this time with a version of their EV car hire scheme for London. I believe we should all be watching the progress of the Autolib in Paris with great interest.

Murad Qureshi AM

Chair of the Environment Committee

Summary

The Mayor's Electric Vehicle Delivery Plan (EVDP) published in May 2009, is one strand of the Mayor's overall strategy to clean up transport and improve air quality in London. It is the mechanism by which he aims to develop a London-wide public charging network, encourage more Londoners to 'go electric' and increase the use of electric vehicles (EVs) across the public sector, notably in the GLA fleet. His long term goal is to have 100,000 EVs on London's streets as soon as possible.

Visible progress has been made since the EVDP was published. There are an additional 588 pure EVs on London's streets and around 400 charge points available to EV users. But take up of EVs has been slower than first anticipated and the pace and scale of delivery for the EVDP revised several times. The Mayor is now committed to delivering 1,300 charge points by 2013, and *Source London*, the public charging network he launched in spring 2011, provides 263 of the 400 charge points in use across London.

There is a considerable way to go to meet the Mayor's goal and the short-term targets set out in the EVDP – 25,000 charge points and 1000 EVs in the GLA fleet by 2015. Questions remain over whether the targets will be met, or in light of the changing landscape whether they continue to apply. Reduced funding and a shift in perception about where and when charging will occur and the need for an extensive public charging infrastructure have helped shape the revised programme for delivering the EVDP.

This report provides an update on progress in implementing the Mayor's EVDP. It also considers the environmental benefits they have to offer. Air quality benefits and reduction in carbon emissions may be lower than historically assumed. Much larger numbers of EVs will be needed on London's streets to help deliver the targets in the Mayor's Air Quality Strategy and better air quality for Londoners. Increasing renewable energy supply to the national grid and the number of charge points that are powered by renewable energy will be crucial to reducing carbon impacts.

Despite the raft of national and regional-based incentives and initiatives available to prospective EV users, numbers remain somewhat low. There are 2,313 registered in London, a mere 0.08 per cent of the three million vehicles that can be found there. Accelerating EV use in London will hinge on three key factors, two of which the Mayor has a considerable degree of influence over: developing a

recognisable and easily accessible charging infrastructure; and improving on the level of information available on EVs and making access to it easier. The third, access to EVs, will be driven by the market. The report calls for the Mayor to build on existing work to raise awareness about EVs by collating and publishing real time data on the charging infrastructure and by partnering with industry to develop a comprehensive communications strategy to increase public awareness and knowledge of EVs.

The report also points out that the public charging infrastructure will need to deliver value for money and calls for the Mayor to develop a clearer and consistent strategy for determining where charge points should be located.

While the report concludes the Mayor has a role to play in encouraging greener modes of transport in London, it raises concerns that the EVDP in its current form will deliver environmental benefits too slowly. It suggests that alternative approaches need to be considered, including measures to encourage take-up of electric taxis, light goods vehicles and buses. Combined levels of pollution from these vehicles are considerably higher than from cars.

1 London the electric vehicle capital of Europe?

1.1 On 19 May 2009, the Mayor committed to making London the electric car capital of Europe. His goal is to have 100,000 electric vehicles (EVs) on London's streets as soon as possible.[1] He aims to dramatically improve carbon emissions, air quality and noise levels in the city. Wide-scale introduction of EVs across the capital will need to be supported by an appropriately-sized accessible public charging infrastructure. There are around 400 charge points available in London. Just over 260 charge points are available through *Source London*, the London-wide charge point network launched by the Mayor in May 2011.[2]

1.2 The Mayor's Electric Vehicle Delivery Plan (EVDP) is the mechanism by which he hopes to deliver his goal of 100,000 EVs in partnership with boroughs and other private and public sector partners, and an integrated and easily recognisable charging network across London. The latter is being developed under the *Source London* banner.

1.3 The EVDP includes specific targets to deliver:

- 25,000 charge points across London by 2015, with 2,500 in on-street and off-street locations and 22,500 in employers' car parks and retail and leisure locations and,
- 1000 EVs in the GLA fleet by 2015

Visible progress has been made since the EVDP was published in 2009, but there is still a considerable way to go to achieve the Mayor's goals and the targets set out in the EVDP.

1.4 There are 2,313 registered EV users in London, compared to 1,725 in 2009. In addition London has 22,536 users of plug-in hybrid electric vehicles (PHEVs).[3] The 2,313 EVs represent approximately two per cent of the 100,000 EVs the Mayor is aiming for on London's streets and around 0.08 per cent of the three million vehicles registered in London. Data suggests

[1] Mayor's press release, 19 May 2009 http://www.london.gov.uk/media/press_releases_mayoral/mayor-invites-world-plug-londons-electric-vehicle-revolution
[2] See https://www.sourcelondon.net/ There are now 263 points available through Source London.
[3] Driver and Vehicle Licensing Agency(DVLA) statistics

that around 49 EVs can be found in the GLA fleet - just five per cent towards the goal of 1000 vehicles.[4]

Changes to the EVDP

1.5 The pace and scale of delivery for the EVDP has been revised several times. In February 2010, after securing funding of up to £17 million, the Mayor confirmed that around 7,500 charge points would be installed by spring 2013 with 1,600 installed within 12 months.[5] In December 2010, Assembly Members were informed that the Mayor would deliver 1,300 charge points through Source London by 2013.[6]

1.6 The Mayor initially estimated that it would cost £60 million to deliver the EV charging infrastructure - £40 million from public sector sources and £20 million from the private sector.[7] In 2010, public sector investment commitment was reduced to around £16 million; approximately £6.6 million to be funded through Transport for London (TfL) and £9.3 million from the Government's 'Plugged in Places' Grant.[8] Working to the assumption that the private sector will still match public sector investment, the Mayor now has a considerably reduced budget at his disposal.

1.7 Reduced public funding has to some extent driven the changes. There has also been a shift in public perception about where and when charging will occur. According to the Government's *Plug-In Vehicle Infrastructure Strategy* users now seem more likely to charge their vehicles at home or at the workplace. [9]

The Committee's approach

1.8 On 12 July 2011, Kulveer Ranger, the Mayor's Director of Environment and Digital London, briefed the Committee on how the EVDP was progressing.

