Electric Vehicle Charging Point Delivery Plan

London Borough of Tower Hamlets

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PEOPLE PASSION PLACES

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1.0 EXECUTIVE SUMMARY

Improving local air quality by reducing emissions from road traffic is a crucial priority for Tower Hamlets. Providing an accessible network of electric vehicle charging points will play a vital role in facilitating the uptake of electric vehicles, which is a necessity to deliver air quality improvements and achieve the Mayor of London's target for a zero emission transport network by 2050.

Electric vehicle ownership in Tower Hamlets is forecast to rise rapidly in the next eight years with an estimated 3500 plus electric vehicles registered to Tower Hamlets residents and businesses by 2025. This represents a huge rise in ownership levels in the borough from just 132 electric vehicles registered at the end of 2016.

With 85% of Tower Hamlets residents without access to off street parking there is a pressing requirement to introduce an accessible range of charging points across the borough to facilitate the growth in electric vehicle ownership. When Transport for London's zero emission capable licensing requirements are introduced for taxis and private hire vehicles (PHVs) from January 2020, the borough will need to provide an accessible charging infrastructure for the large number of taxi and PHV drivers who live here.

A range of electric vehicle charging infrastructures will be required to meet the varied needs of residents and commercial EV users. These will be located in appropriate locations in residential streets, car parks and popular destinations such as High Streets, shopping and leisure centres.

This delivery plan estimates a minimum of 150 accessible charging points will be required to serve the number of electric vehicles located in Tower Hamlets streets by 2025. This would ensure every household is within 500 metres of their nearest charging point. However, the ambition will be to install up to 300 charging points across the borough by 2025.

This document will assist the Council in identifying the most suitable locations and types of charging infrastructure required to encourage electric vehicle uptake and meet growing demand for charging facilities across the borough.

The delivery plan is supported by an evidence base and incorporates latest guidance, providing a robust set of recommendations and actions, which compliment the delivery of the Council's Air Quality Action Plan and vision for a climate-friendly transport future.

2.0 CLIENT REQUIREMENTS

Project Centre Ltd (PCL) has been commissioned by the London Borough of Tower Hamlets (LBTH) to produce a delivery proposal for the installation of electric vehicle charging points (EVCPs) throughout the borough and to assist with the implementation of outputs identified within this document.

The main requirements of the brief were to:

- Review current and projected growth in EV ownership levels across the borough.
- Identify the number, locations and range of EVCP's required to encourage EV take up and meet increasing and varied demands.
- Identify cost neutral funding options for rolling out EVCP networks and partnership delivery.
- Link to LBTH's Air Quality Management Plan and relevant sustainable transport polices including the draft Mayors Transport Strategy 2017.
- Provide an options appraisal of the types of EVCP available and the process for installation.
- Provide a methodology for site identification, incorporating TfL best practice guidance. Addressing challenges associated with installations, such as accessibility, loss of parking spaces and electricity supply.

3.0 INTRODUCTION AND BACKGROUND

Electric vehicles (EVs) and their charging infrastructure are a rapidly evolving technology which has the potential to offer great benefits to London's residents, businesses and visitors, both in terms of health, reduced transport costs and the environment. Uptake of EVs are considered a key tool for decarbonising transport emissions related to climate change and are an essential component for improving local air quality and reducing premature deaths and health risks associated with exposure to toxic air.

Central and Local Government are actively pursuing schemes which will facilitate the adoption of EV's, working in partnership with EV manufacturers, charge point operators and private business.

Demand for EVs has increased exponentially over the last 5 years and is projected to expand rapidly over the next 30 years. It is important that there is sufficient and accessible charging infrastructure to support this transition to low emissions electric vehicles.

The draft Mayors Transport Strategy, 2017 (MTS) contains ambitious plans to make London's transport network zero carbon by 2050, which will deliver essential improvements in air quality. This will require all vehicles to have zero exhaust emissions by that date. To achieve this, there will need to be a complete switch from fossil fuelled (petrol and diesel) vehicles to ultra low emission vehicles (ULEVs), which emit no air pollutants from the exhaust when driven in zero emission mode.

An ULEV is a collective term for all vehicles that can operate with zero exhaust emissions and include battery electric vehicles, plug in hybrid electric vehicles, and range extended electric vehicles. This delivery plan focuses on the infrastructure required to support these electric vehicles, which will be inclusively referred to as EVs throughout this document.

LBTH recognise their role in supporting the uptake of EVs and this delivery plan will provide guidance on identifying the appropriate EVCP infrastructure, located in the right places to support electric vehicle uptake and meet future demand for charging facilities across the borough.

3.1 Policy Context

Air Quality and Sustainable Transport objectives

The primary benefits of EVs are their ability to reduce carbon emissions and to improve air quality.

Air quality

Air quality has become a key issue in recent years as the UK struggles to meet its legal obligations to control levels of pollutants in the air. Since 2000, the whole of Tower Hamlets has been a designated 'Air Quality Management Area' (AQMA) for Nitrogen Dioxide and Particulate Matter.

Currently, motorised road transport is responsible for half of the main air pollutants, with cars contributing around 14% of nitrogen oxides (NOx) and 56% of particulate matter less than 2.5 microns in diameter (PM2.5) emissions – some of the pollutants that are most harmful to human health. EVs offer a solution to this problem as they operate with no tail pipe emissions.

Sustainable Transport

Over the last 15 years, transport planning policies in London have developed a greater emphasis on reducing private car usage through encouraging the use of low carbon, sustainable transport, a modal shift which appears to have had positive impact. According to the GLA, public and active transport now account for 64% of all one-way commuter movements in London.

However, London continues to suffer heavy congestion and deteriorating air quality from the effects of the movement of people, goods and services.

33% of journeys are still being made by private transport (ULEV Delivery Plan, 2015). Tower Hamlets' Local Implementation Plan (LIP) stresses the importance of creating a 'sustainable transport system that contributes to a better quality of life for all who live and work in the borough'.

LBTH's Sustainable Transport Strategy, 'Making Connections', conveys the Council's vision for the development of a transport system that is environmentally, climate and people friendly.

Primarily, in regard to transport, LBTH need to encourage sustainable travel behaviour by:

- Promoting innovative technological change and cleaner vehicles
- Reducing emissions from public transport and public transport fleets (Bus/Taxi)
- Using emissions control schemes to reduce emissions from private vehicles

- Best Practice from London and elsewhere

The OLEV 'Go Ultra Low City Scheme' (GULCS) scheme has resulted in funding for four exemplar cities to develop innovative EV policies and schemes. London is one of these cities and is also one of the leading European cities for EVs. Oslo, Amsterdam and Paris are also key examples. This research has informed recommendations made in this strategy.

- Future Innovations

EVs and EVCPs are new technologies which are developing rapidly due to high levels of investment from the automotive and other industries. Essentially, the capability of chargers and the size of batteries are expected to improve significantly. In 2017, the speed of commercially available chargers has increased by over 300%. Similarly, the range of vehicles expands year on year.

The transition to EVs will place new demands on the electricity generation and distribution infrastructure across the country. No longer will the petrol station network take the burden of this energy supply. For this reason, 'smart charging' which can manage chargers impact on the grid will emerge as a key technology.

4.0 EV'S IN TOWER HAMLETS - CURRENT SITUATION

4.1 EV Ownership

The latest Department for Transport figures (2016) confirm there are 84, 884 electric vehicles registered in the UK. Figure 1, below, shows the steady growth in the numbers of plug-in electric vehicles licensed in the UK from 2011 to 2016. Of the 7,974 vehicles registered in London (Q4 of 2016), only 1.66% (132 vehicles) were from Tower Hamlets.

Figure 1: Registered EV ownership figures

	2011(Q4)	2012(Q4)	2013(Q4)	2014(Q4)	2015(Q4)	2016 (Q4)
Tower Hamlets	16	8	26	46	86	132
London	896	1,042	1,399	2,704	5,015	7,974
UK	2,441	5,040	8,593	22,925	49,331	84,884

Figure 2 graphically represents the growth in EV ownership in Tower Hamlets within the same time frame (2011-2016). Although figures appear to have declined between 2011 and 2012, ownership levels are sixteen times higher in 2016, than they were in 2012. The sharp incline shown in the graph is a positive, and a strategy, in the form of this EVCP delivery plan, is required to ensure adequate charging facilities are installed over the next few years to support the continued growth in EV ownership.

Figure 2 – Rising trend in EV ownership in Tower Hamlets

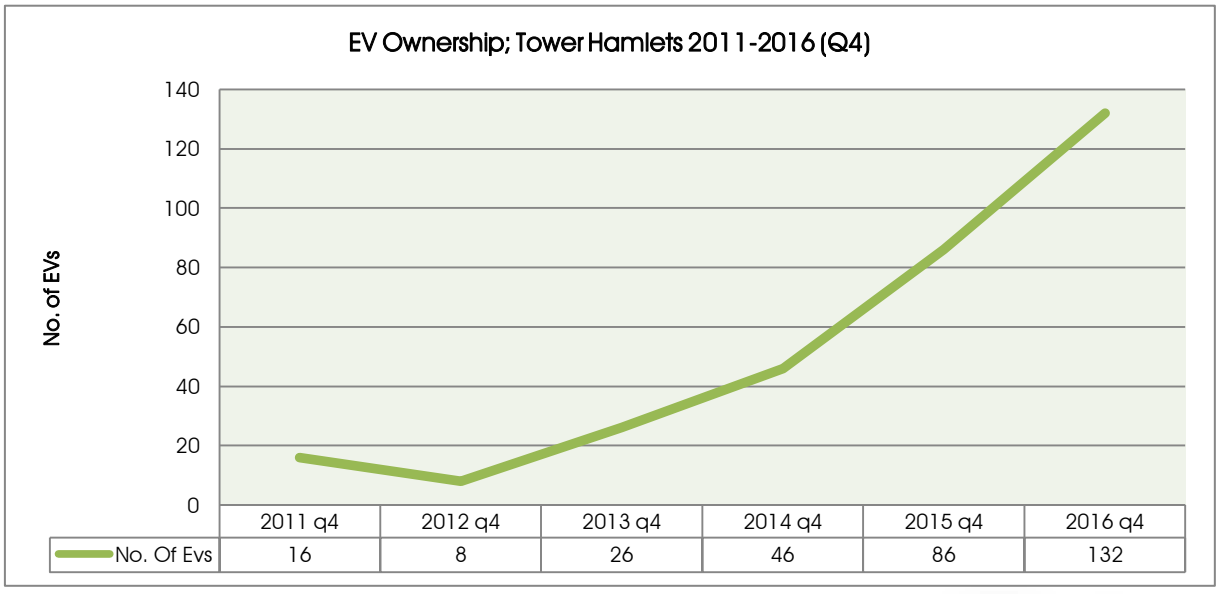


Figure 3, below, shows the number of registered EVs per borough (in 2016). Westminster (691) and Barnet (696) had the highest number of EV's registered, whilst Tower Hamlets (132) had the 8th lowest of all 33 boroughs.

The colour coding in Figure 3 also provides data on the proportion of EVs as a percentage of the total number of registered vehicles in each borough. The 132 EVs in LBTH represent under 0.5% of the total registered vehicle stock in the borough. The boroughs with the highest proportions of EVs in their vehicle stocks were Camden, Westminster, Islington, and Kensington and Chelsea, where EVs made up more than 0.6% of the total vehicle stock. The UK average is 0.24%

Figure 3: Number of registered EV's per borough (Q4, 2016) and proportion of total vehicle stock. (Source: TfL, 2016)

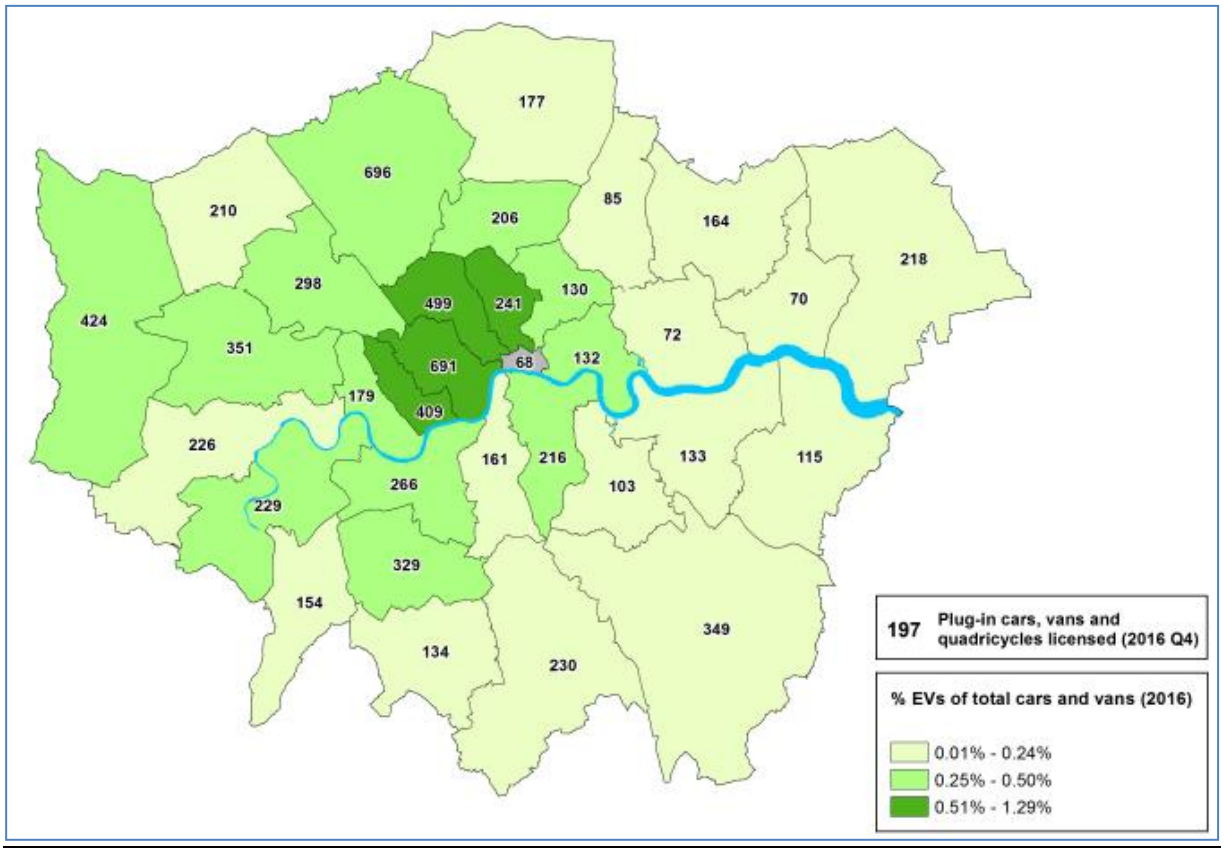
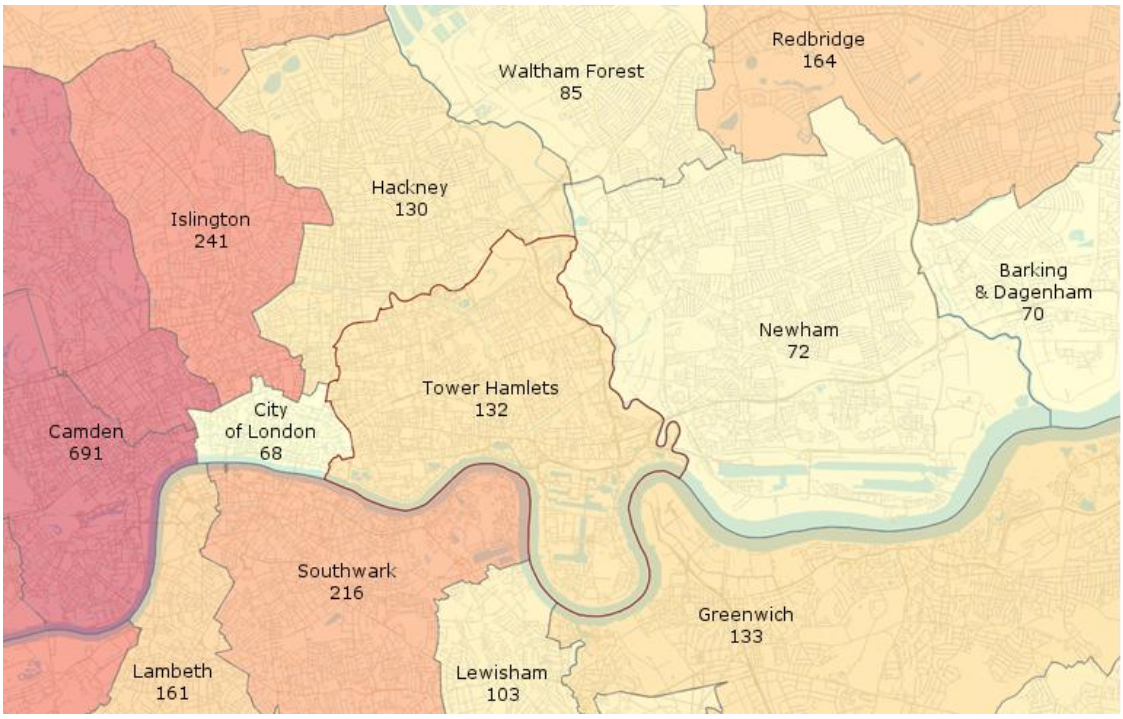


Figure 4 provides a more detailed version of the map shown in Figure 3, depicting the number of EVs within Tower Hamlets and its surrounding neighbours. Camden had the highest number, whilst surprisingly, only 130 EVs were registered in Hackney, despite the roll out of a range of EVCP infrastructure including some of London's first Rapid Charging installations.

Figure 4: LBTH and surrounding boroughs registered EV ownership gives for Q4, 2016.



4.2 Future EV uptake scenarios

Transport for London (TfL) has modelled scenarios of predicted uptake of EVs by 2020 and 2025.

Figure 5 tabulates this projected uptake of EV's based on an average (baseline) scenario and a high scenario.

Both scenarios are ambitious and assume that the speed of EV uptake from now until 2025 accelerates from current growth rates. This will require strong policy interventions from both central and local government, of which the Mayors Transport Strategy, the London Plan and the LIP3 delivery plan mechanism will provide important policy and funding support for enabling boroughs to stimulate EV uptake

rates, through the provision of accessible charging infrastructure and incentives.

Figure 5: Projected uptake of EVs based on an average (baseline) and high scenarios. (Source, TfL 2016)

	Baseline scenario			High scenario		
Borough name	2015	2020	2025	2015	2020	2025
Barking and Dagenham	21	309	1,038	21	399	4,210
Barnet	332	2,200	9,215	332	4,741	16,337
Bexley	142	1,128	4,440	142	2,127	10,247
Brent	153	1,208	4,768	153	2,293	8,551
Bromley	119	1,053	4,034	119	1,860	12,677
Camden	131	1,060	4,169	131	1,984	6,151
City of London	16	106	447	16	232	525
Croydon	216	1,661	6,618	216	3,214	13,322
Ealing	157	1,263	4,963	157	2,373	11,270
Enfield	110	966	3,695	110	1,710	10,835
Greenwich	53	444	1,714	53	808	6,065
Hackney	64	536	2,080	64	981	4,018
Hammersmith and Fulham	85	577	2,390	85	1,216	4,615
Haringey	98	716	2,897	98	1,433	6,295
Harrow	153	1,078	4,428	153	2,226	10,718
Havering	67	788	2,777	67	1,162	8,805
Hillingdon	243	1,598	6,764	243	3,469	17,541
Hounslow	78	728	2,741	78	1,235	7,070
Islington	137	916	3,831	137	1,964	5,397
Kensington and Chelsea	127	802	3,431	127	1,794	5,917
Kingston upon Thames	101	716	2,933	101	1,468	7,453
Lambeth	56	476	1,840	56	864	5,098
Lewisham	36	386	1,398	36	599	5,298
Merton	52	506	1,890	52	839	5,105
Newham	31	311	1,136	31	501	4,157
Redbridge	173	1,208	4,970	173	2,506	11,261
Richmond upon Thames	276	1,719	7,372	276	3,872	11,839
Southwark	48	435	1,654	48	758	3,636
Sutton	79	688	2,648	79	1,224	8,103
Tower Hamlets	123	871	3,553	123	1,784	5,567
Waltham Forest	71	650	2,457	71	1,117	6,512
Wandsworth	195	1,310	5,460	195	2,793	10,022
Westminster	204	1,314	5,593	204	2,893	7,832

The projected EV uptake figures for LBTH indicate a rapid rise in registered EVs by 2025. Even the more reserved baseline estimate predicts 3553 EVs (a 2700% increase on the 132 EV currently registered) parked in the borough by 2025. The actual figure could be even higher if the high scenario uptake estimate of 5567 is achieved. To ensure these forecasts can be accommodated, a substantial charging infrastructure installation programme needs to be rolled out across the borough, as a priority.

Further analysis of the EV uptake forecasts for Tower Hamlets, and how this translates into future demand for EVCP's, is provided in the Recommendations and Action Plan sections of this Delivery Plan.

4.3 Existing EVCPs in Tower Hamlets

There are currently EVCPs operating at eleven locations within LBTH, detailed in Figure 6 and 7. However they are all operated on private property and therefore not entirely publically accessible. They are located in a mixture of hotels, supermarkets, and shopping centre car parks with tariffs, with the majority concentrated in the Canary Wharf area. Overall, there is very little publically accessible EVCP provision within the borough which suggests the majority of current EV users registered in LBTH either have access to off-street charging facilities or travel out of the borough to charge.

