Sylvia Broadley EV Presentation Notes

Slide 1-High level assessment of Birmingham's EV charging needs- Presented by Sylvia Broadley.

Slide 2- Birmingham's fast & rapid EV charging network will be the first component of a comprehensive city-wide approach

Fast & rapid charging network deployment: (Between 2020-2022)

- 394 fast & rapid EVCPs installed in Birmingham;
- EVCPs aimed at taxi drivers, but will serve wider community too;
- First component of a city-wide charging offer

City-wide Birmingham EV charging network developed: (Between 2022-2030)

- Birmingham's EV charging offer expanded beyond the initial fast & rapid network, based on the city-wide EV charging strategy;
- EV charging deployed in residential areas aimed at drivers who lack private parking;
- Commercial fleet charging facilities deployed at strategic locations;
- Rapid charging network grown in line with Birmingham's EV market development

Slide 3- There are many types of EV charging – Birmingham's fast & rapid network will focus primarily on destination and en-route opportunities

Charging Type	Home charging (for residents with shared car parks, landlords will need to enable home charging	Residential-On street parking	Residential charging hub	En-Route charging	Destination charging	Workplace charging
Use case	Charging at home in a private driveway / garage, or apartment car	Charging at a public on-street EVCP near to the driver's house,	Charging at public EVCPs in the driver's local area. In rapid hub case,	Charging along major arte rial routes or main roads	Charging in car parks at the end of an outward journe y. "Top	Charging while parked at workplace. Predictable + long dwell times.

	parking space, typically overnight	typically overnight	quick turnaround means similar model to petrol refueling.	in urban areas. Quick turnaround times.	up" charging model.	Not strictly public charging.
EV's per EVPC	1 EV per EVCP	Small no. of EVs per EVCP	Many EVs per EVCP	Many EVs per EVCP	Many EVs per EVCP	Small no. of EVs per EVCP
Key user group	Residents with off-street parking	Residents without off-street parking	Residents without off-street parking, taxis, car clubs etc.	Taxis, residents without off-street parking, car clubs, company cars	All cars	Employees (particularly those without off-street parking)
Typical location	Driveway, garage, apartment block car park	Along residential street pavement	Along urban roads (not genuine hub), public car park, forecourt etc.	On-street, forecourts and other sites near main roads, e.g. hotel, retail park	Range of car park types, e.g. public car park, supermarket, shopping centre	Employee car park
Typical charging speed	Slow	Slow to fast	All speeds, more likely fast to rapid	Rapid to ultra-rapid, some fast in car parks	All speeds – some sectors shifting to rapid	Slow

Slide4- A high-level assessment of Birmingham's EV charging needs has been carried out

1. EV uptake projections

High level projection of EV stock growth in Birmingham out to 2030

Assumes fastest feasible growth in sales

Considers battery electric vehicles (BEVs) and plug-in hybrid electric vehicles

2. EV charger requirement

High level assessment of the number of chargers needed to support the EV uptake

Considers rapid chargers (50kW+), fast chargers (22kW) and slow chargers (7kW)

3. Comparison with plans

Comparison of the projected charge point requirement with the planned deployment as part of the 2-year fast & rapid contract with ESB

Assessment of how well this deployment puts Birmingham on track to meet demand by 2030

It is important to note that the assessment completed is based on initial, high level calculations which will be refined through EV and EV Charging Point (EVCP) stock modelling as part of the upcoming city-wide EV charging strategy in the coming months. The numbers shown are therefore not "final" and should be treated as such. Note: "charger" refers to an individual EV charging device, which can have multiple charging connectors. Each connector is referred to as an "electric vehicle charge point" or "EVCP"

Slide 5- EV uptake projections – we have modelled an ambitious switch to electric cars and taxis

We have assessed the fastest introduction of car and taxi EVs considered feasible1, with the sale of petrol/diesel vehicles ending in 2030:

EV sales grow from <5% in 2020 up to 100% in 2030 – this leads to EVs comprising **ca. 45% of total car stock by 2030**

This would achieve a **ca. 51% reduction in GHG emissions** by 2030

This highlights that switching from petrol/diesel to EVs is not sufficient – there is significant need for modal shift, reduction in car numbers and a change in the way cars are used (e.g. more shared cars)

For reference, net zero modelling for Greenwich showed that in addition to aggressive EV sales, total vehicle miles would need to reduce by ca. 45%, and even then, the 2030 net zero target would not quite be met.