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[4] This figure is based on verbal responses from the Mayor during Mayor's Question Time on 23 March and 18 May 2011. See questions MQT 0841/2011 and MQT 1258/2011 respectively.
[5] Mayor's press release, 25 February 2010 http://www.london.gov.uk/media/press_releases_mayoral/london-secures-%C2%A317-million-funding-uk%E2%80%99s-largest-electric-vehicle-charge
[6] Mayor's 26th Report to the Assembly, 15 December 2010
[7] Page 11, An Electric Vehicle Delivery Plan for London, May 2009
[8] See question 3989/2010, Mayor's Question Time, 15 December 2010
[9] Page 8, Making the Connection, The Plug-in Vehicle Infrastructure Strategy – Office for Low Emission Vehicles, June 2011 http://www.dft.gov.uk/publications/plug-in-vehicle-infrastructure-strategy/

1.9 The Environment Committee was keen to understand what had driven changes to the pace, scale, and funding of the EVDP and the extent to which the goals and targets it sets out may have been compromised.

1.10 The Committee was also keen to examine the rationale underpinning the EVDP. The EVDP claims that Londoners stand to benefit from improved air quality and reduced levels of carbon emissions. There are also claims of financial benefits for EV users, and the EVDP even hints at possible commercial gains. Stimulating the market for EVs in London, it is suggested, could contribute to the UK car industry's competitiveness, production capability, and potential to be a market leader in the domestic and overseas markets.

1.11 The EVDP focuses on all-electric vehicles, that is, vehicles with an electric motor powered by a rechargeable battery. Correspondingly, our discussions were largely limited to this category of vehicle. However, PHEVs and extended-range EVs (E-REVs), also potentially offer lower carbon dioxide (CO_2) emissions than normal internal combustion engine (ICE) vehicles, and may contribute to cleaner air in London.[10] This report does not cover PHEVs and E-REVs, but we recognise the value in exploring further what contribution they might make to cleaner air and lower carbon emission levels in London.

Report focus

1.12 This report provides an update on the EVDP and incorporates the Committee's views and observations on three key areas:

- the environmental benefits wide-scale use of EVs can deliver for Londoners now and in the future;
- what is needed in terms of infrastructure, policy levers and market growth to deliver those environmental benefits;
- the role, if any, the Mayor should play in stimulating the EV market.

[10] PHEVs are powered by mains chargeable batteries as well as a normal internal combustion engine, and could be run in all-electric mode for short to medium distance journeys. For more information see http://www.dft.gov.uk/pgr/scienceresearch/technology/lowcarbonelecvehicles/ E-REVs are powered by battery, with an ICE powered generator on board. For more information see page 4, Electric Car Guide 2011, The Society of Motor Manufacturers and Traders

1.13 We believe that, in the interest of maintaining transparency and openness, the Mayor should publish a revised EVDP. A revised version should clearly set out the targets and timescales for implementing charging infrastructure, and for introducing EVs into the GLA Group fleet. We would wish to see this report's recommendations incorporated into the revised EVDP.

1.14 Publishing a revised plan will provide much needed clarity on the EV agenda for London, and will help to bring some degree of certainty to investors and consumers alike.

1.15 We would like to acknowledge and thank the expert guests who contributed to our discussion on 12 July 2011, and to this report.

Recommendation 1
We recommend that the Mayor publish a revised Electric Vehicle Delivery Plan for London (EVDP). A revised EVDP should clearly set out targets and timescales for implementing the charging infrastructure, and for introducing EVs into the GLA Group fleet. It should also include details on whether existing targets still apply, the rationale for any revisions, and what funding or other action is being taken to ensure that the commitments in the revised EVDP can be delivered. We would wish to see a revised EVDP incorporate the recommendations set out in this report.

2 Weighing up the benefits

2.1 The EVDP is one strand of the Mayor's overall strategy to decarbonise transport and improve air quality in London. Key measures for cleaning up transport and improving air quality are set out in the statutory strategies - the Mayor's Transport Strategy, Air Quality Strategy and Climate Change Mitigation and Energy Strategy.[11] According to the EVDP, other technologies, such as the hydrogen-fuel-cell-powered bus project, will also have a role to play.

2.2 In this section we assess the environmental value that the EVDP adds to the Mayor's overall approach. What are the environmental benefits of EVs, and to what extent will their wide-scale use improve air quality and reduce carbon emissions from road transport in London, now and in the future?

Environmental uncertainty

2.3 EVs have been around for over 100 years, and have been extensively researched since the 1960s. Research and industrial development has accelerated in the last decade, spurred in part by concerns about the price and security of oil supplies. EVs are seen as a way of reducing our reliance on carbon-based fuels and the UK's commitment to reducing CO_2 emissions over the long term is also a key factor.

2.4 But the environmental benefits of EVs are not clear-cut. Government research commissioned in 2008 strongly advocates the positive impact EVs can have on the environment. It focuses on the effect of tail-pipe emissions, of which, in the case of EVs there are none.[12] However, research recently published by the Low Carbon Vehicle Partnership (LCVP), raises questions about the level of environmental benefits EVs can realistically make over the life cycle of the vehicle.[13] The large amounts of energy used during the

[11] The final strategies were published in May 2010, December 2010 and October 2011, respectively, and can be downloaded at http://www.london.gov.uk/who-runs-london/mayor/publications

[12] Investigation into the Scope for the Transport Sector to Switch to Electric Vehicles and Plug-in Hybrid Vehicles, published by the Department for Business Enterprise and Regulatory Reform and Department for Transport, October 2008 http://www.dft.gov.uk/pgr/scienceresearch/technology/lowcarbonelecvehicles/

[13] Preparing for a Life Cycle CO_2 Measure, May 2011 http://www.lowcvp.org.uk/resources-library/reports-and-studies.asp The Low Carbon Vehicle Partnership (LCVP) is a public-private partnership that exists to accelerate a sustainable shift to lower carbon vehicles and fuels and create opportunities for UK businesses.

production and disposal of EVs significantly add to their carbon footprint.

Air quality benefits

2.5 Used in large numbers over a long period of time, EVs could help to achieve better air quality in urban environments.[14] In contrast to ICE vehicles, EVs emit zero tailpipe emissions of nitrogen oxides (NO_x), sulphur oxides (SO_x) and particulates. All three are known to contribute to serious respiratory illness, reduced quality of life and in some cases premature death.

2.6 At high levels nitrogen dioxide (NO_2) causes inflammation of the airways and long-term exposure can affect lung and respiratory system functions. NO_2 can also increase asthma symptoms. Similar effects are associated with sulphur oxides. Research shows that particles with a diameter of ten microns and smaller (PM_{10}), are likely to be inhaled deep into the respiratory tract. As smaller particles can penetrate deeper, the health impacts of $PM_{2.5}$ are especially significant.