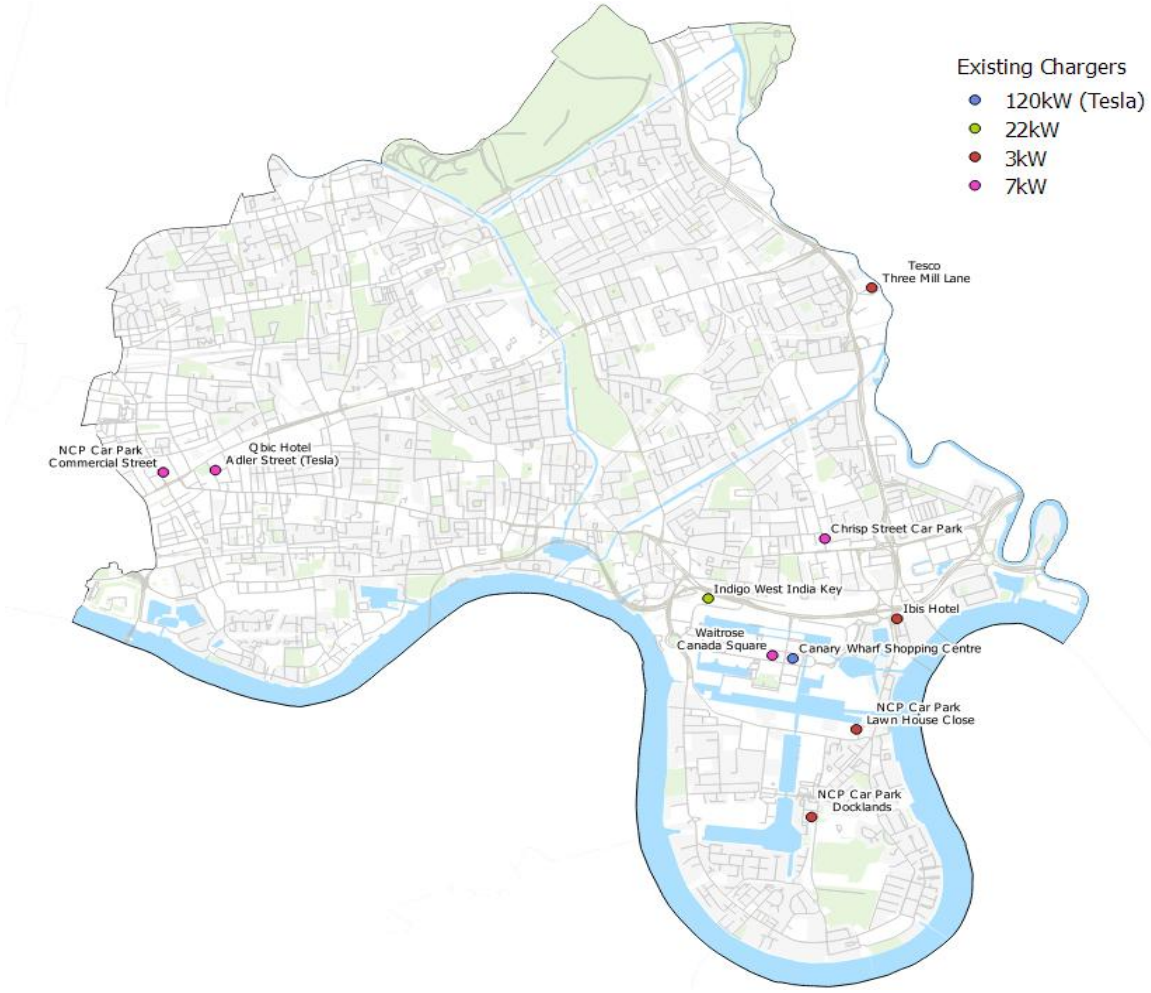
Figure 6: Existing Charge Point locations and tariffs in Tower Hamlets

Location	Post Code	Supplier	Location Type	Costs	Additional Information
NCP Car Park, Docklands	E14 9GL	Chargemaster, 3kW	Public Car Park; 1 device	Legacy Source London point; Free to Use POLAR Plus; Free to Use POLAR Instant; £1.20 connection fee only	Parking charges may apply
NCP Car Park, Lawn House Close	E14 9YQ	Chargemaster, 3kW	Public Car Park; 1 device	Legacy Source London point; Free to Use POLAR Plus; Free to Use POLAR Instant; £1.20 connection fee only	Parking charges may apply
Canary Wharf Shopping Centre (Tesla)	E14 5EW	Tesla, 120kW	Retail Car Park; 4 devices	Free for Tesla drivers	Parking charges May apply
Canary Wharf Shopping Centre	E14 5EW	Chargemaster 7kw	Public Car Park; 14 devices	POLAR - Plus: Free to use; Instant: £1.20 connection fee	Parking charges May apply
NCP Car Park, Commercial Street	E1 7PE	Chargemaster, 7kW	Public Car Park; 2 devices	Legacy Source London point - free to use; POLAR - Plus: Free to use; Instant: £1.20 connection fee only	Parking charges may apply
Waitrose, Canada Square	E14 5EW	Chargemaster, 7kW	Retail Car Park; 7 devices	POLAR PLUS Subscription: RFID Card - £7.85/month. POLAR INSTANT PAYG App – Min £20 balance to start. POLAR PLUS – free to use or 10.8p/kWh	Parking charges may apply £200/year
Ibis Hotel	E14 9PE	Chargemaster,	Hotel; 1	POLAR Plus; Free to Use	N/A

		3kW	device	POLAR Instant; £1.20 connection fee only	
Indigo West India Key, (Tesla)	E14 4AN	Tesla, 22kW	Hotel; 1 device	Free to use for customers	N/A
Chrisp Street Car Park	E14 6LL	Chargemaster, 7kW	Public Car Park; 2 devices	POLAR Plus RFID Card – Free to Use or £1.20 connection fee only via the app	Carpool members only
Tesco, Three Mill Lane	E3 3DA	Elektromotive, 3kW	Retail Car Park; 1 device		Parking charges may apply
Qbic Hotel, Adler Street (Tesla)	E1 1EE	Tesla, 7kW	Hotel Car Park; 1 device	Free to use for customers	N/A

The locations of these existing charging points in Tower Hamlets are shown in Figure 7 below.

Figure 7: Existing Charge Point locations in Tower Hamlets

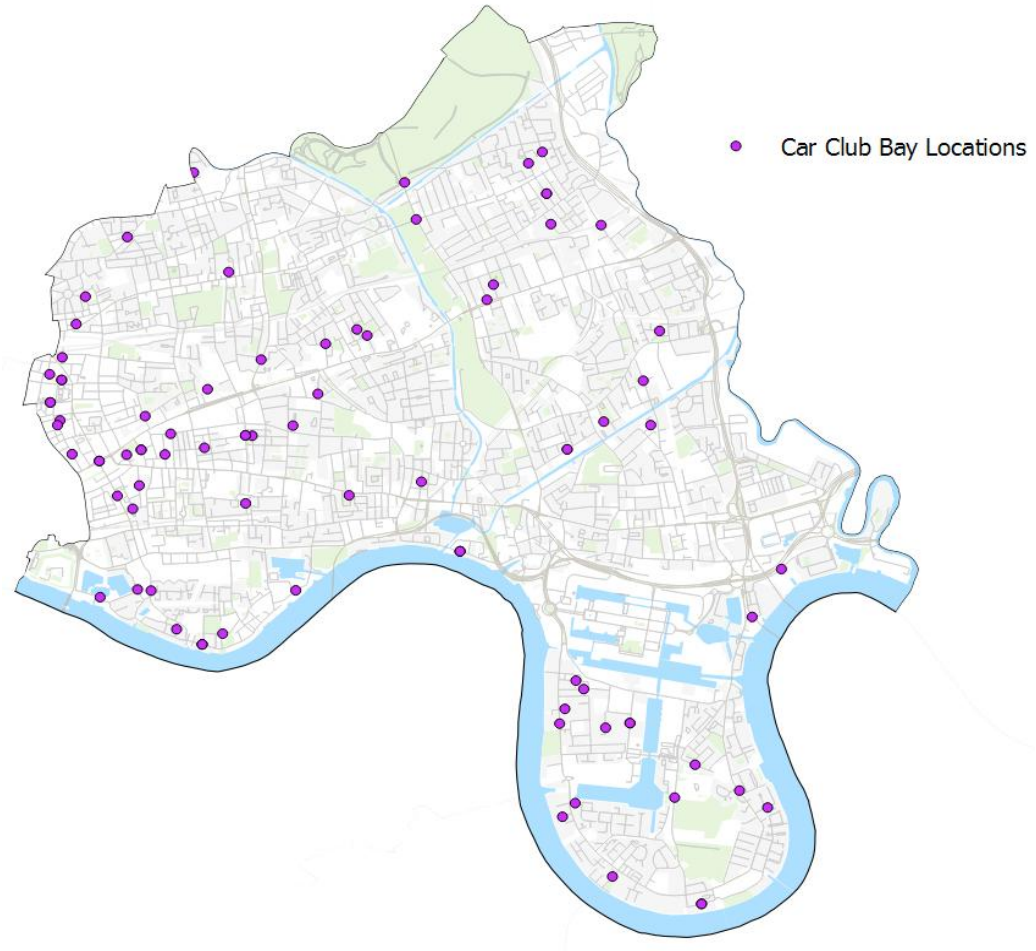


4.4 Car Clubs in Tower Hamlets

Car club services provide an alternative to private car ownership, helping reduce pressure on kerbside parking space, reduce car dependency and unnecessary car use. Car club fleets are usually under one year old and less polluting than most privately owned vehicles. Diesel vehicles have been removed from the vast majority of fleets and an increasing number of operators, including Zipcar and the DriveNow flexible service, offer access to EVs which, in addition to reducing emissions, increases public awareness of EVs and helps 'normalise' their everyday use.

There are currently 126 car club bays within LBTH at 86 separate locations, highlighted by Figure 8, which are utilised by two car club operators: ZipCar and Enterprise City Cars. In addition, E-Car club also operates EVs from two off-street locations: Chrisp Street car park and from the Guerin Square car park on Coborn Road.

Figure 8. Car club locations in Tower Hamlets.



4.4.1 Flexible ULEV car sharing services

Zipcar are soon to offer their customers in Tower Hamlets flexible car club services, similar to the current DriveNow flexible service operating in other parts of London. This will enable Zipcar customers to either return their vehicles to a designated car club parking bay or leave the vehicle elsewhere within the operating area for one-way journeys. Zipcar are planning to introduce the service in Tower Hamlets by the end of 2017 and the fleet will consist of 30-40% EVs, supported by a network of rapid charging facilities located in off-street locations. Providing access to an accessible EVCP network throughout the borough will enable all car club operators to convert larger numbers of their fleets to EVs.

TfL's ULEV Delivery Plan has a target for at least 50% of car club fleets in London to be electric by 2025 and acknowledges car club services have great potential to introduce drivers to EVs and encourage them to switch from fuel and diesel fuelled vehicles.

The majority of LBTH's 126 car club parking bays can be converted by installing fast chargers, which would give the car club EV a top-up charge in between customer bookings and would fully recharge vehicles within 3 hours. These could either be floor standing chargers or via lamp post charging technology if a suitable post could be upgraded to accommodate fast charging capabilities. The benefit of lamp post charging is the lower installation cost and flexibility to move the units if required, however most suitable lamp posts can only accommodate the slower standard charging infrastructure and are yet to be tested in a real car club operating scenario.

LBTH will need to support the expansion of car clubs and identify suitable car club parking bays where EV charging infrastructure can be installed for EV car club fleets. Further details regarding opportunities to electrify car club fleets are provided in the Recommendations and Action Plan section.

5.0 POLICY CONTEXT

5.1 LBTH Air Quality Action Plan 2017-2022

LBTH's Air Quality Action Plan (AQAP) outlines what the Council aims to deliver over the five year period (2017-2022), to improve local air quality by reducing concentrations of pollutants and exposure to pollution.

The plan highlights the biggest source of air pollution in the borough, 53%, is from road traffic emissions. The remaining emissions originate from construction machinery, river traffic and aviation.

Worryingly, around 40% of Tower Hamlets residents live in areas with unacceptable air quality, with 37 Primary Schools and 11 Secondary Schools located in areas where air pollution exceeds legal limits. Studies, including one carried out in Tower Hamlets, have shown that children's health is being negatively affected living in highly polluted areas. Therefore, urgent action is required to reduce emissions and exposure to toxic air.

To do this, the AQAP contains the following objectives which make direct reference to the need to support the uptake of EVs.

- Increased usage of low emissions transport by installing EVCPs
- Greater engagement and awareness with businesses and schools to help reduce their own impact on air pollution
- Ensuring new developments across the borough do not adversely impact the local air quality – use planning systems to ensure charging points are provided where parking is offered, and ensure residents have access to a ULEV car club.

The AQAP actions are grouped into 9 themes. Figure 9 summarises the AQAP actions which directly support the measures identified within this EVCP Delivery Plan.

Figure 9. AQAP actions with direct link to the EVCP Delivery Plan.

AQAP Theme	Why	Action / link with EVCP Delivery Plan
Delivery servicing and freight	Vehicles delivering goods and services are usually light and heavy duty diesel-fuelled vehicles with high primary NO2 emissions.	Use the procurement process to encourage sustainable logistics for deliveries. Review freight consolidation of deliveries.
Borough fleet/contracted fleet actions	LBTH uses 200 fleet vehicles, mostly diesel. Need to replace with ULEV and lead by example to reduce emissions.	Increase no. of EVs in fleet Ensure LBTH contractors (e.g waste collection) use as cleaner vehicles as possible. Procurement: Insert requirement for ULEZ fleets in future contracts.
Localised solutions	LENs and ZEN. Reduce vehicle emissions in targets pollution hotspots to improve the environment of neighbourhoods.	Zero Emissions Network (ZEN) business engagement to take up EV fleets for deliveries and serving with provision of EVCPs. Low Emissions Neighbourhood LENs) installing EVCPs and priority access for EVs.
Cleaner transport	Increasing proportion of EVs in car club fleets	Electrification of car club bays and fleets
Cleaner transport	Transport accounts for over half (53%) the pollution emissions in the borough.	Encourage low emissions travel by installing public electric vehicle charge points, both residential and rapids for taxis and commercial fleets. Review parking charges to incentivise EVs, based on emissions.
Lobbying and partnership working	Air pollution is a complex issue. There needs to be a coordinated approach from all stakeholders.	Work with TfL to ensure the Inner London ULEZ for all non compliant vehicles is introduced by 2021. Lobby TfL for ULEV bus fleets operating in Tower Hamlets. Engage with policy makers to ensure policies adequately address the issue of air quality.

Figures 10 and Figure 11 show the variations in concentrations of the pollutants of concern, NO_2, PM_{10} & $PM_{2.5}$, across the borough. Figures 12 and 13 highlight the traffic sources of these pollutants.

Figure 10. NO_2 emissions in Tower Hamlets. Source GLA (2013)

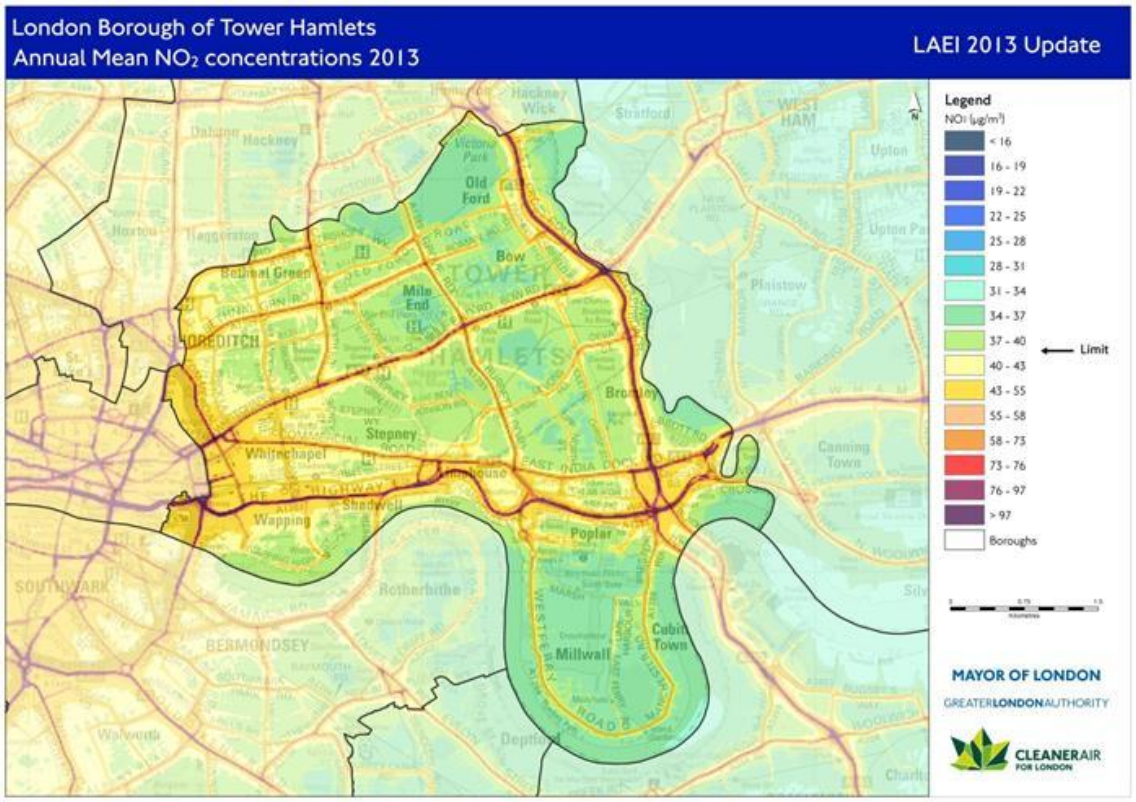
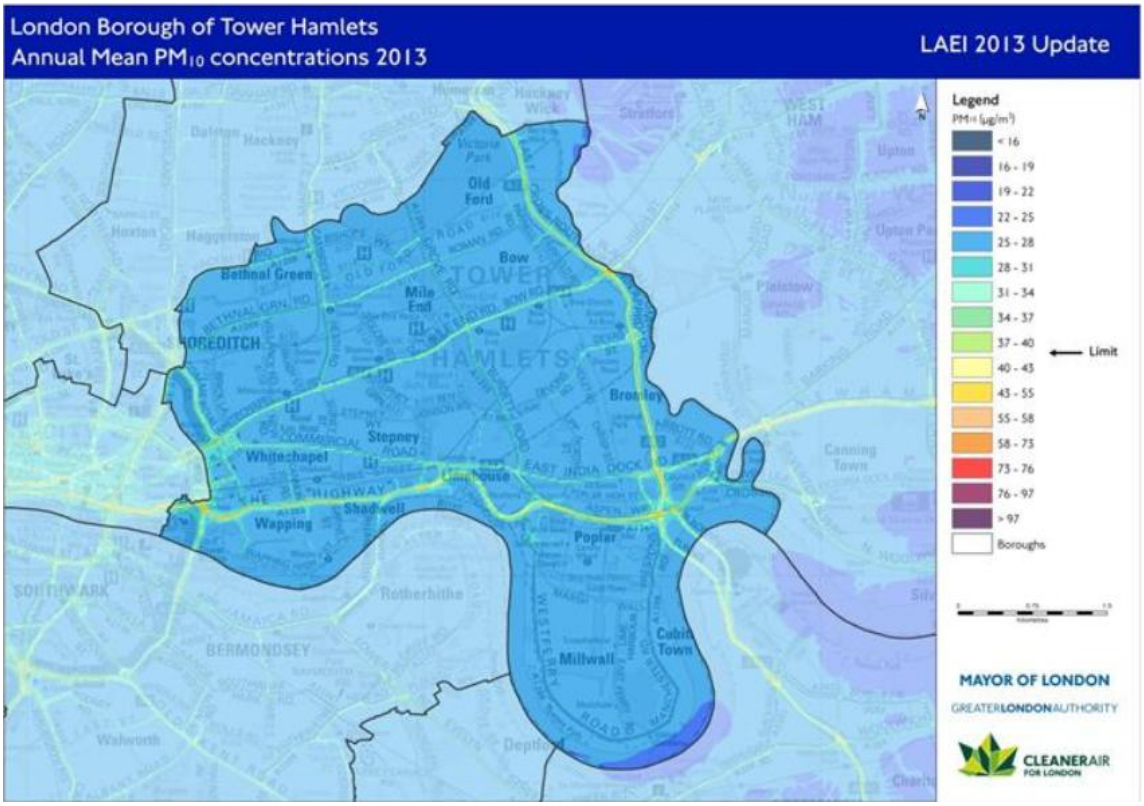


Figure 11. PM_{10} emissions in Tower Hamlets. Source GLA (2013)



The NO_2 and PM_{10} pollution hotspots are unsurprisingly along the main road networks through the borough, in Aldgate, Limehouse and Bromley-by-Bow. However, higher NO_2 levels appear to effect larger areas of the borough.

Figure 12 displays the main transport source of NO_2 with diesel vehicles, vans and mini buses, large HGV's, TfL buses being the main emitters. Petrol cars only account for 10%.

Figure 12. NO_2 emissions from road transport in Tower Hamlets.

