Safety, Sustainability and Human Resources Panel

Date: **17 November 2016**

Item: **Update on the Development of Electric Vehicle Charging Network**

This paper will be considered in public

1 Summary

1.1 Ultra low emission vehicles (ULEVs) are an important part of London's sustainable transport vision and our work to reduce the impact of road transport on air pollution and climate change.

1.2 The term ULEV includes electric vehicles (EVs), plug-in hybrid EVs, range-extended EVs, hydrogen-powered vehicles and any vehicle that emits <75 g/km CO_2.

1.3 Transport for London (TfL) published its Ultra Low Emission Vehicle (ULEV) Delivery Plan in 2015. This was in recognition that coordinated action is needed to help more Londoners switch from conventionally fuelled vehicles to ULEVs.

1.4 Working with private and public sector partners to improve access to reliable charging infrastructure has been TfL's immediate priority in the last few years, as this is a key barrier preventing uptake of these vehicles.

1.5 This paper provides an update on TfL's progress on improving London's charging infrastructure options for EVs and other activity. The key areas of activity on which to update the Panel include:

(a) ULEV Delivery Plan;

(b) Charging Infrastructure Location Guidance;

(c) Rapid Charge Point Network;

(d) London's Go Ultra Low City Scheme (GULCS);

(e) destination/top-up charging;

(f) electric buses and charging technology trials; and

(g) LoCITY (TfL's low emission commercial vehicle programme).

2 Recommendation

2.1 **The Panel is asked to note the progress being made on electric vehicle charging networks in London.**

3 Policy Context

3.1 The Mayor is committed to cleaning up London's air and has proposed bold new measures to remove the most polluting vehicles from London's roads, particularly old, diesel vehicles. TfL is currently consulting on proposals to go further and faster than the confirmed Ultra Low Emission Zone (ULEZ) scheme (which will come into force in central London in 2020) and accelerate the cleaning up of TfL's bus fleet.

3.2 ULEVs are an important part of London's sustainable transport vision, helping to deliver the Mayor's ambition to clean London's air and reduce harmful emissions from transport as they offer the lowest air pollutant and carbon dioxide (CO_2) emissions at tailpipe. Where motorised transport has to be used, for example by public transport services, taxis and private hire and much of the freight industry, we must ensure that these journeys can be and are made by the cleanest vehicle possible.

3.3 In 2014, TfL published the Transport Emissions Roadmap which outlines our air pollutant and CO_2 emissions challenges. It sets out the top ten measures to reduce emissions from road transport in London. This includes the measure "Driving the uptake of Low Emission Vehicles".

3.4 In his manifesto, the Mayor committed to supporting a major expansion in EVs by working with the private sector to deliver EV charging infrastructure.

ULEV Delivery Plan

3.5 Our strategy for encouraging the uptake of ULEVs is set out in the ULEV Delivery Plan. The Delivery Plan sets out 15 actions needed to overcome London's specific barriers to ULEV uptake; these are listed in the Appendix 1.

3.6 The actions are based upon three pillars that are needed to support the uptake of ULEVs. These are:

(a) Infrastructure: To ensure ULEV users have the confidence to charge up or refuel when required;

(b) Vehicles on the roads: Using public sector procurement and regulation, increasing the number of ULEVs in our own fleets and fleets on which we have an influence (e.g. taxis) to increase visibility of ULEVs on London's streets and demonstrate confidence in the technology; and

(c) Marketing and incentives: Using incentives and policy mechanisms to make ULEVs an attractive alternative to petrol and diesel vehicles.

3.7 TfL is working with the boroughs, the Greater London Authority (GLA) and other stakeholders to implement the ULEV Delivery Plan actions. This paper specifically reports on our progress towards improving London's charging infrastructure, which will be vital in enabling more drivers to adopt EVs.

4 Charging Infrastructure Location Guidance

4.1 London needs a coherent network of charging infrastructure if we are to maximise the switch from diesel and petrol to electric. It must serve the needs of all types of EV users, from residents to commercial fleets.

4.2 The ULEV Delivery Plan contained an action that committed TfL to '*Publish guidance on charging infrastructure locations, based on research and stakeholder insight*'.

4.3 This action was set in recognition that boroughs and charge point network operators need evidence-based strategic direction to help to understand where EV charging infrastructure is needed now and in the future. This will be crucial in ensuring all investment in charging infrastructure is effective in meeting the needs of London's future EV users.

4.4 TfL has undertaken a number of pieces of research to understand the likely future charging needs of different EV users, including taxi and private hire drivers, freight operators, residents and car clubs. We are using this research to draft our Charging Infrastructure Location Guidance.