2.7 Reducing air pollution levels remains a significant challenge for London. According to GLA-commissioned research, particulate air pollution contributed to an equivalent of 4,267 premature deaths in London in 2008.[15] London is the only region in the country that failed to meet the EU limit values for PM_{10} by the original deadline. It was also one of 40 air quality zones that failed to meet the 1 January 2010 deadline for complying with EU limits for NO_2. London has the most widespread breaches of limits and the latest projected compliance date – by 2025. All the others are by 2020 or sooner.

2.8 Road transport is the main contributor to poor air quality in London. In 2008, road vehicles generated 79 per cent of particulate emissions, and 60 per cent of NO_x emissions in central London.[16] Across London, cars contributed the highest

[14] Investigation into the Scope for the Transport Sector to Switch to Electric Vehicles and Plug-in Hybrid Vehicles, published by the Department for Business Enterprise and Regulatory Reform and Department for Transport, October 2008
[15] GLA commissioned research, Report on estimation of mortality impacts of particulate air pollution in London, June 2010 http://www.london.gov.uk/air-quality/health
[16] Paragraphs 2.5.3 and 2.5.7, the Mayor's Air Quality Strategy, *Clearing the Air*, December 2010

proportion of road transport emissions: around 35 per cent in 2008. Heavy goods vehicles are also significant contributors, along with buses: about 30 per cent and 21 per cent respectively in 2008.[17]. It should also be noted that tyre and brake wear from road transport now contributes a considerable proportion of PM_{10} emissions across London – a reflection of the fact that improvements in exhaust emissions have not been matched by similar improvements in tyre and brake wear emissions. [18]

2.9 The Mayor estimates that 100,000 EVs on London's streets can reduce particulate emissions by 70 – 90 tonnes per year, and NO_x emissions by 350 – 400 tonnes per year.[19] Any reductions in particulate matter and NO_2 levels are to be welcomed. However, the likelihood of improved air quality in London through increased EV use in the short to medium term is small. Modelling completed for the Mayor's Air Quality Strategy showed that the effects of penetration of EVs into the car fleet is expected to be less than one per cent up to 2015.[20]

Carbon emission benefits

2.10 By the Mayor's estimations, achieving the targeted rates of EV adoption shown in the EVDP could save up to 80,000 tonnes of CO_2 annually by 2020, and a total of up to 400,000 tonnes up until that date.[21] Any reduction in CO_2 emission levels is to be welcomed. However, this is a small proportion of the anticipated combined 3.07 Mt CO_2 annual savings to be generated from actions at European, national and regional levels. [22] Also, these estimated savings may alter, taking into account the EVDP delivery programme changes and possible

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http://www.london.gov.uk/sites/default/files/Air%20Quality%20Strategy%20v3.pdf

[17] Ibid. Paragraph 2.5.10

[18] The Mayor's Air Quality Strategy, *Clearing the Air*, December 2010

[19] Page 6, The Mayor Electric Vehicle Delivery Plan. Appendix C, The Mayor's Air Quality Strategy sets out the annual baseline emissions for particulate emissions and oxides of nitrogen are 2372 and 46557 tonnes respectively.
http://www.london.gov.uk/sites/default/files/MAQS%20Appendices_0.pdf

[20] Page 1, Environment Committee transcript, 13 July 2011

[21] Page 41, draft Electric Vehicle Infrastructure Strategy
https://www.sourcelondon.net/sites/default/files/draft%20Electric%20Vehicle%20Infrastructure%20Strategy.pdf

[22] Page 181, Delivering London's Energy Future: the Mayor's Climate Change Mitigation and Energy Strategy sets out annual savings to be made from government and EU actions, committed and further Mayoral actions.

revisions to the modelling for CO_2 emissions as more is learned about the environmental impact of EVs.

2.11 The research published by the LCVP in May 2011 has opened up the debate. It concludes that EVs can potentially produce higher CO_2 emissions than conventional vehicles over their lifetime, because of the high amounts of energy that can be used during production.[23] Battery construction is particularly energy-intensive. The research notes *"The tailpipe CO_2 metric is insufficient for comparing the environmental impact of zero and ultra-low emission vehicles, …since it does not consider CO_2 emissions resulting from the generation of the fuel, or those embedded within the vehicle production…The vehicle's embedded CO_2 from production and disposal is becoming a greater portion of the life cycle CO_2 emissions."*

2.12 The LCVP identifies the need for more research on vehicle end-of-life to help understand what really happens during vehicle disposal. We would welcome such research. We would also like to see more work on the impact of the battery manufacturing process on an EV's carbon footprint.

The role of renewable sources

2.13 More EVs can potentially lead to more CO_2 emissions, as the demand for electricity increases and given that around 77 per cent of electricity is sourced from coal and gas.[24] Meeting additional demand from renewable or low carbon generation sources is crucial if strict EU limits for carbon emissions are to be met.[25] The Committee is encouraged that the industry recognises this fact.[26] We therefore need to look to ways to boost the renewable content of the energy used and appropriately managing demand on the grid.

2.14 The UK has low existing renewable energy capacity. Environment industry expert Mike Berners-Lee suggests that the switch from petrol to electricity will initially need to be met by fossil fuels, because they are the only source in the UK that

[23] Preparing for a Life Cycle CO_2 Measure, May 2011 http://www.lowcvp.org.uk/resources-library/reports-and-studies.asp
[24] Faye Sunderland, Editor, The GreenCarWebsite.co.uk http://www.london24.com/news/transport/london_electric_car_plan_running_flat_warning_for_boris_johnson_1_954934
[25] EU Emissions Trading Scheme 2009/29/EC
[26] Page 22, Electric Car Guide 2011, The Society of Motor Manufacturers and Traders Limited

will be able to provide the extra capacity. He claims *"Hydro and wind turbines, for example cannot turn any faster."* and argues that this will mean *" the carbon intensity of the electricity needed to power all new electric cars will be significantly higher than the current grid average."*[27] However, it is not clear whether this takes into account other low-carbon energy sources.