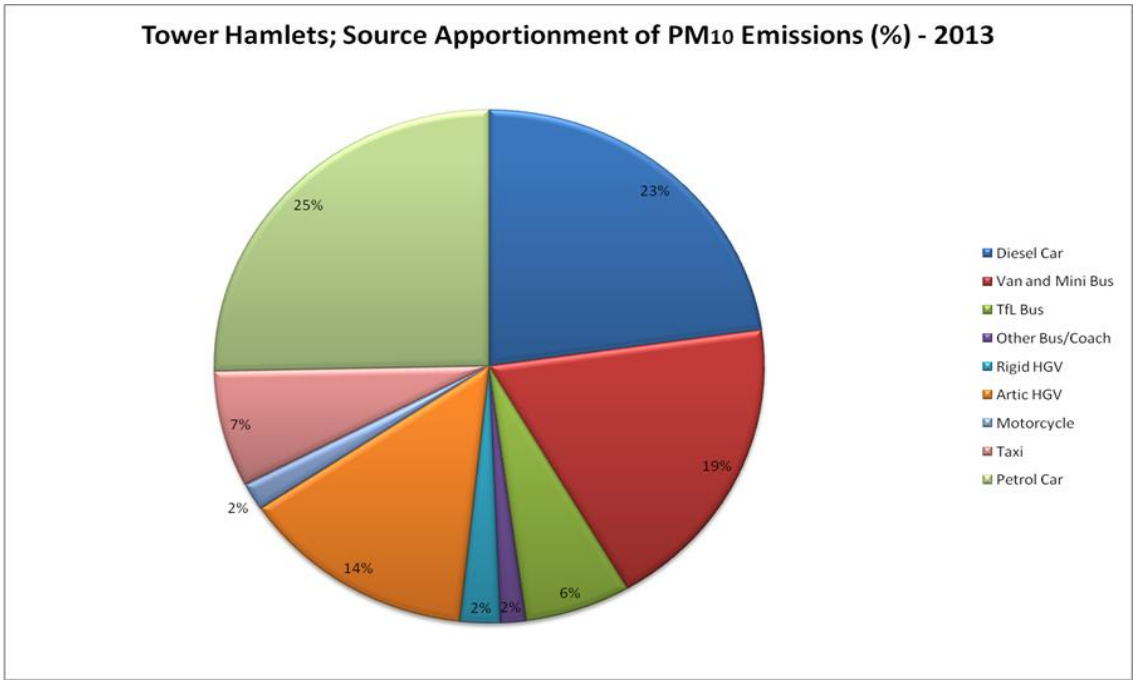
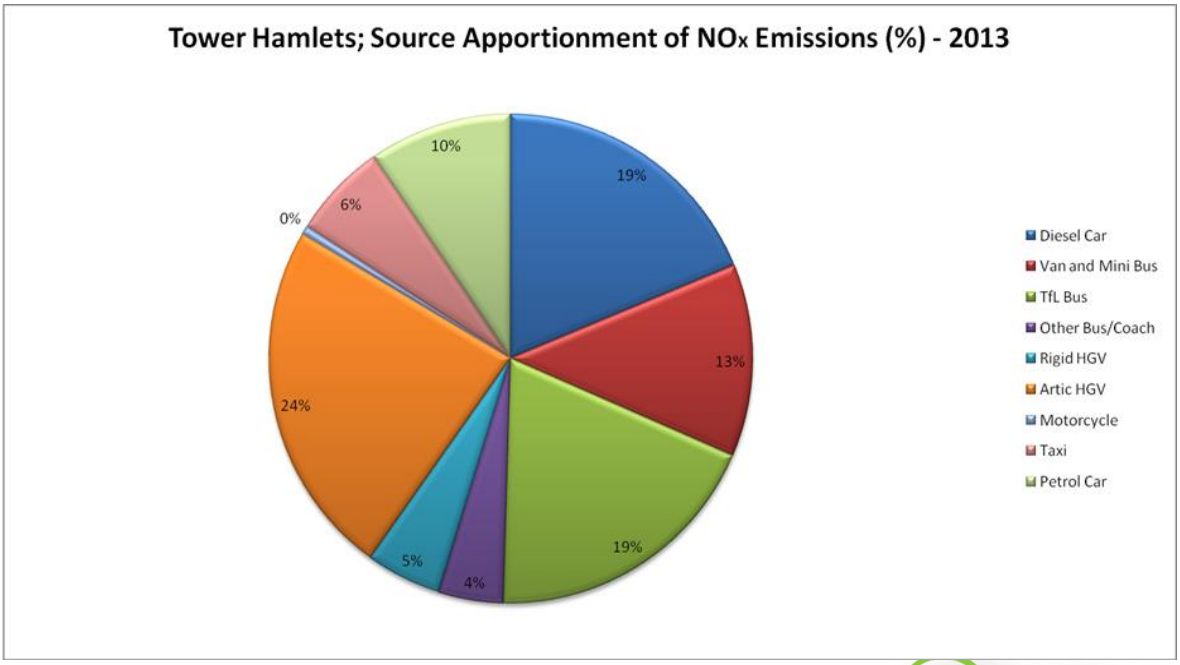


Figure 13 displays the main PM_2 emissions from road transport in Tower Hamlets. Petrol cars are the largest emitters, followed by diesels, vans and mini buses and large HGVs.

Figure 13: PM_{10} emissions from road transport in Tower Hamlets.



5.2 Tower Hamlets Local Implementation Plan (LIP), 2011-31

The document informs the basis of future transport and highways capital investment aimed at delivering local priorities and the objectives of the Mayor of London's Transport Strategy.

The core LBTH Borough Transport Objectives were set as:

Objectives

- To promote a transport environment that encourages sustainable travel choices for all
- To ensure the transport system is efficient and reliable in meeting the present and future needs of the borough's population
- To ensure the transport system is efficient and reliable in meeting the present and future needs of the borough's population and economy
- To reduce the impact of transport on the environment and wellbeing
- To encourage smarter travel behaviour

Concerns

- Tower Hamlets produces the second largest amount of CO_2 of the 33 local authorities in London, of which only 14% comes from transport sources
- Traffic flows have steadily increased within Tower Hamlets over recent years
- Approximately 1000 additional parking spaces are being provided each year associated with new development

Solutions

- Encouragement of carbon-efficient travel behaviour, improving operational efficiency of the highways network and managing travel demand
- Encouraging the switch from conventional combustion engine vehicles to alternative technologies
- Promote and maximise the sustainable, safe, reliable and efficient movement of freight by water, rail, electric vehicles and cycle deliveries. This will help to relieve pressure on the strategic road network
- Support the use of taxis by incorporating taxi ranks as part of public realm and streetscene improvement schemes and consider electric taxis
- Utilise the strong Car Club presence already in Tower Hamlets to further expand the Electric Vehicle Charging programme, through encouraging Operators to trial electric vehicles and charging points to their network

- Cleaner Council vehicles fleet
- Electric Vehicle Charging Programme – provide charge points, especially within the Clean Zone area and in workplaces and encourage private land owners to sign up to the TfL Electric Vehicle plan.

5.2.1 LIP3

A revised long term Borough LIP (LIP 3) will be drafted for implementation from April 2019. The new draft Mayor's Transport Strategy and draft LIP3 guidance has been circulated and the final guidance will be issued in February 2018. Further details regarding policy content in the MTS3 in relation to EVs is covered later in this section.

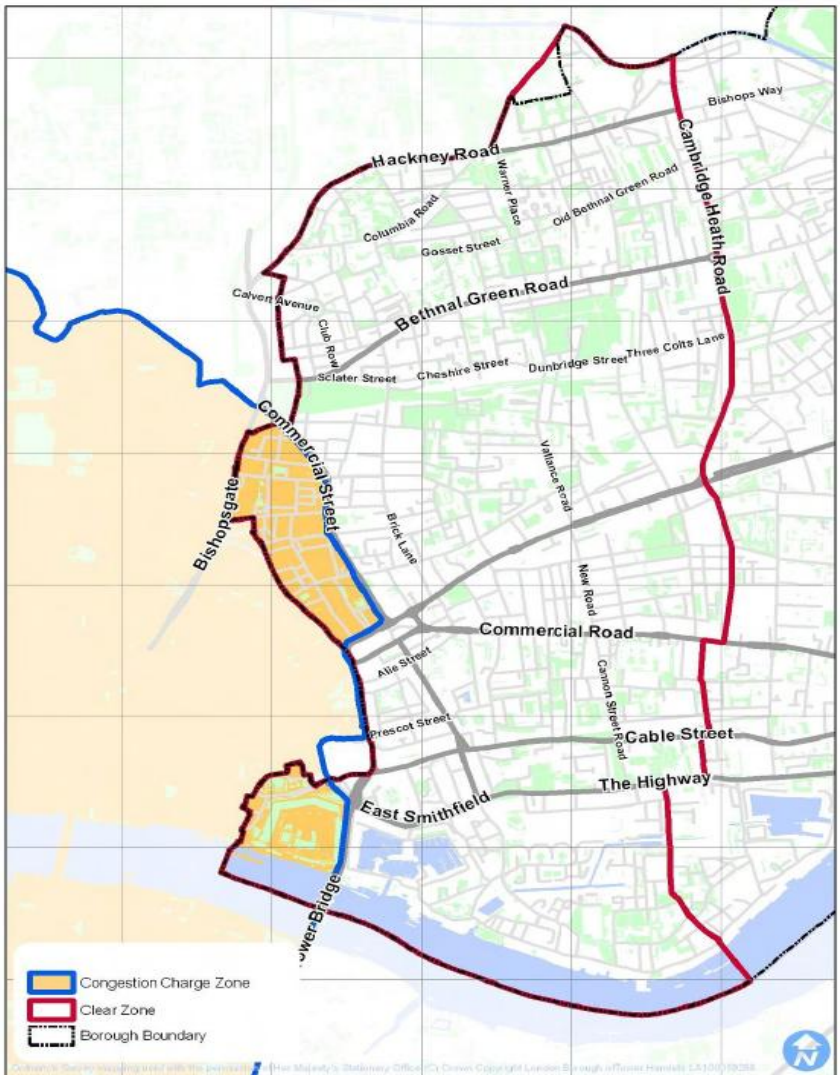
5.3 Tower Hamlets Clear Zone Plan – 2010-2025

Tower Hamlets is declared an Air Quality Management Area due to the high concentration of NO_X and PM_{10} caused largely by traffic on major roads in the borough, as shown in Figures 10 and 11. The hotspots in Tower Hamlets are found in Aldgate, Limehouse and Bromley-by-Bow. Interventions to reduce the sources of air pollution from transport are focussed on reducing the use of polluting vehicles, including encouraging the use of EV's.

The Clear Zone largely consists of high density residential districts and includes the busy commercial areas along Whitechapel Road and Bethnal Green Road as well as the popular leisure destinations of Spitalfields Market and the Brick Lane area.

The Clear Zone covers an area of approximately $9km^2$ in the west of the borough a shown in Figure 14.

Figure 14: The clear zone boundaries



5.3.1 New Technology

The overarching objective in the Clean Zone Plan is to reduce pollutant emissions. The measures described support use of cleaner vehicles and the removal of pollution from the air.

As Tower Hamlets moves towards becoming an 'Electric Vehicle Borough', the Clear Zone will be an area where innovation is encouraged and new approaches supported.

The Clear Zone will promote adoption of EVs by having a network of publicly accessible EVCPs.

5.3.2 Electric Vehicle Hub

A short term plan is to deliver a high concentration of charging points; six points in one square to create a 'mini hub' of charging points. The location selected will reflect TfL's research on the demographics of early owners of EVs.

5.3.4 Electric Vehicle Car Club Network

Given the strong Car Club presence already in Tower Hamlets and the Clear Zone, there is an opportunity to work with the Car Clubs to introduce EVs and their respective charging points on to their networks. The Clear Zone plan outlines that an electric van club would be formed for local businesses within the Clear Zone. The initial location for the van club would be based upon consultation with local business groups, but potential locations were Brick Lane and Whitechapel Road.

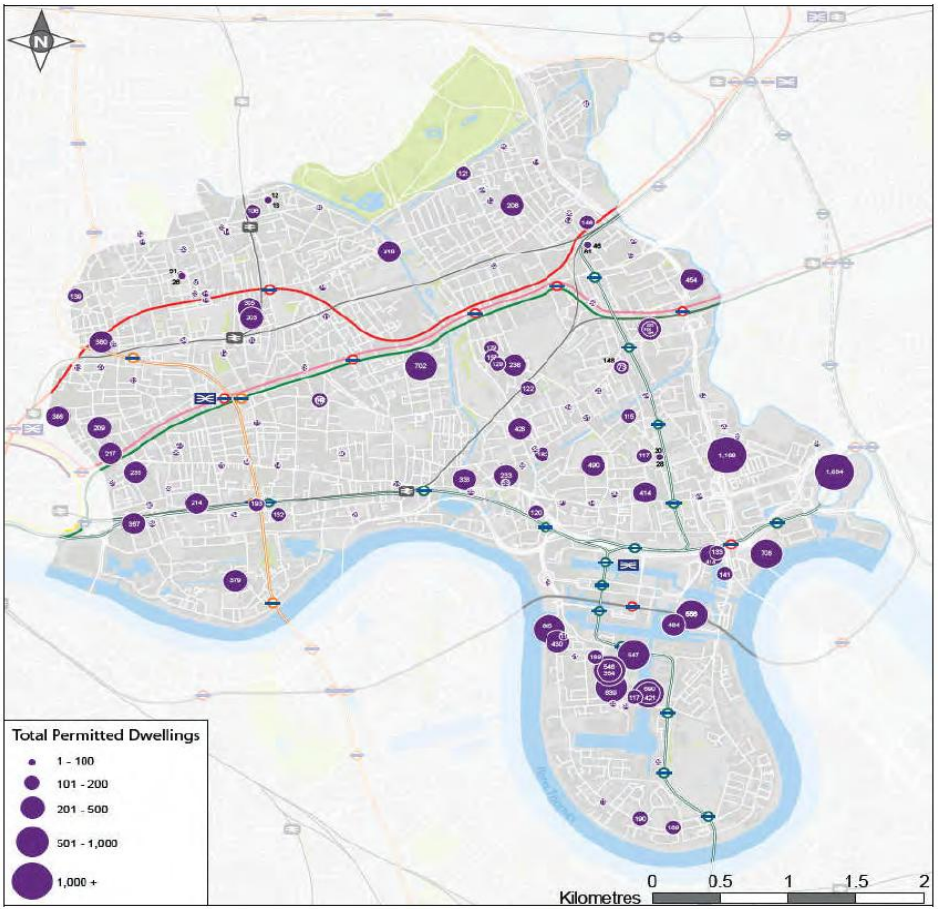
5.3.5 Local Low Emission Zone

Emissions control schemes can drive the uptake of cleaner vehicles, using charging as a tool to enforce higher emissions standards.

5.4 Promoting EV use in new residential developments

The London Plan requires residential developments with off-street parking provision to be provided with 20% active provision plus 20% passive provision for EV charging facilities. Figure 15 pinpoints areas of residential development within the borough where EVCP provision made be required. Although these EVCPs would be on private property and are therefore not publically accessible, their presence may encourage new residents to purchase an EV.

Figure 15: Sites of residential development in Tower Hamlets where off street EVCP may be required as part of the planning consent.



5.5 Mayor's Draft Transport Strategy, 2017 (MTS3)

Three key themes are at the heart of the strategy.

1. Healthy Streets and healthy people

Creating streets and street networks that encourage walking, cycling and public transport use will reduce car dependency and the health problems it creates.

2. A good public transport experience

Public transport is the most efficient way for people to travel over distances that are too long to walk or cycle, and a shift from private car to public transport could dramatically reduce the number of vehicles on London's streets.

3. New homes and jobs

More people than ever want to live and work in London. Planning the city around walking, cycling and public transport use will unlock growth in new areas and ensure that London grows in a way that benefits everyone.

5.5.1 Healthy Streets Concept

The MTS3 introduces the concept of healthy streets and suggests that streets make up 80% of the city's public space.

There are 10 components of the healthy streets agenda, as shown in Figure 16, two of which directly relate to EVs; improving air quality and reducing traffic noise. EVs would contribute to achieving both of these goals within LBTH and across the city.

The Healthy Streets Approach provides a structure for placing human health and experience at the centre of planning the city and recognises improving air quality benefits everyone and reduces unfair health inequalities.

Figure 16. 10 Healthy Streets Indicators

5.5.2 Transport Emissions

London must meet legal pollution limits, sooner rather than later. This requires an earlier introduction and expansion of the Ultra Low Emission Zone (ULEZ) and making sure public services lead the way. The Mayor's aims are:

- For all taxis and Private Hire Vehicles (PHVs) to be zero emission capable by 2033
- For all buses to be zero emission by 2037 and to introduce low emission bus zones
- For all new road vehicles driven in London to be zero emission by 2040
- For London's entire transport system to be zero emission by 2050
- Introduce the ULEZ for central London in 2019. Expand to the North and South Circular for non compliant HGV's, Coaches and Buses by 2020.
- Introduce all non-compliant ULEZ for inner London; including Tower Hamlets by 2021 (see Figure 17 below).

5.5.3 Freight

The MTS emphasises that if unchanged, freight traffic in the central London morning peak is expected to increase by up to 10% in the next ten years. In order to keep London's streets operating efficiently, the Mayor intends to:

- Reduce freight traffic in the central London morning peak by 10% on current levels by 2026
- Reduce total London traffic by 10-15% by 2041

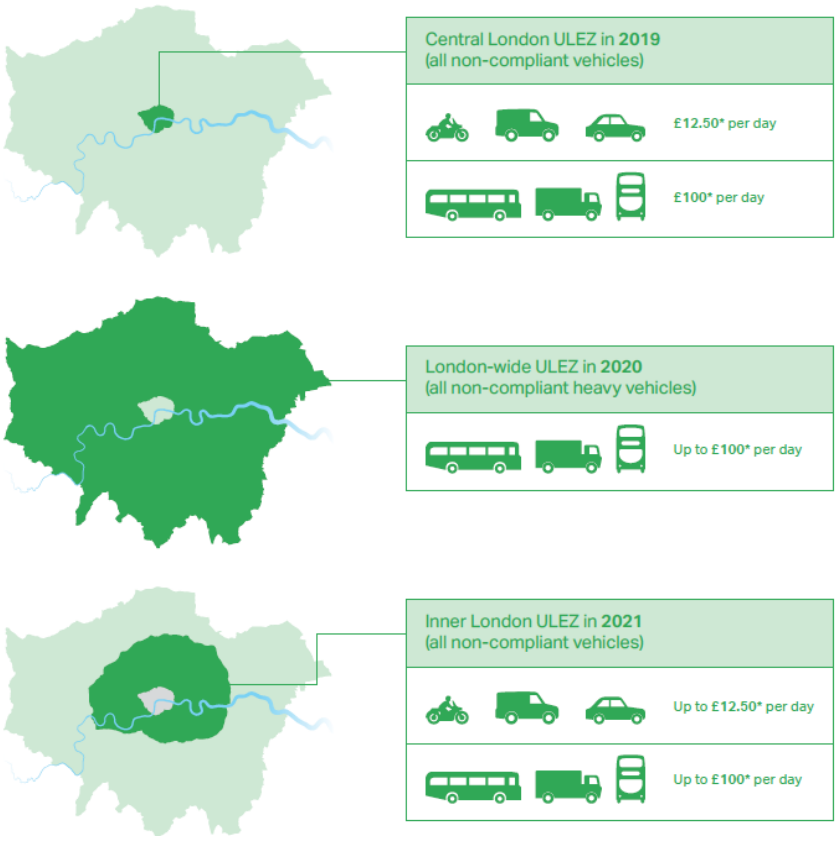
5.5.4 Policies & Proposals

The Mayor will endeavour to reduce emissions on London's streets and attempt to ensure London is compliant with EU legal limits. This includes promoting the shift to EV and promoting electrification.

Outlined below are policies and proposals proposed in the MTS which would directly correlate with EVs.

Schemes including the Congestion Charge, Low Emission Zone and Ultra Low Emission Zones (ULEZ) will remain and be reviewed through TfL.

Figure 17. ULEZ expansion proposals.

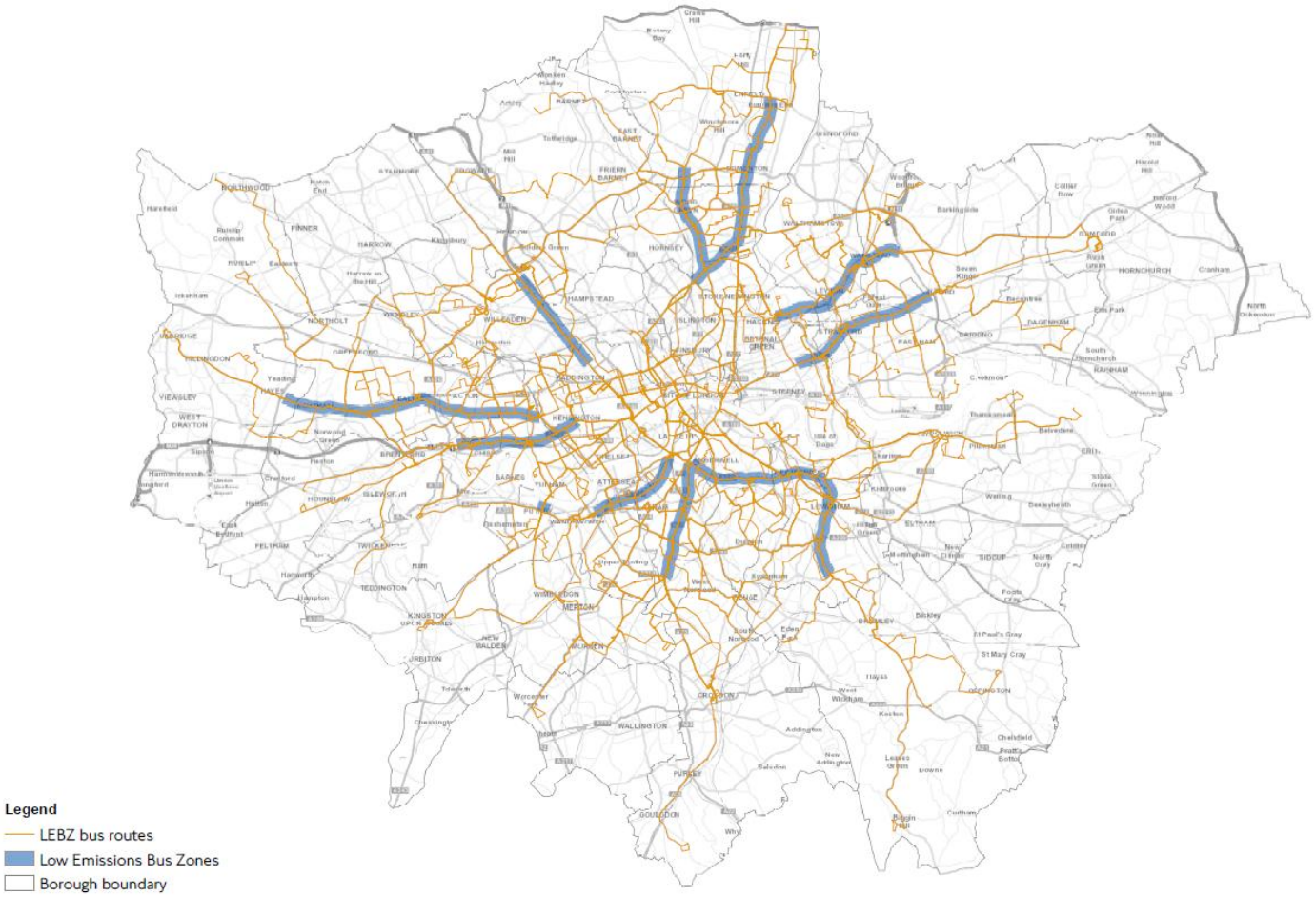


The Mayor will seek to introduce the central London Ultra Low Emission Zone standards and charges in 2019; the zone would be expanded London-wide for heavy vehicles by 2020 and to inner London for all other vehicles (except taxis) by 202.