4.5 Our aim is to ensure that public and private sector investment in charge points is directed to the right locations to best support the uptake of EVs. The guidance will be published later this year, along with the studies that have contributed to it.

5 Charging infrastructure projects update

Rapid Charging Infrastructure Project

5.1 The ULEV Delivery Plan highlights rapid charging infrastructure as a key requirement to support the introduction of zero emission capable (ZEC) taxis and private hire vehicles.

5.2 New licencing requirements will require all newly licenced taxis (black cabs) to be 'zero emission capable' from 2018. For private hire vehicles (PHVs), this licencing requirement is from 2020 for new vehicles or 2023 for vehicles over 18 months. A zero emission capable taxi or PHV must have a minimum electric range but can be a plug-in hybrid or range extended vehicle with an internal combustion engine to be used as a back-up if the vehicle runs out of battery.

5.3 Providing a network of rapid charge points across London will help maximise the amount of time taxis and PHVs (and other commercial vehicles) can operate in zero emission battery mode and therefore minimise the use of the polluting conventional internal combustion engine. This will therefore be vital in optimising the air quality and fuel efficiency benefits of the ZEC vehicle.

5.4 Rapid (43kW or 50kW) charge points can provide full charge in approximately 30 minutes. A 15 minute charge from a rapid charge point could provide around 40 miles range, allowing high mileage drivers to top-up quickly without losing productivity.

5.5 We have developed a delivery strategy for rapid charging infrastructure which aims to overcome the two key barriers to private sector investment in new rapid charging infrastructure in London; namely the availability of suitable sites and the cost of obtaining the necessary upgrades to the electricity supply network. With help from the public and private sector, we are identifying charge point locations, and will enable them for use by charge point operators by upgrading power capacity. TfL has secured over £12m from the government for this work.

5.6 Upgraded sites on public land will then be made available to charge point network operators who will be invited to bid for concession contracts to finance, install, operate and maintain rapid charging infrastructure. Operators will be selected from a framework contract established by TfL. Private land owners can apply to TfL for financial assistance to upgrade power capacity at their sites and will be responsible for contracting directly with charge point operators.

5.7 We have identified a list of potential sites including taxi rest and refreshment ranks in Westminster and the City of London, the taxi feeder park at Heathrow Airport, and areas of land adjacent to the TfL Road Network in inner and outer London.

5.8 The framework contracts will be awarded in spring 2017. This will enable the first charge points to go live in summer 2017, coinciding with the first ZEC taxis coming to market.

Go Ultra Low City Scheme (GULCS)

5.9 To help accelerate the provision of EV charging infrastructure in London, TfL, GLA and London Councils have successfully bid for funding through the Office of Low Emission Vehicles (OLEV). In January 2016, London was awarded £13m towards supporting the uptake of ULEVs. This is expected to be supplemented with match-funding from public and private sector sources, including developer contributions.

5.10 London's GULCS programme will help deliver vital charging infrastructure for Londoners. It has four workstreams:

(a) delivering 1,150 electric vehicle charge points across London to support the charging needs of residents without off-street parking;

(b) delivering 1,000 charge points for car clubs, supporting car club fleets to achieve a target of 50 per cent ULEVs by 2025 and to help normalise these cleaner vehicles;

(c) contributing to the delivery of 300 rapid charge points by 2020 for taxi, HGV and commercial fleets as part of TfL's Rapid Charging Infrastructure Project; and

(d) creating ‘Neighbourhoods of the Future’ (NoF), which will promote innovative charging infrastructure, policies and initiatives to support the uptake of ULEVs across different fleets, and develop a knowledge-base that can be shared.

5.11 Central to GULCS will be the establishment of an agreed centralised method for installing, managing and maintaining the charging infrastructure for residents and car club charging networks. Boroughs are keen on a streamlined EV infrastructure delivery process reducing the resource burden on boroughs and unit costs of infrastructure. Installation of the residential and car club charging infrastructure is expected to start in spring 2017.

5.12 Final proposals for the Neighbourhoods of the Future are currently being developed and implementation will begin by the end of the year.

Destination/Top-up Charging

5.13 EV users will occasionally need to use public charge point networks to top-up when away from their homes/depots, accessing them via a membership scheme or pay-as-you-go. We refer to this type of infrastructure as ‘destination/top-up charging’. Two of the main destination/top-up charge point networks in London are Source London and POLAR (run by Chargemaster).

5.14 Source London was set up by TfL and its partners in 2011, using funding from the government’s Plugged-In Places scheme. When this funding ended, the Source London network was transferred via competitive tender to the private sector to continue to expand without reliance on public sector funding. BluePointLondon, part of the Bolloré Group, was appointed in 2014.