2.15 The Mayor has been unable to confirm that the energy supply to *Source London* charge points will come from renewable sources. His recently published Climate Change Mitigation and Energy Strategy aptly notes that *"many crucial details have yet to be resolved"*. It also notes that developing the infrastructure to bring new renewable energy on-line is costly and it is unclear where the finance will come from. The Government is limited in what it can contribute; securing private sector investment will not be easy, particularly as low carbon technologies are perceived to be riskier investment options. There are unresolved public safety issues about nuclear energy plants and planning and regulatory delays also add to the challenges. [28]

2.16 There are models in other areas of the UK to learn from. Charge points installed by Brighton and Hove City Council are charged by renewable energy sources.[29] The launch of Source East Electric Vehicle charging network was accompanied by assurances that the electricity will come from renewable sources.[30]

2.17 The Mayor has committed to working with boroughs to explore the feasibility of using renewable energy to power charge points in London.[31] We welcome this. But going forward we would wish to see the Mayor proactively engage with private sector partners to secure their commitment to

[27] As written in The Times supplement Eureka, 23 August 2011. Mike Berners-Lee is the Director of Small World Consulting, a sustainability consultancy which brings together environmental and business expertise.
[28] Page 76, Delivering London's Energy Future – the Mayor's, Climate Change Mitigation and Energy Strategy, October 2011
[29] http://www.journeyon.co.uk/newsite/uploads/FAQ's%20Electric%20Vehicle%20Charging%20Points.pdf
[30] http://www.projectsmagazine.eu.com/news/south_east_england_plugs_in_to_electric_vehicles
[31] Question 0624/2010, Mayor's Question Time, 24 October 2010

increase the number of charge points installed in the capital that are supplied with renewable energy.

Conclusions

2.18 The Committee concludes that:

- More work is needed to help us better understand the environmental impacts of EVs. Additional life-cycle modelling on the carbon footprint of EVs would provide more realistic comparative analysis of their benefits over those of conventional combustion engines.
- EVs can offer environmental benefits, and on balance have a part to play in the Mayor's overall approach and programme of measures to clean up road-based transport and to deliver a cleaner environment for Londoners.
- The benefits to be gained are likely to come into play over the long term and depend on securing significant numbers of EVs on London's roads. It is therefore crucial to also pursue measures that will yield benefits in the short and medium terms.
- The public charging infrastructure must be powered as much as possible by renewable energy if strict EU limits for carbon emissions are to be met. Developing such sources of energy is not easy or inexpensive, but lessons can be learned from schemes in other parts of the country.
- The EVDP needs to be realistic and clear in its ambitions and approach to deliver the environmental benefits that Londoners need.

Recommendation 2

We recommend that the Mayor commission research on full life-cycle modelling on EV carbon footprints to further inform policy development in the Air Quality Strategy.

Recommendation 3

The Mayor should note the experience of others in the UK, such as Brighton and Hove City Council and the Source East Electric Vehicle charging network, which use electricity from renewable sources. We recommend that the Mayor work with energy suppliers to determine the feasibility and practicality of sourcing electricity for public charge points from renewable energy. The Mayor could look to include a requirement to source a percentage of London's charge points with electricity from renewable energy.

3 Plugging the gap

3.1 The slow uptake of EVs in London, and in other parts of the UK is in part due to uncertainty about the environmental benefits they offer. However other factors have also contributed to the slow uptake. Our discussions with experts revealed that these factors centre on public concerns about access to:

- charging facilities,
- information about EVs, and
- the vehicles themselves.

The public is particularly concerned about the high purchase costs. These concerns persist despite the raft of national and regional-based incentives and initiatives that are in place.

3.2 This section looks at the range of incentives and initiatives designed to boost EV uptake, and the barriers and challenges identified through discussion with expert guests at the session on 12 July 2011.

National incentives and initiatives

3.3 The Government provides financial support towards the purchase of an electric car through the Plug-In Car Grant. To qualify for the grant, the vehicle must appear on a pre-approved list, drawn up by the Government.[32]

3.4 The grant is administered through the Office for Low Emission Vehicles and provides a subsidy of 25 per cent, up to the value of £5,000 for each qualifying electric car purchased. The grant scheme has been designed to help make the whole-life costs of a qualifying car more comparable to the costs of petrol- or diesel-powered cars. Private consumers and businesses can benefit from the Plug-In Car Grant when purchasing a qualifying ultra-low emission car and registering it in the UK.

3.5 Following the 2010 Spending Review, the Government confirmed that it would continue to support the Plug-in Car Grant for the life-time of this Parliament. But the scheme and level of subsidy will be periodically reviewed. This is to ensure continued value for money for the taxpayer. The first review is due to take place in early 2012.

[32] For more information about the Plug-In Car Grant and the current list of qualifying vehicles, see http://www.dft.gov.uk/topics/sustainable/olev/plug-in-car-grant/

3.6 A number of tax incentives are also available, for example:

- vehicle excise duty exemption
- fuel duty exemption
- enhanced capital allowances
- five-year exemption from Company Car Tax. [33]

London-based incentives and initiatives

3.7 EVs are eligible for a 100 per cent discount from the Congestion Charge. There is a range of borough-level incentives across nine London boroughs.[34] Some London boroughs offer subsidised parking for EVs. For example, Westminster provides free parking and free charging facilities which can save the user up to £6,000 a year. The user is required to pay an annual administration fee of £231. Richmond provides free residents' parking for vehicles with CO_2 emissions of 100g/km or less.

Access to the charging infrastructure

The size and scale of the infrastructure

3.8 The Mayor's revised commitment to deliver 1,300 public charge points by spring 2013, is an indication that the charging infrastructure has not developed as quickly as first anticipated. This is reflected elsewhere in the UK.[35] Officers from Transport for London (TfL) maintain that 1,300 charge points by 2013 *"is about right in terms of the capacity to meet the demand over the next two or three years."*[36] Across Europe, there is a mixed picture on how developing electric vehicle charging infrastructure is progressing. For example Oslo has a network of 200 charge points with reports suggesting that there are more EVs per capita than any other capital in the world. Amsterdam has a network of 1250 charge points, Lisbon 480, Madrid 270, Stockholm 114 and 40,000 homes

[33] Information taken from Electric Car Guide 2011 Questions and Answers, The Society of Motor Manufacturers and Traders Limited and the Mayors Climate Change Mitigation and Energy Strategy, October 2011

[34] Camden, City of London, Enfield, Islington, Kensington & Chelsea, Lambeth, Richmond, Sutton and Westminster. For more information about the incentives and initiatives offered see https://www.sourcelondon.net/existing-charge-point-schemes

[35] http://www.heraldscotland.com/news/transport/green-driving-revolution-fails-to-bloom-in-scotland.16468945

[36] Page 23, Environment Committee Transcript dated 12 July 2011

with access to electric charging through existing facilities.[37] The Committee recognises that city profiles and infrastructure needs will differ. However we consider it crucial that that the suggested infrastructure requirements are underpinned by robust analysis of London's needs. We would therefore wish to see a revised EVDP include an analysis of projected demand in London, and that this demand can be met by the proposed charging infrastructure.