All TfL buses will need to meet the Euro VI diesel standards for NO_x and PM by 2020. This will require the acceleration of the uptake of EVs and ensuring charging infrastructure is in place.

12 low emission bus zones will be introduced where low emission bus fleets will operate along all routes in those corridors. One of the low emission bus zones included part of Tower Hamlets, as shown in Figure 18 below.

Figure 18. The 12 low emission bus zones.



TfL indicate that London's public transport fleet could be fully zero emission by 2037, however more work is required to meet this target through the uptake of hybrid and electric technologies.

The Mayor proposes that the Government amends fiscal incentives, including vehicle excise duty, so that only the cleanest vehicles are incentivised for purchase; and implements a national diesel vehicle scrappage fund to enable cities to take the most polluting vehicles off their streets.

5.6 Modern Transport Bill

The Modern Transport bill is currently under consultation and will be debated in

parliament this year. It aims to aid the uptake of ULEVs which is key if the UK is to meet its goal of all new light vehicles being ULEVs by 2040, meet its legal carbon emission requirements and meet its air quality targets and reduce carbon emissions. It also aims to support the UKs automotive industry.

The bill aims to improve the provision of EV infrastructure in three ways:

1. Improve the public charge point user experience

- Improve the charge point user experience which is currently a barrier to adoption
- A public open database of all charge point locations and availability
- Universal standards that will create interoperability between all chargers on the network
- Open access to all chargers so that users do not require multiple memberships

2. Require chargers at motorway services and large petrol stations

- Enable long distance travel by ensuring rapid chargers at service stations and to expand the network by requiring minimum EV provision at large petrol stations

3. Smart charging

- Ensure all chargers have 'smart' capability which allows them to communicate with the grid and thus demand on the electricity grid to be dynamically managed

5.7 The Transport Emissions Roadmap

The Transport Emissions Roadmap (TERM) was published in September 2014. It looks at how to reduce emissions from transport in London and reports on what we have already done and what we may do in the future. It provides a range of possible new measures that the Mayor, TfL, the London boroughs, the government, the EU and other parties should consider to help meet the challenge of reducing air pollutants and CO2 emissions in London. These measures include:

- Implementing an Ultra Low Emission Zone
- (ULEZ) in central London
- Tightening the Low Emission Zone
- Making traffic management and regulation smarter
- Helping Londoners tackle air pollution and climate change
- Driving the uptake of Low Emission Vehicles
- Cleaning up electricity for London's transport
- Transforming London's bus fleet
- Delivering zero emissions taxi and private hire fleets

- Transforming London's public and commercial fleets
- Developing Low Emission Neighbourhoods

5.8 Go Ultra Low City Schemes

In January 2016, the OLEV 'Go Ultra Low City' funding was awarded to four cities; Nottingham, Milton Keynes, Bristol and London. Each city created a bid which outlined innovative plans to drive the uptake of EVs.

London: London received 13 million to be spent over four years in four different areas.

- Residential charging infrastructure and a delivery partnership which can implement it.
- Install electric vehicle chargers at 1000 car club bays.
- Increase the number of rapid chargers to 300 including rapid charging hubs
- 8 neighbourhood of the future schemes which encourage the uptake of EVs within the boroughs

Tower Hamlets are part of the consortium of London Boroughs which can apply for funds through the GULCS framework mechanism for residential on-street charging networks, electrification of car club bays and the roll out of rapid charging infrastructure. The GULCS will be a key funding source for LBTH to utilise for the delivery of a range of EVCP infrastructure. Following a GULCS bidding process in early 2017, TfL have confirmed LBTH have been awarded £36k GULCS funding in 2017/18 to fund 75% of the costs for installing residential on-street charging facilities. The remaining 25% funding is intended to be provided by LBTH LIP mechanism.

The funding criteria states that the funding can be used up to a maximum of £7.5k for each free standing charging point and £3k for each lamp column charging point.

LBTH will have the opportunities to source more GULCS funding in the next round of bidding, for 2018/19 delivery.

5.9 ULEV Delivery Plan

The Ultra Low Emission Vehicle Delivery Plan (2015) details how London will achieve widespread EV uptake. It defines 15 actions which will be carried out in order to

achieve the transition from internal combustion engines to ULEVs. The ultimate aim is for the entirety of the London vehicle fleet to be ULEVs by 2050.

The four areas of focus are: vehicles, infrastructure, innovation and marketing. Whilst the infrastructure area is most pertinent to this strategy, councils should equally consider the entire plan as an example of best practice in all EV policy.

5.9.1 Infrastructure:

- Create a rapid charging network by 2018

  TfL are creating a network of rapid chargers in the capital to support zero emissions capable (ZEC) taxis and commercial fleet vehicles. They will install 150 chargers by 2018 which will coincide with the requirement for new taxis to be ULEVs and in advance of the introduction of the ULEZ in 2020.

- Provide residential charging options

  It is acknowledged that residential charging will become a significant challenge in the future as the rate of EV adoption rises. It is also a major barrier to more drivers converting from ICE to ULEVs. London is committed to providing support and funding to councils who introduce residential charging schemes. However, it does not explicitly describe any particular methods of solving this problem.

- Support Source London

  London will continue to support the Source London network of chargers which is operating and expanding across the capital. Equally, it is not discouraging other networks from developing alongside.

- Identify charging locations

  TfL are currently researching the best sites for EVCPs and plan to publish a Charging Infrastructure Location Guidance document. Until then, the 'Guidance for Implementation for Electric Vehicle Charging Infrastructure' remains their most up to date publication.

5.9.2 Vehicles:

- Car Clubs: By 2025 50% of the Car Club fleet will be ULEVs. Car clubs have great potential to introduce drivers to EVs and encourage them to convert from ICEs
- Convert the 1100 strong GLA and TfL fleet to ULEVs
- Taxis and PHVs: ZEC requirement from 2018, achieving fully ZEC fleet by 2033
- Increase the number of ULEVs in freight and fleet. Preparing the freight industry for the introduction of the ULEZ
- Buses: In preparation for the introduction of the ULEZ in 2020 all single decker

buses in central London will be ULEVs by 2020 and the entire TfL fleet will be converted by 2040.

5.9.3 Innovation:

- Demonstrate and test new technologies
- Test geofencing for ULEVs
- Prepare London for hydrogen vehicles

5.9.4 Marketing and Incentives:

- Increase public awareness of ULEVs
- Offer incentives for ULEV uptake
- Support local air quality schemes
- Streamline ULEV and charging infrastructure procurement

5.10 TfL Electric Vehicle Charging Infrastructure Location Guidance for London, July 2017

This much anticipated document has recently been published and provides an evidence based guidance to help boroughs and operators identify where best to locate charging infrastructure to meet the current and future needs of EV users across London. The document brings together the findings from independent technical studies commissioned by TfL, with input from stakeholders.

The content of the guidance is focused on 4 themes which have emerged from the research commission by TfL regarding current and future use of EVs in London. These themes are:

- Identification of current demand
- Provision for future uptake
- Installing appropriate charge points in the right locations to ensure the type of charging point installed reflects the needs of the user
- A good geographical spread of charging networks

The guidance focuses on the specific needs of London's key EV user groups:

- Residents and visitors without off-street parking
- Services and deliveries
- Local businesses
- Car Clubs EV fleets

With the provision of three categories of publicly accessible charging infrastructure.

- On-street residential charging for residents without off-street parking facilities
- Rapid chargers
- Destination / top-up charging offered by commercial networks

The content of this guidance has been used to inform sections of this document include future EV ownership and EVCP demand and the types of EVCP required.

6.0 EVCP OPTIONS APPRAISAL

6.1 The Charging Mix

The location and manner in which EVs need to charge is not uniform. It is therefore important to consider the whole charging mix when planning EV charging infrastructure. This will ensure that a network is established which will meet the various needs of users. The majority of charging currently occurs at home or work in a private off-street parking location. Where local government can contribute most is in the spheres of on-street residential charging, rapid charging for taxis and LGVs and trip destination charging, both on-street and in publically accessible car parks.

6.2 Residential charging

"*Within 10 years it is envisaged that perhaps one in five on-street overnight parking bays will need a charging socket*" – Milton Keynes Council

Currently, the majority of EV owners charge their vehicles off-street, at home or work. However, approximately 85% of residents in LBTH do not have access to off-street parking. In order to support the uptake of electric vehicles amongst these residents, it is important that on-street chargers are installed. An additional challenge is accommodating the demand for accessible EVCPs from the high concentrations of taxi and PHV drivers who live in the borough, who will need to ensure their vehicles are compliant with TfL's zero emission capable licensing requirements by 2020.

Councils will play a key role in providing this infrastructure, as residential charging provision has, so far, not been considered commercially viable by private commercial charging point operators. As an emerging demand, there is little precedent on how best to provide these chargers, especially in areas of high on-street parking stress. Below are some potential solutions.

6.2.1 Fast chargers

Fast chargers can be employed in residential locations in much the same way as other locations; either floor standing or mounted onto a wall, for specific car park locations. A single unit will generally offer two sockets which allow vehicles in two adjacent bays to charge simultaneously. The key challenges are funding, loss of parking and how to reserve bays just for residents.

Private commercial charging point operators are unlikely to provide extensive

coverage of network charging infrastructure in residential areas due to lower profit returns, so alternative funding models are required. Westminster has trialled a residential solution where chargers are installed within CPZs. Three users commit to a yearly fee which covers the cost of installation. They then share the usage of the bay, parking in normal residents bays for the remainder of the time. This may prove controversial in areas of high parking stress and lower income neighbourhoods.

6.2.2 Socket networks

Socket networks are plug sockets discretely installed in the footway. There are several variants including bollards (such as those installed on Roman Road Market), popup posts and flip top boxes.

They would offer slower 3kW speeds (like a standard 3-pin plug) but this would be sufficient for overnight trickle charging.

These ideas have not been widely trialled but they are seen as being a low cost solution to residential charging, once clusters of EVs begin to form.

Consideration would have to be given on how best to manage access to these units. One solution is to use 'smart cables'. The user would purchase a cable and the metering technology within it would allow the DNO to bill the user for the energy consumed. A simpler solution would be to provide keys, in a similar way to CPZ permits.

There is potential for creating trip hazards and this would have to be considered. However these units are widely used for other purposes already and are not thought to pose significant risk.

6.2.3 Street lamp chargers

Lamp post charging is a different approach to residential charging, which taps into the existing power network for street lighting. As they piggyback on an existing power grid, they are limited in the power they can supply but are sufficient for overnight charging. They are currently seen by many as the preferred option for residential charging. LB

Hounslow has conducted a successful trial of the Ubitricity technology and several other small trials are currently underway.

The key limitations are a requirement for front of footway lampposts, sufficient capacity within the local lighting grid and in the case of internal units, a compatible diameter and door.

There are several manufacturers entering the market. The two most advanced are Ubitricity and Eluminocity; each of which employs a different approach.

Ubitricity have a unique approach to lamp column charging. They use a 'Simple Socket' installed within an existing lamp post paired with a separate 'smart cable' which contains the communication and metering technology. This approach keeps the chargers small enough to be retrofitted internally and passes some of the cost on to the consumer via purchase of the cable.

The 'Smart Cable' possesses mobile metering technology and data communication capacity. All consumptions are measured precisely and are billed directly to the consumers account. The cost of each Smart Cable is approximately £600.

The 'Simple sockets' infrastructure is low-tech and low cost. It does not posses data communication capacity or metering technology. It stays inert until it is 'woken up' by the SmartCable where, following authorization, charging can begin. Figure 19 below, shows images of the smart cable and the simple socket lamp column charging infrastructure.

Figure 19. The smart cable and simple socket lamp column charging point.

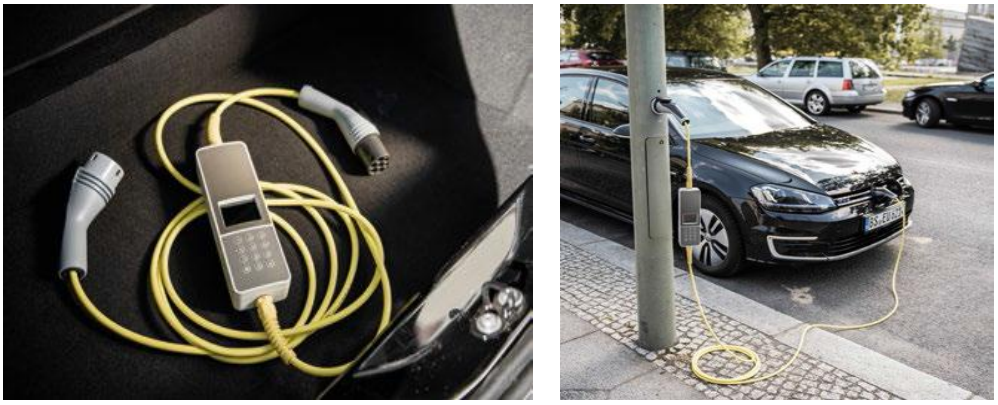


Figure 20.

Ubitricity are conducting trials with London Bouroughs including Hounslow, Richmond and Hammersmith & Fulham.

The cost is significantly less than a floor mounted fast charger and maintainance is minimal. This allows multiple chargers to be installed in one location. Due to their simplicity, they can be easily moved if demand changes.

Eluminocity's approach to lamp post charging is more similar to a traditional floor mounted, stand alone charger. The charger still uses the power supply from the lamp column, but the unit is attached to the outside of the post in a 'backpack' style.

The benefit of this approach over the Ubitricity model is that all the communications technology can be integrated into the unit, rather than an external smart cable, allowing anyone to use them.

The product is visible and obvious to members of the public which is in keeping with TfL guidance; visibility will help to drive adoption.

6.3 Rapid charging

Rapid chargers are capable of recharging a vehicle in 20 minutes rather than hours. They are vital to long distance travel and for commercial vehicles such as taxis, which will need to top up during the day.

The standard rapid charging speed is currently 50kW although we are beginning to see much faster chargers with speeds of up to 400kW. In the coming years it is expected that these faster speeds will become widely available.

Rapid units are significantly more expensive than fast chargers, costing in the region of £40,000. For this reason they are rarely funded directly by councils. Instead private operators rent land from the council and operate the chargers commercially, in return for a profit share.

Due to their greater power consumption, they require larger feeder pillars or a substation and often more extensive civils works. It can be more difficult to find locations for rapids which have a suitable power supply and sufficient space for the feeder pillar

It is becoming increasingly common for rapid chargers to accept debit card payments, which is much more convenient for the user than a subscription service.

6.3.1 TfL Rapid Framework

TfL have publicised their rapid charging framework, offering the scheme to local authorities within London. They are proposing to identify locations across TfL, borough-owned and private land which would be capable of hosting EV rapid charging infrastructure.

Under the scheme, chosen locations would be tendered out to six charge point operators who will bid for a concession contract to install, operate and maintain rapid charge points at their own cost. TfL will fund the installation of the power infrastructure and street furniture.

6.3.2 Other Providers

There are several other operators who will fund and manage rapid chargers. Source London / Bolloré is most notable in London, others include Engenie and InstaVolt.

6.4 Destination charging

There are many network operators who provider trip destination chargers. Each network operates a different business model but they can be separated into those who lease the land from councils and those who sell chargers to councils and profit from fees charged to the user. Within London the two largest networks are POLAR and Source London.

6.4.1 Source London

Source London is operated by Bolloré Ltd., on behalf of TfL. The network currently consists of over 1000 EVCPs but there are ambitious plans to greatly expand this number, with over 2000 by 2019. Users are required to pay a monthly subscription and can then operate the EVCPs via an RFID card.

Signing up to the Source London variation agreement would be a quick win for LBTH. At no cost, a network of chargers could be installed and the council would receive an annual income which could be reinvested into other EV schemes.

However due to the commercial concerns of Bollore, Source London chargers may not be able to operate in all the locations that LBTH wishes.

The solution to this potential issue is to operate a parallel network within the borough. The following is an example of a charge point manufacturer and operator which would be a suitable alternative.

6.4.2 POLAR

The POLAR network is the UK's largest charging network (outside London) with over 12000 points. It is owned by EVCP manufacturer Chargemaster. The company operates points across the country and holds contracts with numerous councils including Milton Keynes and the City of London.

Users operate the chargers using either an app or RFID card. There is the option to either pay for a monthly subscription or to pay on an ad hoc 'pay as you go' basis. This provides flexibility to occasional users who can arrive at a charger, download the app and charge with no prior planning whilst offering convenience to regular users who simply tap their card on the reader. The pricing aims to be cheaper than charging at home: 9p/kWh for members.

7.0 EVCP SITE SELECTION PROCESS

The following section outlines the criteria which should be considered when identifying suitable locations for the installation of EVCPs. The key principles include identifying locations which:

- minimise the impact on existing parking pressures in the immediate area
- will generate a sufficient level of usage demand to ensure the EVCP will become self financing, ie economically viable
- are logistically practical for installation, in terms of footway space, kerb positioning and accessing electricity supply

Sites must meet a number of criteria. The priority of each criterion is ranked below in Figure 21, which includes essential requirements. These criteria rankings should be used as a flexible guide, as each site location differs with specific benefits and challenges, making some sites more suitable for specific types of ECVP infrastructure. The criteria prioritising approach will be regularly reviewed to take into account feedback from users and consultations as EVCP infrastructure is introduced across the borough.

Figure 21. Criteria used to assess suitability of a site for EVCP installations

Criteria	Priority	Explanation
Sufficient demand	Highest priority	Demand must be high to ensure utilisation and enable EVCPs running costs to become financially self sufficient. New EVCP's need to be located at localities where there is existing demand from EV owners and potential demand from future EV owners. Initially, new sites will be geographical spread out to ensure there is local demand.
Minimal impact on parking stress	Highest priority	Impact on existing parking provision should be minimised in areas of high on street parking stress to avoid conflict between EV users and other car drivers. However, it is equally important to ensure sufficient EVCP provision is provided to encourage non EV car owners to make the

		switch, in the knowledge they will be able to charge their EV close to home.
Position of existing chargers	Medium priority	Ideally chargers will be installed to create an even geographical spread across the borough. Initially, new EVCP's will not be located too close to existing publically accessible charging points, unless there is evidence of high demand and requests from residents/businesses for additional EVCP infrastructure in the same locality.
Accessibility for the user	Medium priority	Ideally chargers should be within close proximity to the residence or destination of the users
Potential for multiple bays	Lowest priority	Where possible sites will have potential to support multiple bays, either active or passive. This will ensure EV owners can be confident they will EVCP availability, as charging demand increases.
Available power supply	Essential requirement	There must be sufficient power infrastructure available to supply the EVCP
Feasible Design	Essential requirement	The location must be able to support the charger and street furniture, in terms of adequate footway space for pedestrians behind the charging unit, close proximity to the kerb edge, to minimise trip hazard risk from trailing charging lead, and access feed to electricity supply.

7.1 Sufficient demand

Residential Areas: With 85% of Tower Hamlets residents without access to off-street parking provision, locating networks of accessible EVCPs in residential areas, within walking distance of resident's homes is a key consideration.

Concentrations of EV permits: Controlled Parking Zone permits are heavily discounted for EVs. Analysis of the currently issued permits shows two concentrations

of EVs: around Arbour Square and near Shadwell Station.

Trip destinations: EVCPs are required at trip destinations such as retail, leisure, and commercial premises where visitors are likely to park. PCL used OSM land use data and local knowledge to identify these areas.

Taxis: The upcoming legislative requirement for the electrification of taxis and PHVs will drive demand for rapid charging within the borough and access to residential charging infrastructure for overnight use. EVCPs should be located in areas frequented by taxis, including taxi ranks, railway stations and taxi repair garages. TfL research identifies Tower Hamlets is home to a large number of taxi and PHV drivers. Further data regarding this predicted demand is contained within the Recommendations section of this report.

Arterial routes into London: Rapid chargers should be located on main roads leading into London. This makes it convenient for taxis, freight and long distance travellers to top-up during their journey.

TfL's EV uptake projections: TfL commissioned studies to predict EV ownership growth and future on street EVCP demand are based on the estimated number of EVs parked on street. This data forms a key part of the selection criteria and is referred to in more detail in the recommendations section.

Proposed new developments: New developments should be considered as they are likely to increase demand for charging. New residents who require access to a vehicle, but do not have off-street parking access, should be facilitated to use an EV, through the provision of local charging provision.

Low Emission Network: The tri-borough low emission network scheme is trialling innovative air quality initiatives through installation of filtered accessibility priority for EVs and the provision of on-street charging provision in the Hackney part of the LEN. Providing EVCPs close by within Tower Hamlets would support the take up of EVs and associated benefits of air quality improvements in this area.