5.15 Between them, BluePointLondon and Chargemaster have made public commitments to deliver a total of over 7,000 publicly accessible charge points across London by 2018.

5.16 TfL continues to be an active partner in Source London to help protect its legacy and support its expansion. TfL has worked with BluePointLondon to improve the performance of the Source London network, which has resulted in the network availability improving from 62 per cent in September 2014 to currently over 90 per cent.

6 Electric Buses and Charging Technology Trials

6.1 The ULEV Delivery Plan includes an action to demonstrate and test new technologies and approaches, continuing to lead by example with our bus fleet in developing innovative solutions to reduce emissions from road transport.

6.2 As part of the Ultra Low Emission Zone (ULEZ), we have committed that all single-deck buses passing through the ULEZ will be zero emission at tailpipe, with a total of 300 deployed by September 2020. The number of single-deck electric buses in the fleet is increasing rapidly with 36 currently available for service and the balance of 37 vehicles being added to routes 507 and 521 from now to the end of 2016 to bring these two routes served by electric buses to the full Peak Vehicle Requirement of 51.

6.3 As part of a separate initiative, the world's first double-deck electric buses entered service on route 98 earlier this year.

6.4 Our Zero Emission Urban Bus System (ZeEUS) project is demonstrating the potential for using high power wireless (induction) charging at bus stations, tested using three range-extended (or plug-in hybrid) double-deck buses which are being trialled on route 69. This project will help us understand how wireless opportunity charging on bus routes could enable electric buses to have smaller batteries and therefore reduce the cost of the cleanest buses. The ZeEUS project began in 2013 and is scheduled to finish next year. Our trials started in spring this year and are planned to last for 12 months.

6.5 We are also undertaking the ELIPTIC (Electrification of public transport in cities) project, the aim of which is to expand the electrification of public transport by making use of existing energy infrastructure in cities. TfL is investigating whether the London Underground high voltage network could be accessed for charging electric buses (and, in future, other opportunities such as rapid charging hubs) as an alternative to relying on the public electricity distribution network.

6.6 These projects and our electric bus deployment will provide data and evidence to develop solutions to help the wider deployment of electric bus fleets across London and provide learnings that can be applied to charging infrastructure strategies for other vehicles, such as ZEC taxis.

7 LoCITY (TfL's Low Emission Commercial Vehicle Programme)

7.1 LoCITY is an industry-led collaborative programme designed to improve air quality by lowering emissions from commercial vehicles. LoCITY is preparing fleet operators for the introduction of ULEZ and helping to accelerate uptake of alternatively-fuelled vans and HGVs, including electric and plug-in vehicles.

7.2 LoCITY was launched in January 2016 and is already well-established with over 600 stakeholders actively participating in the programme, representing central and local government, vehicle manufacturers, trade associations and fleet operators.

7.3 The LoCITY working groups have identified a number of barriers to the uptake of plug-in commercial vehicles which LoCITY is working to overcome, including:

(a) Charging Infrastructure: Fleets need more rapid charge points in central London at locations that suit their current duty cycles. We launched an infrastructure map which will allow fleets to suggest new charge point locations. This will support strategic private sector investment and help reduce costs for TfL; and

(b) Electricity network capability: Installing sufficient charge points for large scale adoption of plug-in vehicles can require costly grid upgrades at substation level, for which fleets may be liable. We are facilitating collaboration between UK Power Networks, SSE, Ofgem and other key stakeholders to explore innovative funding mechanisms to overcome this barrier.

7.4 Both of these issues are being addressed through the projects and activities set out elsewhere in this paper.

List of appendices to this report:

Appendix 1 - ULEV Delivery Plan Actions

List of Background Papers:

ULEV Delivery Plan (2015)

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Appendix 1

ULEV Delivery Plan Actions

1. Support stakeholders' aspirations for expanding Source London
2. Identify priority charging and refuelling infrastructure locations, based on research and stakeholder insight
3. Work with car clubs to achieve a target of 50 per cent ULEVs in the London car club fleet by 2025
4. Deploy 1,000 vehicles in GLA Group fleets, including 120 ULEVs in TfL support fleet
5. Increase public awareness and acceptance of ULEVs
6. Deploy a rapid charge point network
7. Provide charging solutions for residents without off-street parking
8. Offer attractive incentives to stimulate ULEV uptake
9. Support the implementation of local air quality schemes
10. Streamline the ULEV and charging infrastructure procurement processes
11. Achieve zero emission capable taxis and PHVs on London's streets from 2018
12. Increase the uptake of ULEVs in freight and fleet organisations
13. Demonstrate and test new technologies and approaches
14. Test and evaluate the application of geofencing for zero emission capable vehicles
15. Ensure London is ready for the commercialisation of hydrogen transport