Meeting demand

3.9 The Mayor's Director of Environment and Digital London informed the Committee that in a bid to improve access to the charging infrastructure, *"(we are) looking to see how we can retrofit, working with boroughs, where there is a demand, to get charging infrastructure either on street around those areas where it is required – and using intelligence in terms of where people actually need it.."* [38] This wholly demand-led approach to installing infrastructure may dissuade individuals from purchasing an EV; they may be unsure whether they will have access to charge points in their local area, or when it is likely to be available.

3.10 Easy access to charge points will be key in ensuring that the infrastructure is fit for purpose. Charge points forming part of the *Source London* network (SLN) will be installed in partnership with private sector partners and they will become an asset wholly owned by them. While TfL will seek to influence the location of charge points, the ultimate decision will lie with the private sector partner, who through match-funding will bear the purchase costs and 50 per cent of the installation costs. The private sector partner will also be responsible for ongoing maintenance of the points and their day-to-day running costs.

Compatibility Issues

3.11 Around 150 available charge points in London do not form part of the SLN. Twenty-six charge points installed across four boroughs, some funded by the Local Implementation Plan, have been removed and replaced by charge points that are compatible with the SLN. The four boroughs concerned –

[37] Electric Vehicles in Urban Europe Baseline Report, May 2010; Electric Vehicles in Urban Europe Expert Seminar, 27 – 28 November 2011 See http://urbact.eu/en/projects/low-carbon-urban-environments/evue/homepage/
[38] Page 23, Environment Committee transcript dated 12 July 2011

Hammersmith and Fulham, Haringey, Hounslow and Kingston upon Thames - have partnered with Source London. Residents in those boroughs who become members of the scheme will be able to access the SLN.

3.12 The SLN offers a single set of Membership fees across London. It is designed to avoid any duplication of borough level membership fees that may occur. For example a resident living in one borough and working in another could, in practice, have been faced with a double set of charges: one in which they lived or worked, and perhaps another they might have needed to travel to for work or personal reasons. This may still be the position in some cases, as the SLN is rolled out across London. During this transition period, we understand that residents have been offered an additional six months to the annual subscription if they are members of an existing borough scheme. Work to standardise access through the SLN commenced in 2010 and is due to be completed in January 2012.[39]

Range Anxiety

3.13 'Range anxiety' is also causing concern about access to the right type of charge point. Range anxiety refers to the fear people have about the distance an EV can drive and the concern that the range may not be enough to reach their destination.[40] While the likelihood of long journeys within London is low, the high level of road traffic congestion can deplete energy reserves; at times users may need instant or near-instant access to a rapid charge point, if their vehicle has this capability. Thirteen rapid charge points have recently been installed across London.[41]

Access to information

3.14 Lack of information and lack of access to information are contributory factors to consumer reticence. Uncertainty about the range capabilities of EVs, their on-going maintenance costs and resale value makes it problematic for the consumer

[39] See https://www.sourcelondon.net/replacing-borough-charging-points
[40] Society of Motor Manufacturers and Traders definition as used in its publication, Electric car Guide 2011, Questions and Answers
[41] The Mayor launched thirteen rapid charge points on 10 November 2011. See Transport for London press release, 10 November 2011 http://www.tfl.gov.uk/corporate/media/newscentre/archive/21558.aspx

to make an informed decision about the true value of their purchase.

3.15 Making information about EVs more accessible to the public could help increase EV use across London. The industry is clearly convinced that the range of initiatives and incentives in place, both nationally and across London presents an attractive package to investors and consumers alike, but recognises that more needs to be done to increase public awareness. *"The next step …is all about the education side of it. The more you can do to educate the public and get them to use all…you have already put in place, then the better. That is where… the next focus would be very useful."* [42]

3.16 *Source London* is a useful reference point for consumers and businesses considering purchasing EVs. However, we believe that the Mayor could build on existing work by collating and publishing real-time data setting out the location, type and availability of charge points across London. There is also scope to work in partnership with the industry to further inform and educate the general public about EVs and their use. The Society of Motor Manufacturers and Traders has expressed a willingness to be involved in a focused communication exercise of this nature.

Access to EVs

3.17 Uncertainty about the cost of EVs has weakened consumer confidence and affected on EV uptake.

3.18 Upfront purchase costs for EVs tend to be higher than for petrol and diesel cars. The price of a new EV can be up to 80 per cent higher, in cases where the battery is purchased outright. New EVs such as the Nissan Leaf cost around £25,000 (including the Plug-In Car Grant).[43] EVs are getting cheaper and can now be purchased for around £17,995 once the Plug-In Car Grant is taken off.[44] But there is still some way to go to make them readily affordable.

3.19 We acknowledge that production costs will decrease over time as production levels increase. This will help to reduce the high

[42] Page 30, Environment Committee transcript, 12 July 2011
[43] http://www.nextgreencar.com/electric-cars/car-costs.php
[44] Manufactured by Peugeot, Page 33, Environment Committee transcript, 12 July 2011.

purchase costs of EVs. But recent research by the Low Carbon Vehicle Partnership (LCVP) suggests that lower purchase costs will not happen in the short term. On average, electric cars will continue to have higher whole-life costs than equivalent petrol or diesel cars at least until 2030.[45]

3.20 Uncertainty about battery costs adds to consumer doubt. Information on the life-span of batteries used to charge EVs and their replacement costs is ambiguous. Andy Palmer, Nissan GB's senior vice president confirmed that replacement costs for a complete battery pack for a Nissan Leaf could total £19,392, more than double previously estimated costs. He did point out that if used mainly for short journeys, for which it is designed, the car would not need a new battery for at least ten years. However, repeated regular use of a rapid charger (more than once a day) or repeatedly driving the Leaf in extremely cold or hot weather could significantly reduce the life of the battery.[46]

3.21 Re-sale values of EVs are also unclear. Two large residual value companies, CAP and Eurotax Glass' Guide have published EV residual values which are competitive with similar sized ICE vehicles. However, each one takes a different view on whether the battery should be sold with the vehicle or leased separately, making it difficult to suggest a consistent residual value at this stage.