Car Parks: Car parks provide convenient and suitable locations for destination/top-up charging and should be prioritised as good locations to support visitor EV demand, as these are locations where vehicles are left for some time. Car parks are easier for installing ECVPs as there is less conflict in regard to loss of parking spaces from other road users and the presence of EVCPs raises awareness of the facilities for future EV adopters.

Housing Land: Tower Hamlets homes own large areas of land within the borough and have several thousand parking bays which could be repurposed as EV charging points. Further consultation and discussions are required before an agreement can be reached for the utilisation of these estate parking spaces for EVCP installation.

7.2 Minimal impact on parking stress

Much of LBTH already experiences high on-street parking stress and the introduction of EVCP bays needs to be carefully located to minimising the loss of parking provision for non EVs in areas of high on-street parking stress. Ideally areas of high parking stress should be avoided so as not to exacerbate parking problems. Where this is not an option there should be a high level of confidence that the EV bay will be well utilised. Parking restrictions and enforcement should be carefully controlled so that these bays are not abused.

The issue of existing parking stress is also a factor in determining whether a cluster of EVCPs could be installed within one street or in close proximity within a neighbourhood, and whether these should be allocated a designed EV only parking space or left unrestricted. For LBTH, where there is high parking stress borough wide, the recommendation is to install dedicated and enforceable EVCP parking bays, to ensure EV users gain access to the points when they need them.

7.3 Position of existing chargers

LBTH should aspire to achieve a good geographical spread of EVCPs across the borough. TfL research showed that 93% of drivers would use a charger within 5 minutes walk of their location, decreasing to 73% for a 10 minute walk. Areas already served by existing chargers, which are publically accessible, were given lower priority, although the majority of the existing network in Tower Hamlets has limited public access, located in car parks with access restrictions.

7.4 Accessibility for the user

In order for an EVCP to be well utilised it must be located where it can be easily and conveniently accessed by the user. Different types of users will need to be accommodated in different locations. For example taxis and LGVs who wish to charge during the working day require rapid chargers, located on key arterial routes into London and close to taxi ranks. Whereas, a local resident who wishes to charge

their vehicle regularly will require a standard or fast charger, within easy walking distance of their home. Access to residential on-street charging facilities will also be used by taxi and PHV drivers living in Tower Hamlets for overnight charging.

Physical restrictions such as car park closing hours should also be considered.

7.5 Potential for multiple bays

Where possible it is best practice to install multiple bays in one location, especially in locations of high demand to ensure EVCP accessibility for users. It is recommended that in locations where it is feasible to install multiple EVCP's, although current charging demand does not require multiple points, it is preferable to install passive provision, by providing the necessary civil infrastructure required, then additional EVCPs can be added at a later date, quickly with minimal installation works, when charging demand has increased.

7.6 Available power supply

To determine whether a location would be viable as an EVCP location it is important to investigate how the electricity supply will be installed; both the physical infrastructure and the availability of electricity.

The DNO (Distribution Network operator) must be contacted and permission obtained to connect to the grid. They will indicate the power capacity available. Due to the large amounts of power which chargers draw they may mandate that upgrades are made to the infrastructure. This is of particular concern with rapid chargers. Upgrades to cables and transformers can become prohibitively expensive.

Ducts and cables must be laid and a feeder post installed. The feeder post will include the energy metre. With some 'fast' chargers it is possible to integrate the post into the charge point or a wide based sign post to minimise street clutter.

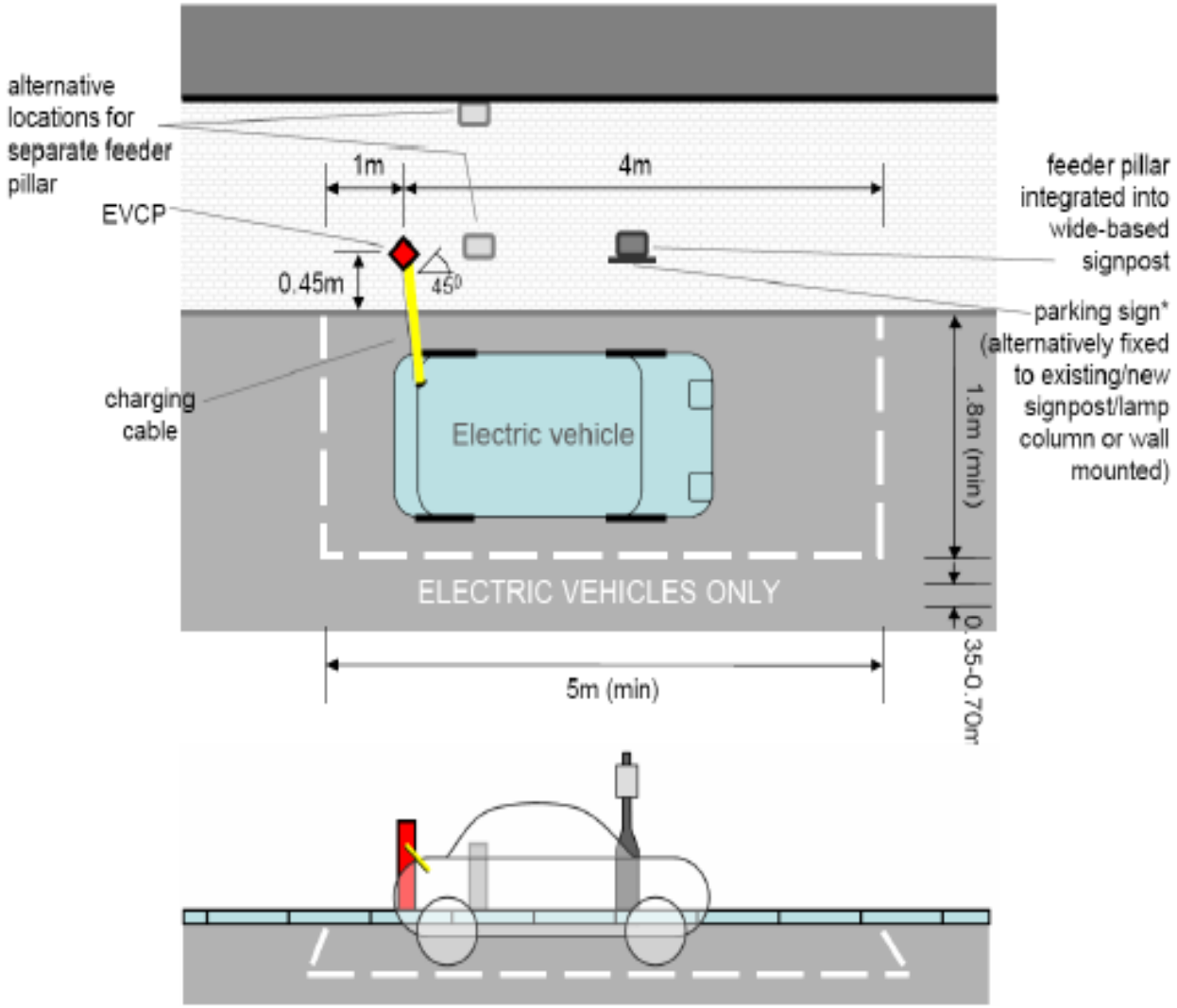
7.7 Feasible Design

An EVCP must be accompanied by a selection of street furniture; this includes a bay marking, sign post/plate, a feeder pillar and often a barrier in front of the unit. Consideration should be given to whether these items can be installed in an acceptable manner. Consider street design guidance, visual impact (especially in

conservation areas) and safety. TfL have produced design guidance for EVCP bays in different scenarios, as shown in Figure 22 and Figure 23.

- TfL streetscape guidance recommends that the charge point should be 450mm from the kerb edge and should leave a minimum of 1500mm footway clearance for pedestrians
- If a location fails to meet this criterion, an option could be to provide a build-out within a bay to facilitate the charging point, thereby removing the need to place the unit on the footway. There is however greater impact on loss of on street parking space
- A single 50kW rapid charging unit would require a Type 1 feeder pillar (380mm x 800mm x 1125mm - D x W x H). If two or more rapid charge points are being considered, a Type 2 feeder pillar is required (500mm x 1250mm x 2250mm). Fast chargers require smaller pillars which are less restrictive
- The length of trailing charging cables should be kept to a minimum to prevent trip hazards. The angle of cable between the charger and the car is key to achieving this

Figure 22– TfL EVCP Design Guidance illustrated



* See TSRGD 1028.4 for indicative layout/dimensions of bay - formal recognition of road markings/sign subject to *Traffic Signs (Amendment) Regulations and General Directions (TSRGD) 2010* consultation document – September 2009

Figure 23: Good Practice principles for the design of on street EVCP bay layouts

Good practice principles for designing the layout of on-street charging bays:

- **Angle of EVCP** and **height of controls:** position the charging point at 45 degrees to maximise accessibility (for disabled as well as non-disabled users). As with parking meters, the controls should be at a height which permits access by wheelchair users
- **Street clutter – feeder pillar:** to minimise street clutter incorporate feeder pillar into modified (wide-based) signpost housing (or where possible use charging point with integrated feeder pillar)
- **Effective footway width – feeder pillar:** where separate feeder pillar is used locate so as to not obstruct access to charging point or pedestrian movement on footway – consider locating at back of footway
- **Sign plate location:** where possible, locate sign plate on existing signpost/lamp column or on wall (assuming integrated signpost/feeder pillar not used)
- **Kerbside obstructions – charging cable:** locate feeder pillar no more than 0.45 metres from kerbline to minimise extension of charging cable
- **Contact details – feeder pillar:** feeder pillar to show borough and EV supplier contact details
- **Sign plate** details and **road markings** – currently require type approval from DfT but formal recognition proposed in DfT consultation document. Road markings likely to be a variant of TSRGD no. 1028.4

7.8 Charger Installation Check List

The site selection principles outlined in Figure 21, earlier in this chapter, form the basis of the site selection audit, detailed below in Figure 24, which should be carried out to confirm the suitability of potential EVCP locations.

Figure 24: Site selection audit

Purpose	Users	Who will use the chargers?	The location and type of charger should be matched to the needs of the expected users.
	Chargers	What type of charger do you intend to install?	
Scale of plans	No. of EVCP bays	How many ECVP bays do you plan to install?	It is best practice to install multiple bays/chargers at each location. This increases the likelihood of there being an available charger for users and introduces economies of scale for the council.
	Passive provision	Will you install passive provision?	Passive provision of infrastructure allows additional chargers to be easily installed as demand increases in the future.
Location	Demand	Are you confident that there will be a high demand for a charger at this location?	Chargers should only be installed where they are likely to be regularly used. Consultation with residents/business is important.
	Accessibility	Is this location accessible easily and at all times?	To ensure a high level of usage a charge point should be accessible at all times.
	Existing provision	How many chargers are there in the surrounding area?	The ideal situation is a wide geographic spread of chargers across the borough. Users are unlikely to walk more than 10mins from the charger to their destination.
Energy Supply	DNO permission	Do you have DNO permission to install infrastructure at this point?	Chargers cannot be installed unless permission is obtained from the DNO.
	Network Capacity	Is there suitable power capacity to supply the charger/s planned. The speed or number of chargers may have to be adjusted.	The DNO will define the amount of capacity available in the local network.
	Upgrade works	If no, what upgrades will need to be made to the infrastructure?	Upgrading the power infrastructure such as cables and transformers may be prohibitively disruptive or costly.
Impact on parking	Loss of parking	Will there be a loss of existing parking spaces?	Locations should be chosen which minimise the impact on parking stress.
	Dedicated bays	Will dedicated bays be installed?	In most situations a dedicated EV charging bay is required to prevent 'ICEing'.
	Restrictions	If yes, what parking restrictions will apply to these bays?	Limited stay parking restrictions can be applied.
	Enforcement	Have you considered how the bays will be enforced?	Enforcement of EV restrictions is required. CEOs may require guidance on how to achieve this. Smart sensors may aid this process.
Design	Street furniture	What street furniture is required?	Most EVCPs require bay markings, signs, feeder pillars and barriers.
	Feeder pillar	What size of feeder pillar will be required?	Rapid chargers require large feeder pillars which may be prohibitive, especially when more than one unit is installed.

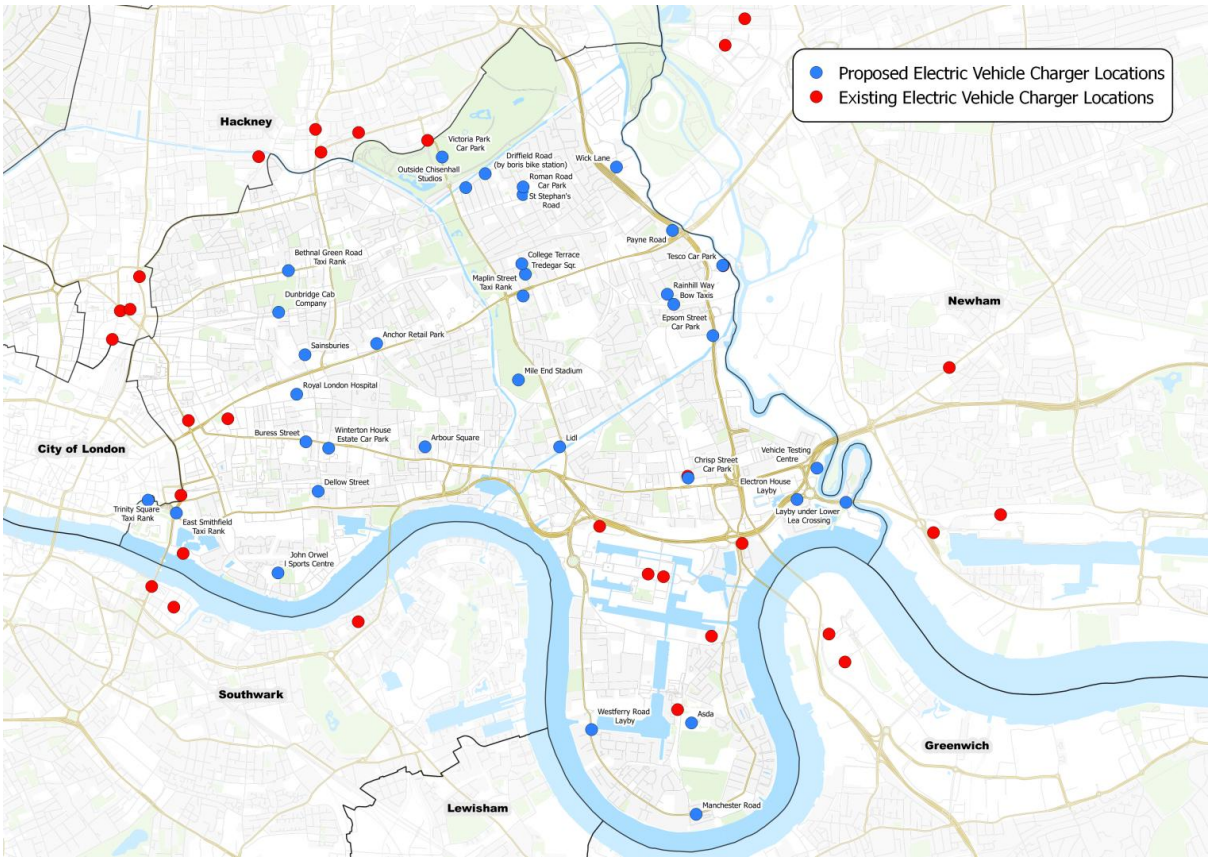
	Footway width	Is there sufficient footway width to accommodate the charger and other street furniture?	TfL recommends 1500mm of footway and 45mm of clearance between the kerb edge and charger.
	Build outs	If there is not sufficient width then will a kerb build out be required?	Kerb build outs are a possible solution to limited footway width but they will have a greater impact on parking stress.
	Trip hazards	Does the design minimise the risk of trip hazards?	EVCPs should be designed as to limit the length of trailing cables.
Maintenance		Is a maintenance plan in place for the chargers?	There will be ongoing maintenance issues which must be resolved and paid for.
Cost efficient installation	Street works	Is it possible to install the EVCPs as part of other street works schemes?	Where possible reduce the number of individual street works that must be carried out. This reduces costs and disruption.
	Passive provision	Is passive provision being installed	
	Multiple points	Are multiple EVCPs being installed at this location	
Review	Strategy	Have you considered this location in the context of the wider strategy?	An individual charger will form part of a wider network, which must be considered.
	Review	When will this charge point be reviewed?	Existing chargers should be regularly reviewed. Lessons learned must inform the selection criteria used for future charger installations.

7.9 Potential EVCP Sites

PCL has conducted an initial desktop exercise to identify 35 locations, which appear to be suitable for EVCPs. These sites will require further investigations including site visits, parking stress analysis/surveys, Distribution Network Operators (DNO) permission, local grid capacity and utilities searches before they can be confirmed as viable.

The selection attempts to achieve a good geographical spread and provide sites suitable for different types of users and charger types. Figure 25 maps the location of the proposed EVCP locations, and includes the locations of existing charging points both in Tower Hamlets and within close proximity in neighbouring boroughs. Details of the exact location details identified for the 35 potential sites for EVCP installations are contained in **Appendix A**.

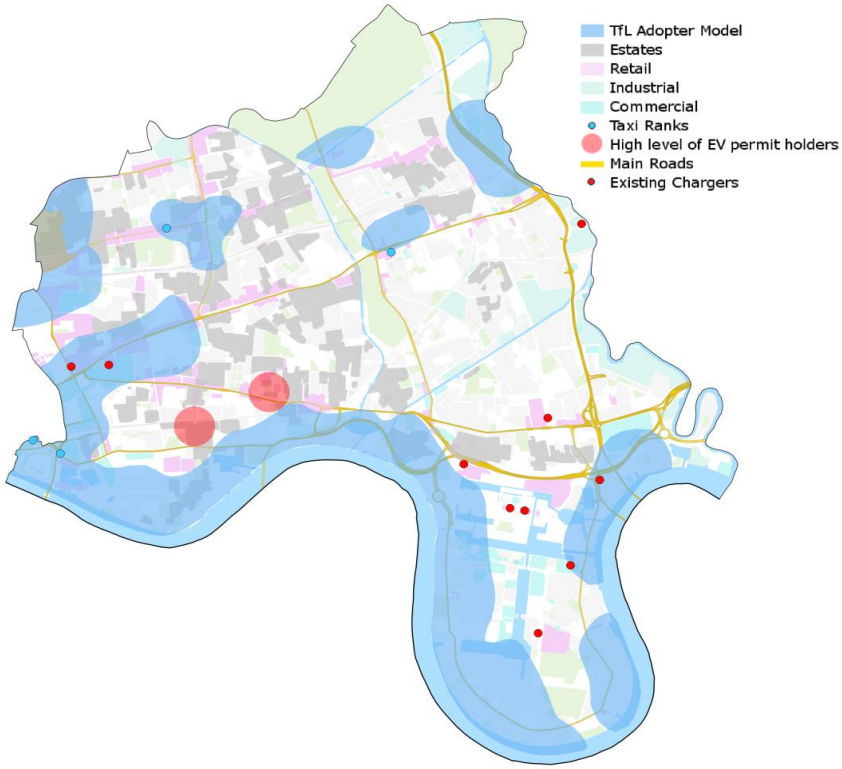
Figure 25. Proposed EVCP locations and location of existing charging points.



These sites were identified as quick wins in regard to being the easiest to implement for the initial round of EVCPs expansion. Car parks, key routes into central London and areas frequented by taxis were a priority for identifying these 30 locations. Residential on-street locations will be the focus for the next phase of site selections surveys, delivered through GULCS funding with LIP match funding.

Figure 26, below displays the over laying of data relating to a number of the criteria used to identify suitable areas with high demand or potential demand for EVCP access.

Figure 26. Criteria used to identify suitable areas for EVCPS.



8.0 FUNDING OPTIONS AND PROCUREMENT

Whilst it is vital that LBTH is able to provide EV charging infrastructure it is also important that these schemes remain as cost neutral as possible. Therefore LBTH must make best use of all available funding streams. These include TfL LIP and GULCS funding, national grants, commercial networks, local budgets and development levies.

- TfL/ LIP /GULCS Funding

  GULCS funding (detailed in section 5.8), the Borough's annual LIP funding allocations, and new funding streams allocated through the MTS3 and LIP3 process, such as the Healthy Streets and Liveable Neighbourhoods initiatives will provide the majority of the funding support directly obtained by LBTH to invest in the take up of EVs and the expansion of charging infrastructure.

- Partnerships with Commercial EVCP network operators.

  There are two main Commercial EVCP network operators in London, the largest by far is the Source London network from BluePoint Ltd, and there is the Polar network from Chargemaster. These commercial operators will fully fund purchase, installation and maintenance for the charging infrastructure installed and their back office administration service. In return the operator will require approval from the Local Authority to lease a site (usually an on street space or car park space to install the EVCP) and the right to charge users for the service. This will enable the LBTH to provide accessible EVCPs to the public with no capital cost involved. The Source London network is the primary option in London and it is strongly recommended that LBTH sign up to the Source London partnership as a matter of urgency.

- Source London Network

  BluePoint Ltd (BPL) took over the management of the Source London EVCP network from TfL in September 2014. There are now over 850 Source London EVCPs across London, providing access to both fast and Rapid charging facilities. Charging points can be booked in advance via an app or the Source website which indicates available EVCPs nearby or on your route. Membership of Source London is required to access these charging points which is currently £48 per year (£4 a month) and gives the EV owner access to the entire Source London EVCP network. There are additional costs each time for charging at a

Source London EVCP. These are 3.6p/min when using their new smart charge points with a minimum session fee of 20 minutes and an overnight cap of £8.64 from 8pm to 7am. For the Rapid Charger, the costs are £1.80 fee plus £0.30 per kWh.