Conclusions

3.22 The Committee concludes that:

- Misconceptions about EVs, fuelled by uncertainty and lack of information, will need to be addressed to bring about the shift in consumer confidence needed to boost EV uptake in London.
- Practical approaches that will help bring about that shift should include:
  - the timely development of an infrastructure that meets the EV drivers' needs;

[45] Influences on the Low Carbon car Market from 2020 -2030, July 2011 http://www.lowcvp.org.uk/assets/reports/Influences%20on%20the%20Low%20Carbon%20Car%20Market%20from%202020-2030%20-%20Final%20Report%20010811_pdf.pdf

[46] Page 14, The Times, *Electric car buyers may face £19,000 battery shock*, 1 August 2011

- A focused communication strategy to help improve access to information and increase public awareness;
- More explicit information about purchase and whole-life costs of EV ownership;
- a reduction in the upfront costs of purchasing EVs;

- *Source London* is a useful reference point for consumers and businesses considering purchasing EVs. However, we believe that the Mayor could build on existing work by collating and publishing real-time data setting out the location, type and availability of charge points across London, to include charge points located in work places, businesses, and retail and leisure developments.
- While we recognise that the Mayor has already provided funding through the Local Implementation Plan to assist boroughs in raising awareness about EVs, we believe that a more cohesive approach is needed. We would urge the Mayor to take up the opportunity to work closely with industry partners to develop a comprehensive communications strategy to increase public awareness and knowledge about EVs.

Recommendation 4
A revised EVDP should include analyses of projected demand for an EV public charging infrastructure in London.

Recommendation 5
We recommend that the Mayor build on existing work to raise awareness about electric vehicles, by collating and publishing real time data setting out the location, type and availability of charge points across London, to include charge points located in work places, businesses, and retail and leisure developments.

Recommendation 6
We recommend that the Mayor, in partnership with the Society for Motor Manufacturers and Traders to develop a comprehensive communications strategy to increase public awareness and knowledge about EVs, and bring about the shift in consumer confidence needed to boost EV uptake in London.

4 Raising London's game

4.1 Given the challenges of promoting widespread EV use in London, the Mayor's the EVDP must be designed to deliver value for Londoners, both environmentally and financially. In this section we consider:

- whether there is a role for public intervention at regional level,
- and if so how that role might best be deployed; and
- whether the thrust and approach of the EVDP creates the right balance to deliver the best possible environmental benefits economically.

The challenges

4.2 We recognise that there are a considerable number of hurdles to overcome, to keep the delivery programme going. But, as pointed out to us during the briefing session, four key factors are now beginning to come together to support the Mayor's plan in the future.[47] The market is becoming more established, EV demand is increasing, supply is diversifying, and there is a concerted government push for a transition to low emission modes of transport. We welcome these trends.

4.3 Around 2,313 EVs are registered in London - 588 more than when the EVDP was published in 2009. However, there is still a significant way to go in order to meet the Mayor's goal for 100,000 EVs on London's streets. We recognise the scope to move the EV agenda forward, but would argue the case for improved Mayoral intervention.

Public intervention

4.4 The Mayor clearly has a role to play in encouraging greener modes of transport in London. Anything that improves London's air quality and reduces the negative impacts of road transport is a positive step forward for Londoners. And the contribution EVs can make to that is to be welcomed.

4.5 We are concerned that the EVDP in its current form will deliver environmental benefits too slowly. Our understanding is that the EVDP projections for improved air quality and reduced CO2 emissions are based on achieving 100,000 EVs on London's streets "as soon as possible". An average of 147 new EVs per year, have been licensed in London over the last four years. Clearly the current rate of progress will have to increase

[47] Page 5, Environment Committee transcript 12 July 2011

significantly if EVs are to play any role in targets for reducing pollution within the timescales set out in the Mayor's Air Quality Strategy and Climate Change Mitigation and Energy Strategy.

4.6 According to the Mayor's Director of Environment and Digital London the slow pace in delivery of EVs to the market is a big factor. He said, *"We are in a battle to get the manufacturers to deliver their vehicles here….They need to look at ramping up production and bringing them to the market"* [48] The Committee accepts that EV numbers are likely to increase at a faster pace as the vehicles become more commercially available and public charging infrastructure is improved. However, achieving the goal of 100,000 EVs by say 2020, as is implied in the EVDP, remains a formidable challenge.

Delivering Value for Money

4.7 The Mayor will need to demonstrate that the EV charging network will deliver value for money, given the high level of public funds already committed to the delivery of the EVDP.

4.8 Over £1 million was provided to boroughs through the Local Implementation Plan between 2008 – 2010 to install charge points, and help increase EV use locally.[49] However not all boroughs have achieved the desired level of take-up. For example, by September 2010 Haringey had received £94,000 funding and had installed 12 charge points. The borough had one registered user. Additionally all 12 charge points have since been replaced to ensure compatibility with the SLN.

[48] Pages 20 and 27, Environment Committee transcript, 12 July 2011
[49] MQT 3378/2010, 13/10/10
http://mqt.london.gov.uk/mqt/public/question.do?id=33286

AUTOLIB PARIS

Members of the Committee saw an alternative approach to encouraging EVs in Paris where the Mayor has promoted a public service EV car hire scheme – Autolib. Operated by the Bolloré Group, with technology provided by the IER Group, the car hire scheme is designed to diversify the transport offer in Paris and surrounding towns and to open up car use to those who might not have ready access to one. Using EVs will also help improve air quality and, of particular importance for Parisians, reduce noise pollution.[50]



Creating the right balance

Approach and focus

4.9 Additional measures are needed to build on the work achieved to date and to provide the stimulus needed to accelerate market growth and increase EV use in London.

4.10 We believe that a renewed focus on commercial vehicles is needed. The EVDP has mostly focused on getting more electric cars on the road. However, the combined level of pollution generated from taxis, light good vehicles (LGVs) and buses is considerably higher than that generated from cars. In 2008, cars were responsible for 23 per cent of central London particulate emissions. Taxis were responsible for over 30 per cent and LGVs up to 20 per cent.[51] A revised EVDP should set out the opportunities for developing electric taxi and light goods vehicles, including measures to encourage take-up.[52]

[50] The site visit took place on 16 January 2012. A presentation is available on the London Assembly website at http://www.london.gov.uk/who-runs-london/the-london-assembly/publications/environment

[51] Page 39 (LGVs), and page 93 (taxis), Clearing the Air, the Mayor's Air Quality Strategy

[52] These could include plans for financial incentives or tougher regulation.