The benefits to the Council for introducing the Source Network into Tower Hamlets are:

- There are no costs incurred by the Council for the EVCP purchase, installation, maintenance, repairs, upgrades and electricity use of the Source Network. BPL will do everything.
- Majority of EVCPs installed will be Fast chargers. Rapid charger installations may also be possible if suitable locations can be found.
- BPL will commit to funding the expansion of the Source London charging network in Tower Hamlets (covering all costs inc TMO's, consultation and installation) with plans to install over 2000 charging points across the London network by 2018.
- New charge point installations will only be made with the full agreement of the Council.
- LBTH will receive a fixed income of £700 per charging point per year.
- 20% of cumulated net profit will be proportionally shared with partners once BPL is profitable and pro-rata the number of points in boroughs.
- LBTH will have access to an online statistics & reporting tool which will provide usage data and will enable tracking and monitoring of all charge points.
- BPL will hold a contractual yearly meeting with Boroughs to discuss the pricing policy.
- BPL will apply a discount to car club fleets according to the number of hours they spend on a Source London bay. The discounts applies to the standard £2/ hour rate.
- BPL will consider introducing flexible charging tariffs with reduced hourly charging rates at off peak times and in areas of the borough which are more residential than town centre.
- BPL may request to trial their electric car club fleet, which is currently being successfully rolled out in Hammersmith and Fulham.

Other Commercial EV charging options:

In addition to the Source London network, the Council is considering alternative and compatible charging infrastructure solutions to meet the increasing demand for on-street access to charging infrastructure. These options include Charge Master's Polar Network and alternative on-street charging provision such as setting up local residential networks and socket charging (via plugging into existing street furniture such as lamp columns).

The Source London network alone can not address rising demands for on-street charging access from Tower Hamlets residential neighbourhoods, especially as BluePoint's ambitious expansion plans for the Source London network will predominately focus on providing charging facilities at hub/attractor locations, including town centres, retail centres and transport interchanges. However, BPL will be committed to rapid expansion in the borough, at no cost to the Council, which would provide a speedy option for installing a network of EVCPs across the borough within the next 12 to 18 months. Source London has confirmed they could install up to 200 EVCPs in Tower Hamlets in the space of the next 24 months.

- Government Grants

The Government offers a number of grants for ULEV projects, administered via OLEV. The primary fund available to local councils is the residential charging grant which provides 75% of the capital costs for on-street residential charging. Additional grants include:

  - The Electric Vehicle Homecharge Scheme
  - The Workplace Charging Scheme
  - The On-street Residential Charging Scheme
  - Plug-in Car Grant
  - Plug-in Van Grant

- Planning regulations

The London Plan requires 20% active and 20% passive provision of EV chargers for all new developments.

- Section 106

Require developers to contribute to on street chargers in the areas surrounding their developments.

- Community Infrastructure Levies

Requirement to contribute to a charging infrastructure strategic fund could be set up to provide for charging infrastructure and projects in the wider community, paid for by contributions from developers.

8.1 Procurement

The newly proposed TFL procurement frameworks are an exciting development. Firstly it will greatly simplify the procurement process. Secondly it will develop a specification which is established as suitable for all councils.

The rapid charging bid framework is an innovative approach to EV charging that looks to combine the benefits of public control and planning with the financial backing and expertise of private CPOs.

8.2 OLEV

The Office for Low Emission Vehicles (OLEV) is part of the Department for Transport and the Department for Business, Energy & Industrial Strategy. OLEV is a team working across government to support the early market for ultra-low emission vehicles (ULEV). They are providing over £600 million from 2015 to 2020 in funding to position the UK at the global forefront of ULEV development, manufacture and use. An additional £270m was announced at the 2016 Autumn Statement. This will contribute to economic growth and will help reduce greenhouse gas emissions and air pollution on UK roads.

In 2017, London Councils, TfL, and the GLA were awarded £5.2 million for a residential scheme and £2.93 million for a car club scheme by OLEV. London Boroughs have submitted their initial bids and registered their interest, in order to win a percentage of the funds.

- Infrastructure Grants

The Government (as of January 2017) has committed almost £1bn to support Ultra Low Emission Vehicles (ULEVs) from 2015-2020. Of this funding, £32m has been committed for infrastructure. This has been broken down into the following schemes:

- The Electric Vehicle Homecharge Scheme

OLEV is currently part-funding electric vehicle charging points for domestic installation. To help private plug-in vehicle owners offset some of the upfront cost of the purchase and installation of a dedicated domestic recharging unit, the Government is running the Electric Vehicle Homecharge Scheme. Customers who are the registered keeper, lessee or have primary use of an eligible EV may receive up to 75% (capped at £500, inc. VAT) off the total capital costs of the charge point and associated installation costs. Customers must provide evidence of keepership, lease, be named as the primary user of an eligible EV or have a vehicle on order in

order to be able to qualify for the grant.

- The Workplace Charging Scheme

The Workplace Charging Scheme is a voucher-based scheme that provides support towards the up-front costs of the purchase and installation of EVCPs for employee and fleet use. The contribution is limited to £300 for each socket up to a maximum of 20 across all sites for each application. The voucher will be valid for 4 months (120 days) from the date of issue, (expiry date printed on the voucher). Once the charge point(s) have been installed, the authorised installer will claim the grant from OLEV on the applicant's behalf by submitting a PDF claim form via OLEV's portal.

- The On-street Residential Charging Scheme

This grant is available to councils who wish to install on-street charge points in residential areas. This encourages the installation of chargers in these un-commercially viable areas which are not attractive to private companies.

OLEV will fund 75% of all capital costs up to £7500. This includes the equipment, installation and costs associated with the bay and TMO.

- Plug-in Car Grant

OLEV will offer a grant to subsidise new ULEVs. The funding depends upon which category the vehicle falls into, as shown in Figure 27, below. This scheme will be open until March 2018.

Figure 27. Categories of OLEV grant funding.

	Requirement	Grant	Examples
Category 1	Cars with a zero emission range of over 70 miles	£4,500	Full EVs such as BMW i3 and Nissan LEAF
Category 2	Cars that have CO_2 emissions of less than 50g/km and a zero emission range of between 10 and 69 miles	£2,500 (If vehicle under £60k)	Hybrids such as the Audi A3 e-tron and Toyota Prius Plug-in)
Category 3	Cars with CO_2 emissions of 50 to 75g/km and a zero emission range of at least 20 miles	£2,500 (If vehicle under £60k)	

- Plug-in Van Grant

A more generous grant is available for commercial vehicles. There are currently very few ULEV vans and the higher subsidy represents the desire to drive adoption in this category. For vans under 3.5T there is a grant of 20% of the price (up to £8000) and for those over 3.5T there is a 20% grant capped at £20000. This will be reviewed either after 5000 applications or in 2018 depending on which is reached first.

OLEV also fund other projects such as the Go Ultra Low Scheme which awarded £40million to four cities to carry out innovative projects which aid the adoption of ULEVs. It also funded the Plugged-in Places project which created regional charging networks such as Source London.

- Go Ultra Low Cities Scheme

The Go Ultra Low Cities scheme is part of a wider £600 million investment from the Government to encourage EV uptake in the UK through a step change in ULEV car uptake in their locality, including criteria for the bids included improvements in air quality, innovation, and linking with other OLEV schemes. More detail has been provided in section 5.8 of this document.

8.4 European Union Funding

Opportunities for funding innovative EV charging technologies, electrification of freight deliveries and behaviour change initiatives to encourage the take up of EVs are all measures which have recently awarded Horizon 20:20 funding through the European Union. Colleagues at the London European Partnership for Transport (LEPT), within London Councils provided regular EU funding briefing for London Boroughs informing of calls for funding submissions and partnership opportunities.

8.5 UK Government Budget

The most recent national budget pledged a significant level of funding to support the introduction and development of ULEV vehicles in the UK.

£80 million for charging infrastructure

£270 million as part of the industrial strategy fund

£150 million for the conversion to clean buses and taxis

£60 million to subsidise new electric vehicle

£4 million to fund the Go Ultra Low projects

- Clean Bus Technology Fund 2015

It is possible to bid for funding to upgrade buses to ULEVs and provide accompanying infrastructure via the Department for Transports 'Clean Bus Technology Fund 2015'. Grants are available up to £500,000.

9.0 RECOMMENDATIONS

Provision of the appropriate charging infrastructures required to facilitate a substantial increase in EV usage in LBTH, requires a number of challenges to be resolved. This section provides a summary of the recommendations required to address these challenges and is followed by a detailed Action Plan of deliverable measures.

The challenges to EV uptake in LBTH have been identified as follows:

- Increasing number of requests for EVCPs from residents and businesses wanting to invest in EVs but do not have access to suitable charging points.
- Over three quarters (85%) of LBTH residents have no access to off street parking.
- Current inadequate provision of accessible and reliable charging points a barrier to further EV uptake.
- Majority of the borough experiences high on street parking stress and competing road user demands for limited kerbside space.
- Difficulties providing EV charging spaces in areas of high parking stress.
- Growing population and employment opportunities adding to kerbside pressures.
- Air quality and emission reduction targets will not be met without significant shift to EV usage and low emission modes of transport.
- Limited funding available for infrastructure installation. Long term maintenance and electricity usage charges need to be cost neutral to LBTH.
- 21000 estate homes with no charging provision and limited off street parking provision.
- Limited off-street parking. Only one council owned off street car park
- High demand expected for accessible fast chargers once ULEV/taxi electrification comes in. Key routes into the city will require rapid chargers as uptake increases (A11, A12, A13).

These challenges can be addressed through the provision of a range of EV charging infrastructure networks, located in appropriate and accessible locations to serve both existing demands as well as facilitating predicted growth in EV usage and ownership.

9.1 Vision for LBTH

LBTH needs to work towards making the following vision a reality by 2025.

'Tower Hamlets provides a network of easily accessible EVCPs which cater for a range of residential and commercial charging requirements from a growing number of EV users. This infrastructure has facilitated the growth in EV usage required for the borough, and London, to meet air quality objectives and deliver a zero carbon transport network by 2050.'

Over the next few years, increasing EVCP provision should ensure residents and businesses have increasing confidence in utilising and purchasing EV's as their preferred and most convenient choice of vehicle use in LBTH. Through the delivery of the recommendations and actions contained within this strategy, supported by accompanying actions within LBTH's Air Quality Action Plan and appropriate Local Plan and LIP3 policies, the above vision and EV user experience is realistic and needs to be attained if air quality improvements and emission reduction targets are to be met.

9.2 Objectives:

LBTH's primary objective should be to increase the proportion of EV's registered in the borough. Currently 0.25% (132) vehicles registered in LBTH are EVs. LBTH should aim to raise this number of EVs to 2% by 2020 (1056 EVs) and at least 10% (5280 EVs) by 2025.

This is in line with targets set out in the MTS3, to achieve a zero emission transport network by 2050.

To achieve these ambitious targets, LBTH requires the installation of a planned and coordinated network of EV charging infrastructure that serves the needs of all types of EV users, including residents, visitors and commercial fleets.

9.3 Principles for supporting EV take up

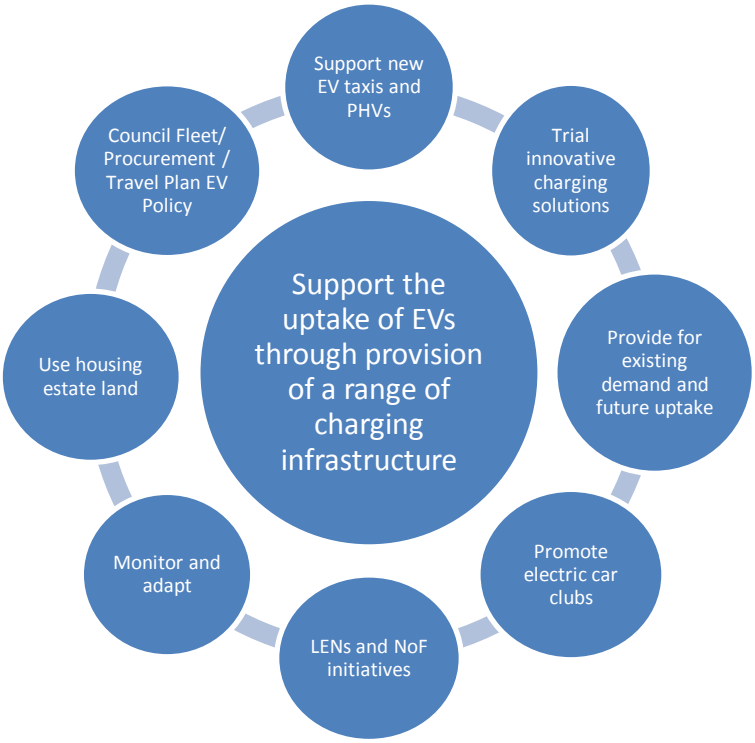
TfL's EV Charging Infrastructure Location Guidance (2017) recommends the following 4 themes are addressed to ensure the most appropriate type and scale of charging infrastructure is provided for current and future EV users.

- Identification of current demand. Meet the existing demand from residents and businesses requesting access to charging points. Need to provide balance between competing demands for space and maximise charge point usage to ensure its viability.
- Provision for future uptake. Provided infrastructure based on predicted demand from residents and also prioritising requirements to charge essential commercial vehicles, zero emission capable (zec) taxis and PHVs.
- The appropriate charge points in the right locations to ensure the type of charging point installed reflects the needs of the user. Eg. Taxis and commercial deliveries will require quick and frequency top up charges from rapid chargers, located along strategic routes into central London.
- Provision of an accessible borough-wide EVCP network to encourage the switch to EVs. On street and public assessable car park locations in key trip attractor destination, with charging facilities open to all EV users by allowing pay as you charge option.

These principles apply to LBTH, and have been incorporated into the following recommendations and the action plan in section 9.0.

LBTH will need to deliver the following key actions, as illustrated by Figure 28 to implement the charging network required to facilitating EV expansion and demand.

Figure 28 – Objectives required to deliver the charging network to support the take up of EVs in LBTH.



9.4 Provide for existing demand and future uptake:

The key EV users in LBTH requiring access to charging infrastructure are broadly identified as:

- **Residents, predominately without off-street parking**

Approximately 85% of LBTH residents do not have access to off-street parking provision such as driveways or car parks so to make the switch to EV usage they are reliant on access to on-street parking provision.

Future on-street EV charging requirements for inner London residents have been predicted as part of TfL's research for the EV Charging Infrastructure location guidance. The study used the key characteristics of existing EV owners across London, which correlated to households in employment with higher incomes. Applying these characteristics to projected population and car sales in 2025 provides a prediction of EV ownership levels in 2025. Figure 29 shows the results of this predicted EV ownership in London, which suggests wards within Tower Hamlets will have EV ownership levels of between 4 to 10+ % of the total vehicle stock. (Figure 30 provides zoomed in close up of Tower Hamlets) This is a rapid rise from the current 0.25% EV ownership rate in Tower Hamlets in just 8 years.

Figure 29 shows potential EV ownership levels in London in 2025.

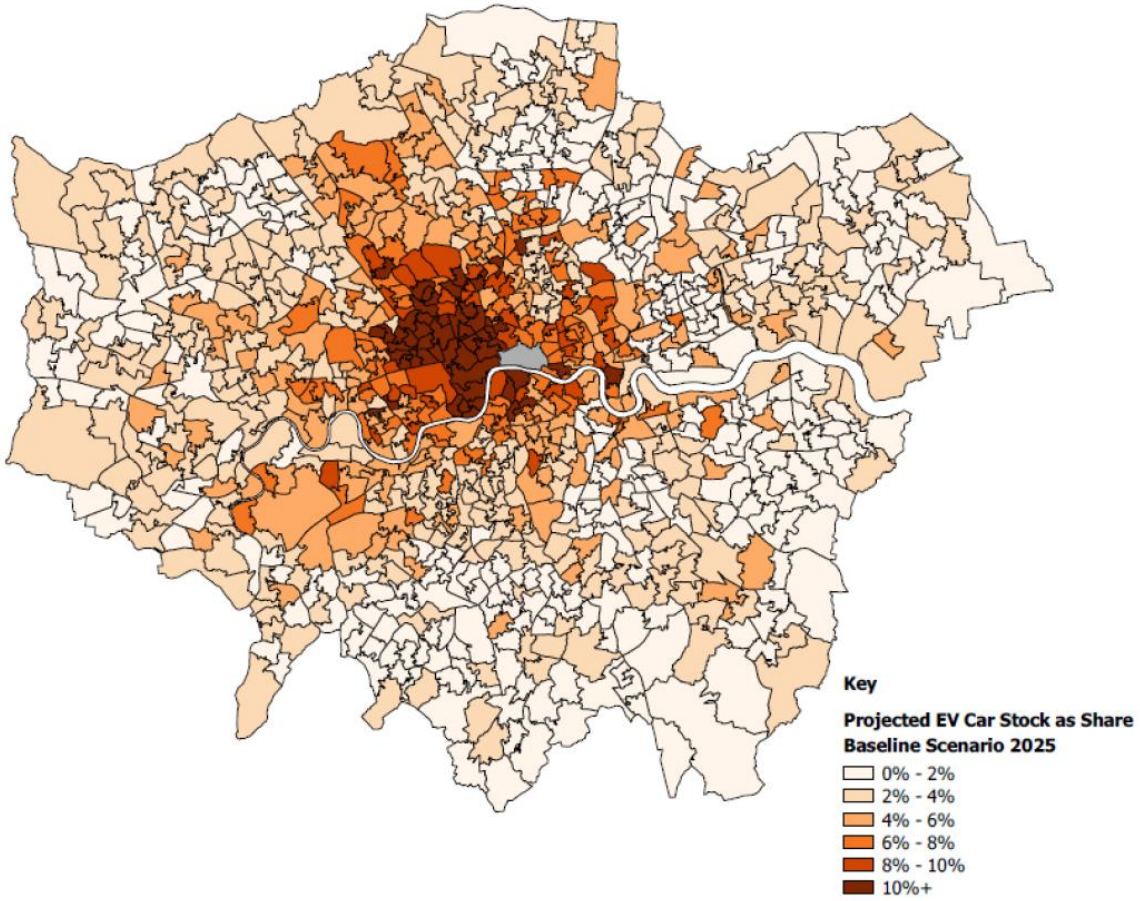
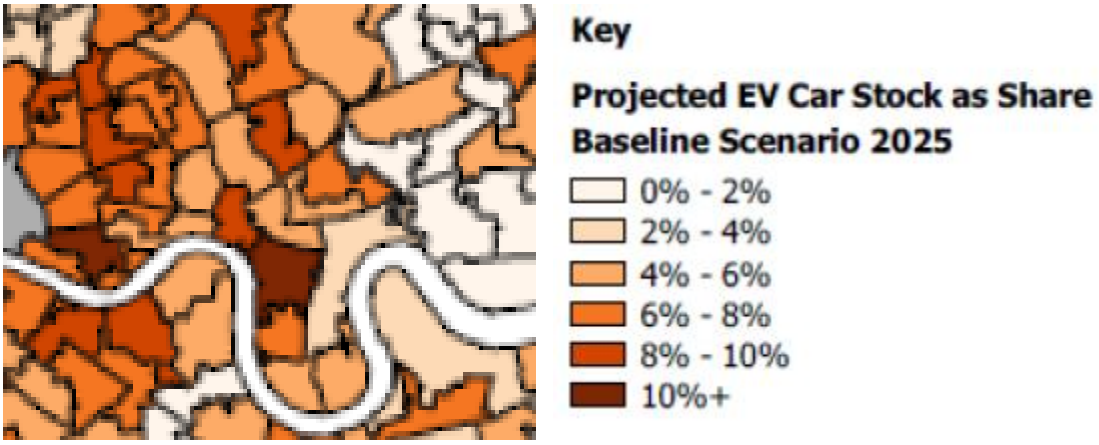


Figure 30. Zoomed into Tower Hamlets wards, showing range of EV ownership predicted to be between 4 and 10+%. (Source TfL, 2016).



With approximately 85% of LBTH residents currently without access to off-street parking facilities, the rapid increase in EV ownership by 2025 will require an extensive network of on-street charging facilities.

Figure 31 below, shows predicted numbers of EV's parked on-street by 2025, based on the ownership figures in Figure 30, above. This was calculated by combining EV

uptake projections with assumptions on reliance of on-street parking (ie the 85% of residents without off-street parking).

Figure 31 shows potential number of resident owned EV's parked on street across London in 2025, which will require to charge on street. (Source: TfL, 2016).

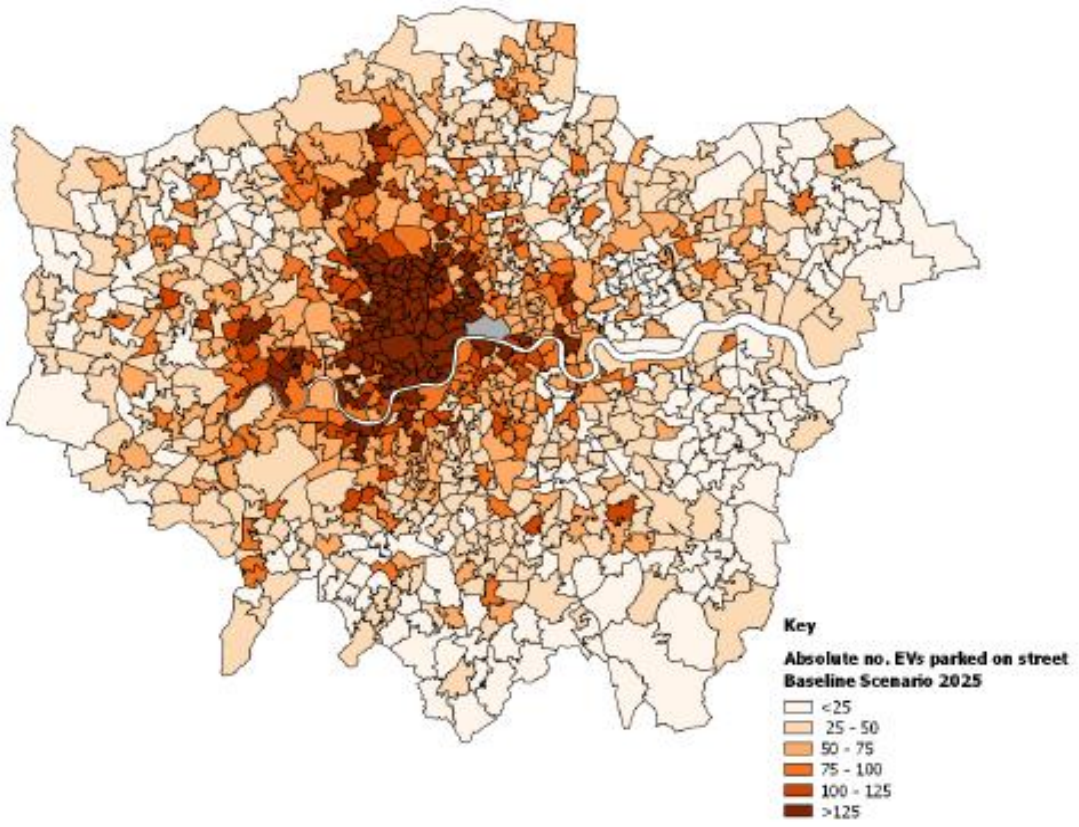


Figure 32. Zoomed into Tower Hamlets wards, showing number of EV's parked on street requring access to charging facilities could range from 25, to more than 125 depending on the ward. (Source TfL, 2016).