4.11 Efforts are already being made to reduce emissions from buses, through the Bus Emissions Programme for London's buses and the Low Emission Zone: bus emissions now contribute less than 10 per cent to PM_{10} in central London. [53] However electric technology continues to offer an attractive zero-emissions solution to London's long-term transport needs.

4.12 To date, TfL's main focus has been on rolling out hybrid technology, with plans to introduce 300 hybrid buses by 2012.[54] While hybrid buses generate electrical energy as their brakes are pressed, they continue to rely on ordinary diesel engines for much of their power. In contrast, pure battery-powered buses emit zero exhaust emissions.

4.13 Electric buses currently available on the market include the Optare Solo EV – three in Durham and eight in Nottingham, and the Proterra BE35, currently operating in the US.[55] While commercial models currently available are all single deckers - with a range of about 60 miles/100km on a single charge – battery technology is developing rapidly, and the range of vehicles is anticipated to increase accordingly. In addition, several cities across the world are now successfully operating electric buses: Seoul plans over 2000 by 2020, the Italian cities of Genoa and Turin have already introduced them.[56]

4.14 The Mayor has previously confirmed that he would support an early demonstration project of an all-electric bus.[57] However, battery units for pure electric buses manufactured in the UK do not currently meet the operational requirements or range required by TfL. There is scope to learn more about the technology in use overseas and the potential for it to be replicated in the UK. We therefore propose that the Mayor explore the opportunities for using overseas suppliers of pure battery-powered, single-decker buses to assess if they are

[53] Page 39, Clearing the Air, the Mayor's Air Quality Strategy
[54] http://www.tfl.gov.uk/corporate/projectsandschemes/2019.aspx
[55] For more information see Durham: http://www.optare.com/pr_22_01_10.htm; http://www.bbc.co.uk/news/uk-england-nottinghamshire-13014254
[56] Seoul: http://www.e-traction.nl/overige-paginas/e-traction-signs-memorandum-of-understanding-(mou)-with-econex-ltd; see also DfT 'Green Bus Fund': http://www.dft.gov.uk/publications/green-bus-fund-round-3.
[57] MQT 3128/2011: http://mqt.london.gov.uk/mqt/public/question.do?id=38054

suitable for operation in London and whether it is possible to conduct a trial.[58]

4.15 A focused delivery programme on electrifying the taxi and LGV fleets could make a significant contribution to improved air quality and reduced CO_2 emissions over the short to medium term. In December 2010, the Mayor and Transport for London announced a £1 million fund to encourage taxi owners to upgrade to low emission vehicles such as electric black cabs. We would welcome more information on how the initiative is progressing. [59] The Mayor's commitment to work with the taxi manufacturing industry to develop an affordable taxi capable of zero-emission is a positive step; however every effort should be made to ensure that these taxis are in operation before the 2020 deadline that has been set.

LOW CARBON FUTURES, NORTH EAST

Members of the Committee discussed with colleagues from the North East's Low Carbon Futures team how demand for electric vehicles was likely to develop over the coming years. There were many lessons to learn from the experience of the North East, which has installed 342 charging points. A clear strategy is needed to ensure that the locations chosen for the charging points are appropriate for EV users. One particular proposal they are working on is to ensure that there are quick chargers available at key points on major roads to help ease "range anxiety" and allow for EVs to take on longer distance drives.[60]

Zero Carbon Futures
Innovative Transport North East England
CHARGE YOUR CAR
PARK + PLUG + RECHARGE

[58] There are approximately 2,700 single decker buses in the TfL fleet of 8,500 (see http://www.tfl.gov.uk/static/corporate/media/newscentre/archive/3724.html)
[59] Mayor's press release, 14 December 2010 http://www.london.gov.uk/media/press_releases_mayoral/mayors-tough-new-air-quality-standards-remove-dirtiest-black-cabs-londo
[60] The site visit took place on 12 January 2012. A presentation is available on the London Assembly website at http://www.london.gov.uk/who-runs-london/the-london-assembly/publications/environment

Charging Infrastructure

4.16 Early insight from trials by EDF Energy and UK research shows that dependency on public charging infrastructure is not as high as initially perceived. Most charging is likely to take place at home or work.[61] The Government agrees with this assessment; its Plug-in Vehicle Infrastructure demonstrates a shift in policy away from heavy investment in a public charging infrastructure to installing charge points at key destinations such as supermarkets, retail centres and car parks.[62] Officers from TfL confirmed to the Committee that research undertaken since 2010 had informed their revised target of 1300 charge points by 2013.[63]

4.17 The right balance needs to be created between access to a public charging network and home and work charging facilities. We would like to see the Mayor, together with local authorities and energy companies, further explore opportunities for making home charging more accessible in the capital. We welcome his commitment in the London Plan, to ensure that one in five parking spaces in new developments provides electric charge points.[64] But in our view there is a more pressing need to seek out workable options for home charging, particularly in residences that do not have access to off street parking. Off-peak charging will play an important part in minimising EV emissions, especially in the short term. The Society of Motor Manufacturers and Traders confirms that *"in the short-term, to minimise EV emissions it is important that most charging takes place outside peak hours (i.e. overnight)."*[65]

EV take-up in the GLA fleet

4.18 There is still progress to be made towards the target of 1,000 EVs in the GLA Group fleet. Clarity is needed on the exact number of EVs in the GLA Group fleet. We note that there may be around 49.[66] The target presents an opportunity for the

[61] EDF written submission to the Environment Committee, dated 7 July 2011
[62] Making the connection: The Plug-in Vehicle Infrastructure Strategy, June 2011
[63] Page 23, Environment Committee transcript, 12 July 2011
[64] Policy 6.13 requires the provision of electrical charging points in all new developments as part of parking provision requirements. See page 200
[65] The Society of Motor Manufacturers and Traders, Electric Car Guide 2011
[66] Mayor's Question Time 23 March 2011 and 18 May 2011, see questions 0841/2011 and 1258/2011 respectively. Confirmation of the exact figure was requested but not received.

GLA Group to lead by example and we therefore look forward to seeing further progress.