Figure 32. Zoomed in version of Figure 31.

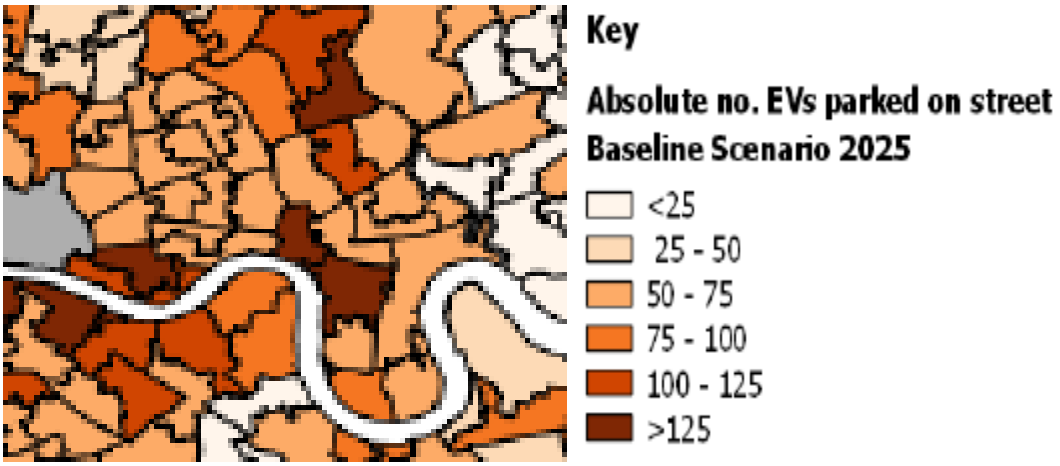


Figure 32, suggests there could be pockets of high demand for on-street charging provision in some residential streets in Tower Hamlets. Many of these locations already experience high levels of parking stress, and in areas like Canary Wharf there is limited on supply of on-street parking spaces.

The lack of additional parking and rising population densities may result in on-street charging demand being high in more wards than this projection suggests.

This will required an extensive network of local residential on-street charging hubs, which initially will need to be funded via the GULCS, the Borough's LIP and S.106 developer contributions.

LBTH will need to consider provision for additional EVCP capacity for future demand when planning to install on-street charging facilities, such as providing passive provision for the installation of additional charging points, as EV uptake and demand increase.

LBTH will also have to balance EVCP access with other conflicting demands for limited street space. Certain sections of street will need to be prioritised as EV charging hubs, resulting in the conversion of parking bays for EV charging. Although this, initially, could create conflict with non EV car owners, prospective EV owners need to have confidence they will be able to charge their vehicle on-street near their home, in order to make the choice to purchase an EV.

Provision of shared on-street charging facilities for residents, local businesses and visitors would help balance competing demands for parking.

The option of allowing residents to charge their EV's on-street by trailing a cable across the pavement from their property will also be considered. Guidelines will be

drafted to identify the criteria, terms and conditions. This will include charging mats of appropriate and charging lead specifications, and associated safety mechanisms to mitigate against the risks of trip hazards, electric shock and tampering plus the liability responsible and associated insurance cover.

To reduce the trip hazard risk, the protective matting would need to be secure to the floor, no taller than 20mm and should have tapered edges down to about 5mm, which is achievable to carry standard charging cables. 10 Amp EV cables are 2mm in diameter, 32 Amp EV cables are 5mm in diameter, so both should fit within 20mm tall matting.

There would also need to be an electric current instant cut off mechanism built into the lead and socket to reduce risk of electric shocks if the charging lead, socket or vehicle are tampered with or vandalised. This safety mechanism would need to be similar to those incorporated into existing public EVCPs including the lamp column socket charging facilities.

- Car club operators

Car club services provide an alternative to private car and require an accessible range of fast charging infrastructure to enable operators to introduce more ULEV vehicles into their fleets, to ensure at least 50% of car operators fleets in London are ULEV's by 2025.

Expansion of EV car clubs will be an essential service to encourage lower car dependency in Tower Hamlets, as population densities and demand for EVCPs increase from car owners.

Electrification of existing and all new car club bays can initially be funded through the GULCS funding and then longer term, operators should be required to invest in the infrastructure in designated bays for back to base services. Floating and point to point car club models will require access to rapids, destination fast chargers and on street residential charging networks.

- Taxis and PHVs

TfL has confirmed that 'zero emission capable' (ZEC) licensing requirements for taxis and private hire vehicles (PHVs) are coming into force from 1st January 2018 and from 1st January 2020 for newly licensed PHVs. In additional to these licensing requirements a number of PHV firms are already deploying or are interested in introducing ULEV's into their fleets.

The natural of taxi and PHV's journey requirements means electric taxis and PHV's will require access to charging facilities at home as well as fast and rapid charging facilities in strategic network locations (to minimise down time)during their hours of operation.

Figures 33 and 34 demonstrate that many taxi and especially PHV drivers are residents in Tower Hamlets who will not have access to off-street parking. These drivers will need access to on-street charging points close to their homes, if they are to convert to ZEC vehicles.

Figure 33. PHV driver home post codes showing high numbers are residents within Tower Hamlets, as shown by the shades of blue.

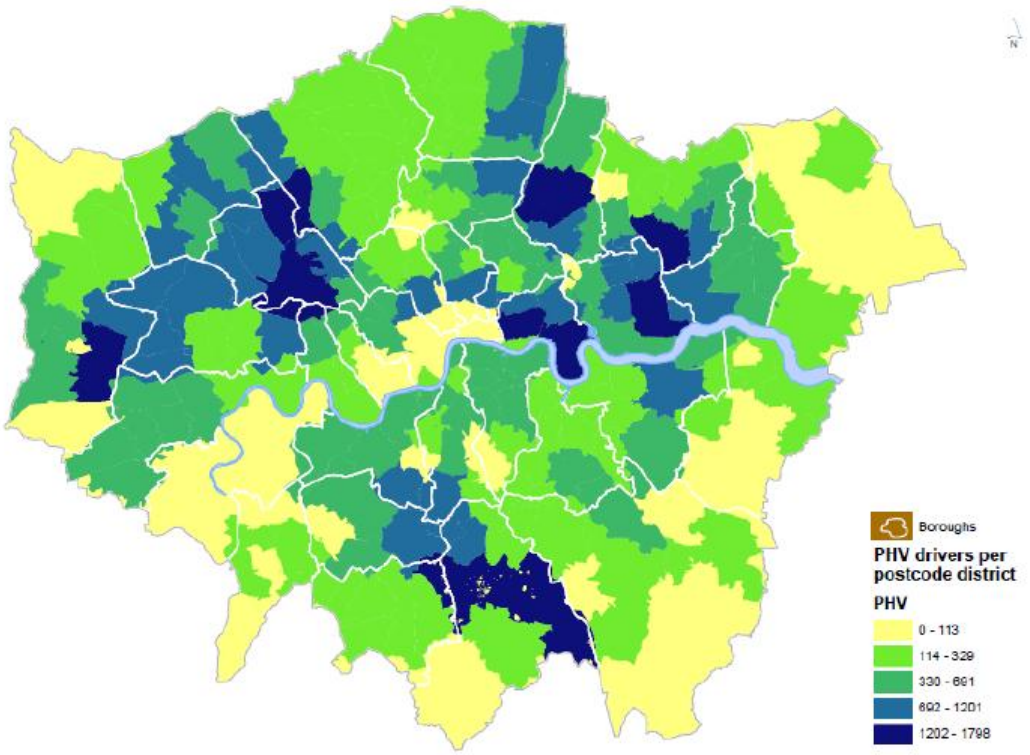
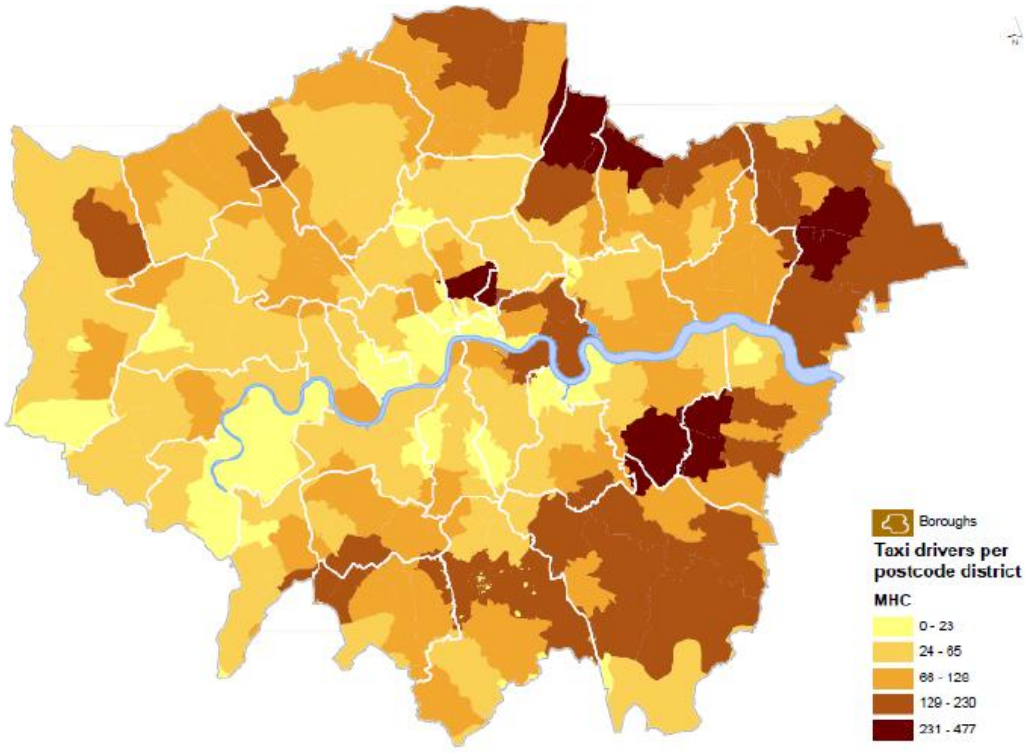


Figure 34 Taxi driver home postcodes shows there are high numbers of taxi drivers living in Tower Hamlets.



The data above highlights the need to provide local access to rapid and fast EVCPs in the short term, with a mass rollout of residential focused EVCPs in the short to medium term.

Immediate rollout of EVCP infrastructure is required to support the predicted increase in EVs parked on-street, supplying both residential and commercial demands (initially taxi, PHVs) through a range of charging facilities, including on-street residential, visitor, car club and business use, rapids for taxis, PHV's and public access and off-street (car parks and private).

- **Commercial fleet operators (deliveries and servicing)**

LGV and HGV freight traffic consisting of commercial fleet operators and local business deliveries and serving vehicles account for a substantial percentage of traffic within central and inner London, including Tower Hamlets. Within the City Fringe LEN area in Hackney, HGVs, LGVs and buses, account for 78% of all traffic.

The majority of these LGV's and HGV's are diesel contributing directly to local air pollution hotspots.

Reducing transport emissions from these vehicles is essential and the provision of fast charging on street infrastructure will be necessary to encourage fleet operators and local business to switch to ULEVs.

Areas of Tower Hamlets, such as Brick Lane, the LENs area and Canary Wharf have a

mix of residential and commercial activity competing to kerbside space. Provision of commercial charging networks such as Source London or Polar can provide access to encourage EV take up in the short term. In the medium term shared on street charging infrastructure for use by residents, business and visitors would help balance competing demands.

9.5 Identifying the appropriate EVCP locations

TfL's EV charging infrastructure guidance recognises the street type classification guidance used by TfL to classify all London streets according to the function of movement and place can be used to assist with identifying the most appropriate locations for installing different types of EVCP infrastructure.

As detailed in Figure 35 below.

Figure 35. EVCP mix for Street type classification

Type of charging infrastructure	Street type classification
Residential on street charging	Local Streets – make up 80% of London's road network, predominately borough managed roads where majority of boroughs residents live.
Rapid charging	Streets with high movement or high 'place' function and along strategic corridors. Often Rapids with located in off street 'hubs' close to these types of streets, close to town centres and transport hubs or in designated LENs areas such as the City Fringe LENS.
Destination / top up charging	High Streets and city streets, in town centres and retail/supermarket/leisure facility car parks that attract car trips.

The range of EV charging facilities appropriate to LBTH are:

- **On-street residential charging for residents without off-street parking facilities**.

Provision of on-street residential charging facilities, usually for regular overnight charging, can be provided by standard 3kw or 7kw standard charging points, which provide a full charge within 6-8 hours. Use of street lamp columns as charging points can also be considered to increase coverage for residential street locations, where the lamp column positioning is close to the kerb to minimise trip hazard potential.

The key EV users requiring access to on-street residential charging points are:

- Residents and visitors without off-street parking
- Services and deliveries
- Local businesses
- Car Clubs EV fleets

- **Rapid chargers**

Rapid charging points (up to 50kw) provide a full charge in approximate 20-30 mins. These chargers are suitable for high mileage users such as ZEC taxis, PHV's and electric commercial fleets involves in deliveries and servicing which require quick and frequent charges. Rapids are also useful for ULEZ car club fleets and as a top-up for residents. To support the introduction of EV taxis, LBTH should install rapid chargers via the TfL framework. LBTH should aim to install 10 rapid chargers by 2020 and 20 by 2025/26, subject to available funding, identification of suitable locations and power supply capacity.

- **Destination / top up charging**

These are usually fast charging units (22kw) providing a full charge within approximately 2 hours. They are offered by commercial operators such as the Source London and Polar networks. To ensure viability, fast chargers are usually located in trip generator destinations included High Street shopping centres, town centres, and retail/supermarket car parks, where there will be a high turnover of customers. Faster charging units are useful for car club vehicles, delivery and servicing vehicles and as back up options for residential charging.

9.6 EVCP Installation targets

Taking into account the above summaries of potential EVCP demand, LBTH will need to be ambitious with its targets for implementing publically accessible charging infrastructure. The Action Plan table details the recommended EVCP installation requirements and delivery schedule. In summary this involves the implementation of:

- **Commercial Networks** of faster chargers provided by Source London and accompanying alternative network such as Polar. Approximately **200** fast chargers could be installed through this network by 2025/26.
- **On-street residential networks**. A minimum of 150 EVCPs will be required by 2025/26, with interim milestones of 50 installed by 2020 and **150** available by 2025/26. Ideally a network closer to 300 should be installed by 2025/26, requiring 100 EVCPs available by 2020 and a further 200 installed by 2025/16. **300** on-street EVCPs would provide a borough wide coverage of 2 EVCPs within 10 minutes (or within 500 metres) or every residents home.
- **Rapid chargers.** Install 10 GULCS funded EVCP's before 2020. LBTH should aim for the installation of 4 rapid charges by 2018/19 and **10** in total installed by 2020. LBTH should then aspire to increase the number of rapid charges to at least **20** by 2025/26, subject to funding and power supply capacity.

It should be noted that it is currently difficult to estimate how many EVs would be serviced by a single on-street EVCP. Currently there are very few clusters of EV vehicles which rely solely on public chargers. Due to this lack of information we are unable to confidently predict how many vehicles an EVCP could support. Our best estimate would be 10-15 (one Standard 7kW charger, with two bays) but there is significant uncertainty in this number.

9.7 Trial innovative charging solutions

To prepare the borough for a future with high demand for EV charging infrastructure in residential areas it is important to trial new technologies which could be rolled out in the future. A particular focus should be to undertake a feasibility study to identify suitable residential lamp column charging locations, incorporating the learning from the trials undertaken in Hounslow and Kensington.

Innovative shared on-street charging solutions such as charging from lamp columns could ensure the provision of a high density of accessibility on-street charging facilities to meet predicted on street demand by 2025.

9.8 Electrification of LBTH's fleet of Council and contract vehicles

LBTH currently runs a fleet of vehicles. These vehicles could be converted to EVs. We recommend that LBTH replaces its vehicles with EVs as their replaced or leasing contracts are renewed.

9.9 Make use of underutilised housing estate land for new charger sites

Tower Hamlets Homes owns large amounts of land within the borough, including 788 parking spaces which are currently unrented. These underutilised bays could be redesigned as public electric vehicle charge points. Alternatively bays could be electrified to encourage EV ownership amongst residents of THH's 21000 residential properties.

Provide for existing demand and ensure viability of charging point.

The provision of electric vehicle infrastructure should remain cost neutral wherever possible so as not become a financial burden on the council.

To achieve this LBTH should make use of all available funding and revenue. This includes government grants, partnerships with private companies which provide profit shares and fees, make use of planning powers (sect. 106 and CIL).

9.10 LENs and NoF initiatives

There are a number of innovative proposals and incentives being developed within the LEN's and NoFs schemes prioritising access for ULEVs, focuses on freight, deliveries and servicing vehicles, in areas of poor air quality. LBTH should consider rolling out these LEN's proposals in appropriate locations across the borough, providing fast and rapid charging infrastructure to encourage the take up of ULEV delivery fleets.

9.11 To monitor and adapt to developments in the field of EV

EV is a fast moving new technology. To ensure LBTH is providing the best possible infrastructure it must continue to periodically monitor developments and update strategy accordingly. A review of EVCP strategy should be carried out no later than 2020.

9.12 Lobbying and working in partnership

The recommendations and actions contained with this strategy supports the delivery of several actions identified within LBTH's Air Quality Management Plan, relating to Council vehicle fleets, green procurement, lobbying TfL and LIP3 policies for delivery of Healthy Streets and Liveable Neighbourhood schemes. All the 'Cleaner transport'

actions are supported as well as identifying lobbying and partnership opportunities.

10. Action Plan for the delivery of LBTH EV Charging strategy

The following action plan contains several proposals to support the take up of EV's and provide the range of charging infrastructure, supporting policies and incentives to encourage EV take up and meet future charging demand. The measures are SMART, with a timescale and funding options provided.

Objective	Action / Tasks	Outcomes	Details	Time Scale: Short term: <2yrs Medium: 2-5 yrs Long term: 5+ yrs	Funding Source
Support the uptake of EVs through provision of a range of charging infrastructure	• Respond to current demand. Undertake survey of charging habitats of EV users in Tower Hamlets. • Provide for future uptake • Install appropriate infrastructure in right locations • Provide EVCP network to cover whole of LBTH	Increase proportion of EV's in LBTH from 0.25% to 2% by 2020 and above 10% by 2025. **Install up to 300 EVCP's by 2025/26. (Minimum target is 150 EVCPs).** **Supported by network of 100 EVCP's by 2020/21 and 300 EVCPs by 2025/26 to ensure all resident and business EV owners in LBTH are within 500 metres of an accessible charging point by 2025.**	The overall ambition of the EV strategy should be to increase the proportion of vehicles which are EV. Currently 0.25% (132) vehicles registered in LBTH are EVs. LBTH should aim to raise this number of EVs to 2% by 2020 (1056 EVs) and at least 10% (5280 EVs) by 2025. Immediate rollout of EVCP infrastructure is required to support this increase in EV's, supplying both residential and commercial demands, through a range of charging facilities, including on street residential, visitor, car club and business use, rapids for taxis, PHV's and public access and off street (car parks and private) providing a network of at least 150 EVCPs and an aspiration to stall 300 by 2025/26. TfL research informs that 93% of EV users would use a fast charge point within a 5 minute walk of their vehicle and 73% would use a charge point if it were within 10 minutes walk. This equates to a distance of roughly 500m. LBTH should aspire to install significant ECVP coverage to ensure all residents and businesses are within 500m walking distance to an accessible charging point. This would require an estimated minimum of 150 EVCP's installed at locations spread across the borough. However, EVCP's ideally should be located in clusters of at least 2 units per location, to increase availability. This will require the installation of 300 publically accessible EVCP's.	Short, Medium and Long Term	Various – see below
Install range of EVCPs across LBTH to provide for existing demand and support growth of EVs	**Destination/top up charging infrastructure:** • **Sign up to Source London** to enable charging infrastructure to be quickly installed across the borough. Co-operate with BPL to find suitable locations • **Consider introducing alternative commercial charging networks (in addition to Source network)**. Arrange meeting with Chargemaster (provide Polar network) and Ubitricity (use smart	Provides network of maintained fast charging infrastructure for destination/top up charging in high turnover locations, such as town centres/retail/supermarket or transport hubs. Membership and PAYG access. No investment required by LBTH and income source guaranteed. Source London installs chargers. Council will received an annual permit income from each Source London charging point. Alternative networks, such as the chargemaster Polar network could also be introduced to extend EVCP coverage	Source London is able to provide fully managed chargers at no cost to LBTH and will provide an annual income per charger. This is an efficient, cost positive way to provide chargers, however parallel networks are also required to meet the needs of all EV users. Source London are likely to aim for a rapid installation of fast chargers, located in clusters of up to 3 in high turnover destinations. It is realistic to assume up to 100 fast charger ECVPs could be installed by 2020. Source London representatives have confirmed they have the capacity and resources to deliver this infrastructure within a year and have the ambition to roll out over 200 EVCP's if they can agree suitable locations with LBTH . This figure could be higher if an additional commercial network is added, such as Polar.	Short and Medium Term	**COST POSITIVE FOR LBTH** Externally funded by Commercial Operators + generates modest income for LBTH

	leads and lamp column charging).	of LBTH residents and businesses.	Commercial network EVCP energy requirements will need to be linked in to LBTH's infrastructure delivery plan to ensure there is future grid capacity.		
	On-Street residential charging Install GULC funded on street charging points for residential, car club use and local business use.	Locate in following areas: • where already demand for charging points, • where likely to be future demand (ie residential areas without off street parking provision), • to provide access for local business use, • to electrify existing and future car club bays. • Minimise loss of existing on street parking provision. • Aim to install at least 2 charging spaces per location. • Require a minimum of 150 EVCP's installed for residential access by 2025/6. • Ambition is to install up to 300 EVCP's by 2025/26	PCL have identified 35 potential sites for rapid, destination, and residential on street EVCP installation based on a desk top analysis. A thorough borough wide, street by street audit is required to identify suitable sites for up to 300 EVCPs to be installed by 2025/26. This will enable EVCPs to be installed in pairs at 150 locations across the borough, providing residents with access to an EVCP within 10 minutes walk (under 500 metres) from their home. EVCP's installations will include standard chargers, including lamp column charging and faster charging installations in locations of high demand. The GULCS framework will advise of the types of residential charging networks and back office arrangement to implement. EVCP energy requirements will need to be linked in to LBTH's infrastructure delivery plan to ensure there is future grid capacity.	Short, Medium and Long Term	**GULCS + LIP funding** **£36k** confirmed from GULCS for 17/18 delivery of EVCP's + 25% LIP match funding = **£48k** budget for 2017/18.
	Rapid Charging Network Install rapid chargers procured via TfL framework	Aim to install 10 GULCS funded EVCP's before 2020. TfL framework contractors will install rapids (currently 4 preferred locations). 9 further locations under consideration. LBTH should aim for the installation of 4 rapid charges by 2018/19 and **10** in total installed by 2020. LBTH should aspire to increase the number of rapid charges to at least 20 by 2025/26, subject to funding and power supply capacity.	TfL is already investigating a small number of sites for rapid chargers in the borough. LBTH should continue to support this process by identifying further locations, such as air quality hotspots (ie LEN), and busy high streets (Brick Lane/Shoreditch). The provision of the rapid network is vital to support the conversion of taxis, and PHV's to EV's and provides commercial delivery and servicing fleets with confidence to convert to EVs. Also provides back up charging option for residential EV usage. LBTH should aim to maximum utilise of TfL's funded rapid programme and install 10 rapid charging points by 2020. The ambition should be to have installed a total of 20 rapid chargers by 2025/26. Need to link in power supply requirements with LBTH's infrastructure delivery plan.	Short and Medium Term	**COST NEUTRAL FOR COUNCIL GULCS/TFL Funded**
	Introduce charging hubs, as part of the delivery of the Liveable/ Healthy Streets approach identified in the draft MTS3.	Creation of charging/sustainable transport hubs. Incorporating EV charging facilities (inc lamp columns), alongside electric bicycle docking stations/secure on street cycle parking provision (in residential areas (flats) with limited cycle storage facilities), and electrified car club bays. Provide EVCP hubs, where concentration of charging facilities in locations where low emission transport is prioritised, to address air quality issues.	Linked to similar LEN's initiatives being developed for the City Fringe low emissions neighbourhood (see below). Also supports the merging MTS3 policies, incorporating Health Streets and Liveable Streets schemes, and supports LBTH Air Quality Management Plan (AQMP) proposals. Locations should be identified to fit the objectives of the AQMPs, targeting areas with the poorest air quality, closure to schools, playgrounds and shopping areas. Brick Lane should be considered for such measures.	Medium and Long Term	**LBTH LIP FUNDING** Liveable Neighbourhoods and Healthy Street funded schemes through LIP3 funding mechanis

					m
	Trial innovative charging solutions Carry out audit of street lighting and other suitable street furniture, such as lit signage and BT boxes to identify suitably located infrastructure and adequate power supplies.	Use of existing street furniture for charging source, such as street lighting columns. • Set up lamp columns charging trial for residential and business use in appropriate on street locations. • Trial utilisation of existing electricity feeder pillar supply in market areas for EV charging on **non** market days.	Lack of on street residential charging facilities are a major barrier to EV adoption in inner London where 85% of homes have no off street parking (TfL). Lamp post charging is currently seen as the most viable and economic mode of residential charging. LBTH should run a large trial in residential streets similar to the smaller successful trials run by other London Boroughs, including Richmond, Westminster and Hounslow's Ubitricity model. There are 10 street markets in LBTH, with a range of operating days, some 6 days a week (Monday-Saturday) or 5 days (Monday –Saturday) early morning till evening, others are 3 times a week or just on Sundays, which could be more practical for EVCP trials.	Short and Medium Term	**GULCS + LIP Funding + External Investment**
	Investigate options for allowing charging cables across public footway to enable on street EV charging from home.	Draft criteria for establishing guidelines for use of charging mats over the public footway to enable charging cable to trail from property, across public footway to charge EV parked on street. Clearly need to emphasis health, safety and liability risks associated with this option.	Draft criteria and guidelines to allow residents, in appropriate locations, to trail charging cables from their property across the footway to charge an EV parked on street. Through use of a protective mat to cover the charging cable to reduce risk of trip hazards. There are several health, safety and liability risks to be considered and mitigated against with this option. However, it could be a low cost short term solution to enable residents, especially the taxi and PHV drivers living in the borough, to charge their EV's directly outside their property, if strict criteria guidelines and liability responsibilities were agreed and adhered to. Criteria would include buy a protective mat and charging lead of acceptable specifications.	Short and Medium Term	**LIP funding and externally funded by resident requesting to charge on street from home**
Support the uptake of EV taxis, PHV's and freight (deliveries and servicing)	Through progressing the installation of rapid chargers via TfL framework and accessible fast charging on street EVCP networks	TfL installs rapids in key locations for taxis and freight	With the introduction of the ULEZ and the EV taxi requirements there will be high demand for rapid EV charging within the borough. This will be concentrated around taxi ranks, stations and key routes into London. Rapid chargers should be installed at key locations.	Short Term	**GULCS + LIP Funding**
Electrify the LBTH fleet	To replace the LBTH fleet vehicles with EVs wherever possible and to provide accompanying chargers to support them at depots.	All new LBTH vehicles to be EV	LBTH should act as an example to the public and convert its fleet vehicles from ICEs to EVs. A policy should be implemented that all new vehicles will be EV. Also install chargers to service them at depots. This should be supported by a LBTH Travel Plan policy and target and will support LBTH's Air Quality Management Plan.	Medium Term	**LIP and LBTH Parking Revenue funding**
Workplace Travel Plan Policy	Travel Plan policies to incentivise conversion of grey fleet to EVs	LBTH should consider introducing work place travel plan policies requiring employers to convert their employees grey fleet to EVs LBTH to lead by example and ensure its own policies for employee essential and casual car user allowance for grey fleet	This should be supported by a LBTH Travel Plan policy and target and will support LBTH's Air Quality Management Plan actions regarding LBTH's fleet operations. Could also be introduced as a condition within construction management plans for new developments and delivery and servicing plans for freight operations.	Medium Term	**S106 and LIP funding**

		use are incentivised for electric car use.			
Green Procurement	Use procurement mechanism to require contracts to use EV's for delivery of services.	Contractors required to introduce ULEVs for their supply chain and delivery of services	This should be supported by a LBTH Travel Plan policy and target and directly contributions to the delivery of LBTH's Air Quality Management Plan, related to green procurement for contracts, borough fleets, deliveries, serving and freight.	Medium Term	**COST NEUTRAL**

Electrify car club bays	Install EVCP's at existing and new car club bays to allow electric vehicles to operate	Ensure at least 50% of car club bays are electrified by 2025 (currently equates to 86 bays). LBTH should aim to encourage car club operators in borough to have 100% ULEV fleets by 2025.	TFL's Car Club Strategy target requires at least 50% of car club fleets to be ULEV vehicles by 2025. This will require car club fleets to have adequate provision to EVCP charging infrastructure, through the electrification of at least 50% of existing and new car club dedicated bays and operators fleets having access to other EVCP networks. There are currently 171 car club bays within LBTH which could be converted to EV. Car club fleet operators require assurances that adequate charging infrastructure is accessible to roll out EV's within their fleets. Car Club EV's play an important role in normalising EV by raising familiarity and providing drivers with an opportunity to try electric vehicles. Car Clubs also play an important role in reducing private car ownership and usage. Supports same action identified in LBTH's Air Quality Management Plan.	Short, Medium and Long term	**GULCS and external funding** (car club operators)
Electrification of car club fleets	Include as requirements when current car club contracts are retendered	Include ULEV fleet requirement as condition of new car club contracts. Require car club operator's fleets in LBTH are at least 50% ULEV fleets. Ensure car club operators in LBTH introduce ULEV's into their fleets and removed all diesel and Incorporate requirements for Developers to source car club provider with ULEV fleet options for S106 conditions for the provision of car club services for new developments.	Support TFL's ULEV Delivery strategy target to ensure 50% of car club operator fleets in London are ULEV's by 2025.	Medium term	**COST NEUTRAL TO LBTH**

LENs and NoF initiatives: Priority road access to EV's through filtered permeability road closures	Feasibility study for piloting road closures with filtered permeability, allowing access for ULEV's. Allocating strategic located car parks for EV only access, with charging	Incentivise EV ownership by introducing filtered permeability, only providing accessing for EV's and not ICE vehicles. Roads and junctions identified as poor air quality hotspots should be considered. Priority locations would be where there are existing rat runs, congested junctions and locations by local school Develop LEN's proposals for implementation in LBTH, focussing on ULEV priority for access, loading and freight deliveries.	Filtered permeability, allowing access for ULEV's but not ICE vehicles can be enforced through the use of number plate recognition cameras. This is the approach being considered by Hackney Council as part of the City Fringe proposals within the Low Emission Zone neighbourhood, in which some streets could be prioritised for access pedestrians, cyclists and ULEV's, focusing on freight and deliver traffic. Similar proposals should be introduced in LBTH. PCL are already considering feasible sections of LBTH's road network where filter road closures could be trialled, such as part of road safety traffic management proposals around schools, bring the added benefit of alleviating traffic congestion, encouraging active travel and significantly improving air quality. Undertake feasibility of introducing these measures for ULEV only access in commercial streets with poor air quality. Egg, the Brick Lane area, at certain busy periods and for deliveries traffic. Restricted access to ULEV's during periods of the day, to improve local air quality and encourage operators to convert to ULEV for undertaking deliveries.	Medium and Long Term	**LIP FUNDED** Liveable Neighbourhoods and Healthy Street funded schemes through LIP3 funding mechanism

			These initiatives should be identified in conjunction with LBTH's Air Quality Management recommendations and is linked to the Liveable Streets and Healthy Streets policy approach identified in the draft MTS3.		
Incentivise EV via parking tariffs	Provide discounted P&D fees for EV drivers	Reduced parking fees, which will act as an incentive for EV adoption. Review Borough's parking charging policies and charging structure	LBTH already discounts parking permits heavily for EV vehicles. To further this policy LBTH should consider similar discounts at its P&D parking bays to encourage the use of EVs. LBTH should consider active travel related incentives to encourage residents to convert from ICE vehicle CPZ permits to EV permits.	Medium Term	**LBTH parking revenue**

Make use of underutilised housing estate land	Install EVCP's in some of the social housing parking provision. Currently 766 unutilised parking bays	EV bays installed on housing land for use by public and residents. Potential income for housing from lease deals.	Tower Hamlets Homes owns large areas of land within the borough, including 788 parking spaces which are currently not rented. These underutilised bays could be repurposed as public electric vehicle charge points. Alternatively bays could be electrified to encourage EV ownership amongst residents of THH's 21000 residential properties.	Medium Term	**GULCS and Parking Revenue**

Remain cost neutral	Sign up to Source London leasing and profit share agreement.	Annual income from Source London chargers	Blue Point Ltd offer an annual payment for each charger operating within a borough. This income should be used to support additional chargers in non-commercially viable locations such as residential chargers.	Short Term	Cost positive. Will generate income stream
	Make use of GULCs and other OLEV funding.	Funding for 75% of installation costs	GULCS and other OLEV grants are available to cover 75% of EVCP installations. Best use should be made of this funding stream.	Short Term	GULCS
	Make use of section 106 / planning policy to fund public chargers in new developments	Income for provision of chargers at no cost to the council	Planning policy can be used to obligate developers to contribute to EV charging. This can take the form of specific installations via section 106 or a contribution to EV infrastructure overall via CIL or a strategic electric vehicle charging infrastructure fund.	Medium Term	S.106
	Seek additional funding sources to support roll out of EV charging infrastructure	Identify options for sponsorship of EVCP's funding by GULCS and rapid chargers. Seek partnerships and trial opportunities to pilot emerging and innovative EVCP technologies in the borough.	The charging point unit, including lamp column chargers could accommodate sponsorship income potential which would support the longer term viability of increasing the installation rate of EVCPs. Such as increasing the viability of locating new EVCP's in areas where there is not an identified EV owner or potential customer based. Embrace trial opportunities for new and emerging EVCP technologies. Including sourcing renewable energy sources to address predicted rising demands on national grid. Has tidal flow energy generation from the River Thames being considered as an alternative energy source for EV charging?	Medium term	Advertising

Adhere to London Plan EV requirements	Ensure enforcement of 20% active requirement.	20% active and 20% passive provision at all new developments	The 20% active, 20% passive EVCP provision required of new developments in the London Plan is vital to the overall EV strategy in LBTH, where there are large volumes of new development planned.	Short Term	COST NEUTRAL
	Review Updated London Plan when released	Any new policies to be integrated into EV strategy. New draft London Plan scheduled for consultation publication in Autumn 2017.	It is expected that the revised London Plan will include EV policies. LBTH should review the document as soon as it is available so that the EV strategy can be adapted accordingly.	Medium Term	COST NEUTRAL

Incorporate EVCP Strategy recommendations in development of LIP3 and related Air Quality and carbon reduction strategies	Ensure EVCP infrastructure implementation is incorporated into the policies, deliver plans and identified funding mechanism for LBTH's LIP3 proposals.	Ensures opportunities to deliver EVCP infrastructure are effectively identified and efficiently funded.	The LIP3 process will progress in earnest during 2018.	Short Term	LIP / Staff resource
	Ensure the recommendations of this strategy are delivering in conjunction with the proposals identified in LBTH's Air Quality Management Plans.	Supports delivery of objectives for both strategies	Strategies complement each other. This strategy supports the delivery of several actions identified within LBTH's Air Quality Management Plan, relating to electrifying Council fleets, green procurement, LIP3 policies for local solutions through the delivery of Healthy Streets and Liveable Neighbourhood schemes. All the Cleaner transport actions are supported as well as identifying lobbying and partnership opportunities.	Short and Medium Term	LIP / MAQF
To review EV strategy and adapt to new developments in the field of EV	Carry out a review of EVCP strategy by 2020/21 to ensure delivery of action plan targets and proposals.	Review and revise strategy in 2020/21 in response to EV demand, technological and policy developments. To be assessed against achieving the following targets: • **Increase EV car ownership share to 2% by end of 2020** • **Installed 50 EVCP's across LBTH by 2020/21 (by March 2021)** Trial innovation emerging EV charging technologies: • Seek funding opportunities and partnerships to trial emerging charging technologies such as wifi and inductive loop charging. (both regional, national and international (through LEPT) • Work with TfL and bus operators to ensure LBTH bus routes are prioritised for the roll out of EV bus service fleets. Identification of viable bus stand locations for the installation of rapid and inductive/wireless charging opportunities should assist this process. • Support the Mayor of London's proposals to expand the ULEZ and other measure to reduce vehicle emissions, such as the introduction of a diesel scrappage scheme.	Target to increase number of EVCPs across LBTH to 50 by end of 2020/21. • Interim target for 2018/19 to have installed 15 EVCP's. • Interim target for 2019/20 to have installed another 15, bring total to 30 new EVCPs. • Interim target for 2020/21 to have installed a further 20, bring total to 50 EVCP's installed over 3 year period from 2018/19 to 2020/21. EVs and EVCPs technology is a rapidly evolving industry and policy needs to adapt to embrace new approaches. To ensure LBTH is providing the best possible infrastructure it must continue to periodically monitor developments and update strategy accordingly. Funding opportunities should be sorted with regional, national and international partners. PCL have contact with officers at the London European Transport Partnership (within London Councils) who advise on emerging European funding bid and partnership opportunities in the field of increasing EV take up and trialling charging technologies. The air quality concerns facing LBTH should be used to lobby TfL and bus operators to prioritise the install EV or hybrid fleets on LBTH bus corridors. Access to rapid charging locations at bus stands, is essential for this transition to take place quickly.	Short, Medium and Long Term	LIP + European bid opportunities

APPENDIX A – Proposed EVCP Locations

APPENDIX A:

EVCP Site Selection Criteria for LBTH :

The proposed sites represent 35 locations at which it will be easiest to implement the initial round of EVCPs. Focus was on car parks, key routes into London and areas frequented by taxis, and initial feedback for on-street locations where there is less parking stress, which would be suitable for residential charging points. At last 150 sites will be required to obtain a good geographical spread. The following criteria have been used to guide the selection process:

- TfL demographic model used to indicate demand
- Residential areas where less on street parking street
- Areas with high concentrations of existing EV permits (existing demand)
- Proposed new developments
- LEN area
- Retail/Commercial areas
- Taxi Ranks and taxi hotspots
- Arterial routes into London
- Position of existing chargers
- Parking Stress (avoided where possible)
- Car parks (prioritised)
- Housing estate land has been excluded (although we recommend it is utilised in the future)

Location details:

	Location	Type	No. Of Points	Description
1	Epsom Street Car Park	Rapid	2	Small car park, Just off A12
2	Payne Road	Rapid	1	In existing permit bay outside Bow Baptist Church.
3	Tesco, Three Mil Lane	Fast or Rapid	Multiple	One existing 3kW charger in large car park. Potential to greatly expand provision.
4	Layby under Lowe Lea Crossing	Rapid	2 or more	Close A13 junction
5	Electron House Layby	Rapid	1	Close A13 junction
6	Wick Lane	Rapid	1	Industrial area close to A12. Kerb build out required in existing permit bay or SYL
7	Maplin Street Taxi rank	Rapid	1	Taxi rank adjacent to Mile End Station
8	Vehicle Testing Centre	Rapid	1	Just off A13 junction

9	Victoria Park Car Park	Fast	1	Council owned, public car park
10	Roman Road Car Park	Fast	1	Council owned, public car park
11	Mile End Stadium	fast and rapid	Multiple	Public, large car park, close to mile end and commercial road
12	John Orwell Sports Centre	Fast	1	Small car park. An off road location in area of high parking stress.
13	Lidl	Fast	1	Large car park, close to Commercial Road / A13.
14	Asda, Isle of Dogs	Fast	Multiple	Large car park, in residential / commercial area. Near cross harbour station.
15	Sainsburys, Whitechapel	Fast	Multiple	Just off Mile End Road. Key route into the City.
16	Anchor Retail Park	Fast or Rapid	Multiple	Large car park in retail park of Mile End Road.
17	Arbour Square	Fast	1	A concentration of EV parking permits
19	Winterton House Estate Car Park	Fast	1	Close to Watney Market, just off commercial road
20	Buress Street On Street Bay	Rapid or Fast	1	Just off Mile End Road - single bay. Key route into the City.
21	Newark Street	Fast	1	Outside Barts School of Medicine, next to loading bay in existing permit bay, wide footway. Ideal for visitors to University or Hospital.
22	Bethnal Green Road Taxi Rank	Rapid	1	Existing P&D bay adjacent to taxi rank outside the Tesco on Bethnal Green Road.
23	Canrobert Road	Fast	1	Around the corner from taxi rank
24	East Smithfield Taxi Rank	Fast	1	Convert one of the three taxi ranks outside the Royal Mint into an EV charging bay.
25	St. Stephan's Road	Rapid or Fast	1	Use end of shared use bay north of taxi rank. Requires kerb build out.
26	Trinity Square	Fast	1	Covert taxi rank bay outside of No.43 to EV. Close to Tower Hill Station.
27	Dunbridge Cab Company	Fast	1	Dunbridge Street Cab Repair Garage forecourt.

28	Devons Road	Fast / Rapid	1	Bays outside of Bow Taxi's garage, alternatively bay at end of Rainhill Way. Suitable for Taxis and residential charging.
29	Dellow Street	Fast	1	Opposite Shadwell Station in existing P&D bay at wide point of footway. This area as a cluster of EV parking permits.
30	Westferry Road	Fast / Rapid	1	Layby at end of Millway Outer Dock currently with two residents bays.
31	Stafford Street	Fast.	1	Next to existing car club bay.
32	Tredegar Square	Fast or Lamp post	Multiple	Several options. Alongside car club bay for example.
33	College Terrace	Fast or Lamp column	1	On defunct school keep clear marking
34	Chisenhall Road	Lamp Post / Fast	Multiple	Low parking stress residential area ideal for lamp post charging or a fast charger outside of Chisenal Studios.
35	Driffield Road	Fast	1	Area around the Boris Bike station.

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