4.19 Procurement frameworks will help to increase EV numbers and to develop the charging infrastructure. We acknowledge the work that has already gone into securing frameworks for vehicle and infrastructure purchases. However in due course we would also like to see a framework established for the Metropolitan Police Service, which has the largest fleet in the GLA Group.[67]

Conclusions

4.20 The Committee concludes that:

- It is right that every effort is made to improve air quality and to mitigate climate change impacts. However it is imperative that the EVDP delivers value for money. There are clear practical ways that value, both environmental and financial, can be achieved by:
  - ensuring the charging infrastructure matches demand;
  - targeting increased EV take up amongst the more polluting vehicles such as buses, taxis and light goods vehicles and;
  - focusing on the GLA and wider public sector fleets.
- There is a clear policy shift away from developing public charging infrastructure of large scale proportions. We agree with this shift, especially given the need to manage the impact on the national grid and to maximise opportunities to use renewable energy.
- Reduced access to public sector investment need not be an unfavourable outcome for London, provided care is taken to ensure that investment in the charging infrastructure is proportional to demand.

Recommendation 7
In the interest of maximising the environmental benefits electric vehicles have to offer, we recommend that the Mayor develop a more targeted approach to introducing more electric vehicles in the taxi fleet and light goods vehicles on London's roads.

[67] The Metropolitan Police Service remains outside the framework that has already been established. See page 35, Environment Committee transcript, 12 July 2011

Recommendation 8
There is scope to learn more about the technology in use overseas and the potential for it to be replicated in the UK. The Mayor should set out a timescale for discussions with overseas suppliers of pure battery-powered single-decker buses to assess if they are suitable for operation in London, and if so, conduct a trial at the earliest possible opportunity.

Recommendation 9
We recommend that the Mayor improve on the current levels of electric vehicles in the GLA Group fleet by making a new assessment of the potential, to include a breakdown of which types of GLA vehicles are suitable for replacement by electric vehicles currently being trialled, and the total number of potential replacement vehicles.

Appendix 1 Recommendations

Recommendation 1

We recommend that the Mayor publish a revised Electric Vehicle Delivery Plan for London (EVDP). A revised EVDP should clearly set out targets and timescales for implementing the charging infrastructure, and for introducing EVs into the GLA Group fleet. It should also include details on whether existing targets still apply, the rationale for any revisions, and what funding or other action is being taken to ensure that the commitments in the revised EVDP can be delivered. We would wish to see a revised EVDP incorporate the recommendations set out in this report.

Recommendation 2

We recommend that the Mayor commission research on full life-cycle modelling on EV carbon footprints to further inform policy development in the Air Quality Strategy.

Recommendation 3

The Mayor should note the experience of others in the UK, such as Brighton and Hove City Council and the Source East Electric Vehicle charging network, which use electricity from renewable sources. We recommend that the Mayor work with energy suppliers to determine the feasibility and practicality of sourcing electricity for public charge points from renewable energy. The Mayor could look to include a requirement to source a percentage of London's charge points with electricity from renewable energy.

Recommendation 4

A revised EVDP should include analyses of projected demand for an EV public charging infrastructure in London.

Recommendation 5

We recommend that the Mayor build on existing work to raise awareness about electric vehicles, by collating and publishing real time data setting out the location, type and availability of charge points across London, to include charge points located in work places, businesses, and retail and leisure developments.

Recommendation 6

We recommend that the Mayor, in partnership with the Society for Motor Manufacturers and Traders to develop a comprehensive communications strategy to increase public awareness and knowledge

about EVs, and bring about the shift in consumer confidence needed to boost EV uptake in London.

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Appendix 2 Orders and translations

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Hindi

यदि आपको इस दस्तावेज का सारांश अपनी भाषा में चाहिए तो उपर दिये हुए नंबर पर फोन करें या उपर दिये गये डाक पते या ई मेल पते पर हम से संपर्क करें।

Vietnamese

Nếu ông (bà) muốn nội dung văn bản này được dịch sang tiếng Việt, xin vui lòng liên hệ với chúng tôi bằng điện thoại, thư hoặc thư điện tử theo địa chỉ ở trên.

Bengali

আপনি যদি এই দলিলের একটা সারাংশ নিজের ভাষায় পেতে চান, তাহলে দয়া করে ফো করবেন অথবা উল্লেখিত ডাক ঠিকানায় বা ই-মেইল ঠিকানায় আমাদের সাথে যোগাযোগ করবেন।

Greek

Εάν επιθυμείτε περίληψη αυτού του κειμένου στην γλώσσα σας, παρακαλώ καλέστε τον αριθμό ή επικοινωνήστε μαζί μας στην ανωτέρω ταχυδρομική ή την ηλεκτρονική διεύθυνση.

Urdu

اگر آپ کو اس دستاویز کا خلاصہ اپنی زبان میں
درکار ہو تو، براہ کرم نمبر پر فون کریں
یا مذکورہ بالا ڈاک کے پتے یا ای میل
پتے پر ہم سے رابطہ کریں۔

Turkish

Bu belgenin kendi dilinize çevrilmiş bir özetini okumak isterseniz, lütfen yukarıdaki telefon numarasını arayın, veya posta ya da e-posta adresi aracılığıyla bizimle temasa geçin.

Arabic

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العنوان البريدي العادي أو عنوان البريد
الإلكتروني أعلاه.

Punjabi

ਜੇ ਤੁਸੀਂ ਇਸ ਦਸਤਾਵੇਜ਼ ਦਾ ਸੰਖੇਪ ਆਪਣੀ ਭਾਸ਼ਾ ਵਿਚ ਲੈਣਾ ਚਾਹੋ, ਤਾਂ ਕਿਰਪਾ ਕਰਕੇ ਇਸ ਨੰਬਰ 'ਤੇ ਫ਼ੋਨ ਕਰੋ ਜਾਂ ਉਪਰ ਦਿੱਤੇ ਡਾਕ ਜਾਂ ਈਮੇਲ ਪਤੇ 'ਤੇ ਸਾਨੂੰ ਸੰਪਰਕ ਕਰੋ।

Gujarati

જો તમારે આ દસ્તાવેજનો સાર તમારી ભાષામાં જોઈતો હોય તો ઉપર આપેલ નંબર પર ફોન કરો અથવા ઉપર આપેલ ટપાલ અથવા ઈ-મેઈલ સરનામા પર અમારો સંપર્ક કરો.

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