Slide 6- Rapid EV charging requirement – we have assessed the infrastructure required to support and drive the switch to electric

Drivers with driveways / garages will do vast majority of charging at home – modelling shows **ca. 80% cars / vans in Birmingham have access to off-street parking** (landlords will need to enable charging for tenants)

There is uncertainty in the scale of public charging required, due to uncertainty in how the EV and EV charging markets will develop

Initial estimates of charger volumes required have been made, based on the EV uptake shown, and the latest research into how the ratio of EVs to EV chargers will evolve in the UK *(based on 2020 International Council on Clean Transport (ICCT) analysis)*

By 2030, Birmingham is expected to need in the region of **ca. 600 public rapid EVCPs1** (50kW+) and **ca. 9,000 slow-fast EVCPs** (7-22kW) – this represents a baseline case, and depending on how the 150kW+ EVCP market and EV capabilities develop, the volume of rapid EVCPs required in 2030 may in fact be lower than those shown below

High level projection of the rapid EVCP stock required to support ambitious EV uptake in Birmingham

Year	Rapid Charge Point Requirement
2021	96
2022	124
2023	166
2024	215
2025	271
2026	332
2027	397
2028	467
2029	539
2030	616

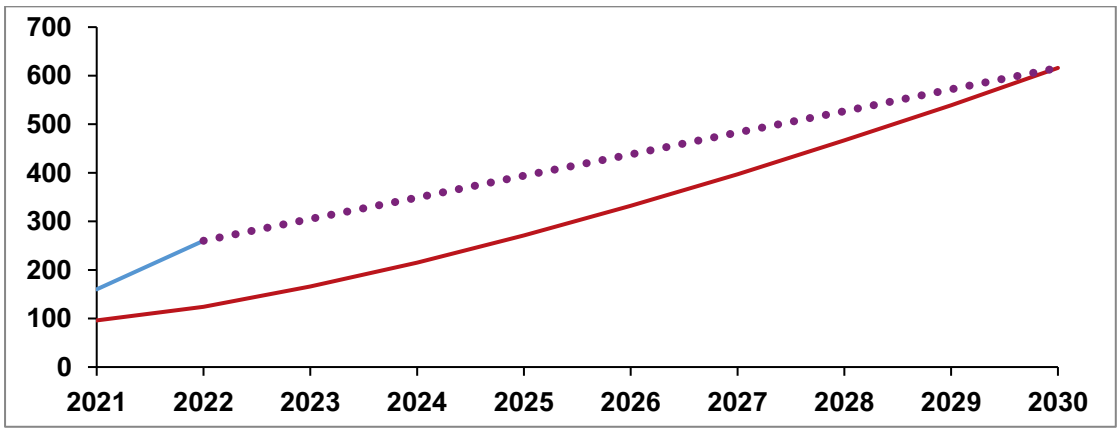
Slide 7-Comparison with plans – we have assessed how the current public EV charging contract aligns with Birmingham's rapid charging requirement

The current EV charging network contract with ESB will deliver **200 rapid EVCPs** by end-2022 at high quality locations focused on the serving the city's taxi community, but also publically accessible – these will be located on a mix of public and private sites

There are ca. 60 existing rapid EVCPs within Birmingham postcodes at a range of sites (forecourts, leisure centers etc.)

By end-2022, **Birmingham will have over 250 rapid EVCPs,** putting it on track to support a quick transition to EVs and meet the city's 2030 rapid charging infrastructure requirement (based on ambitious EV uptake)

Prioritising hub-based rapid charging is aligned with the best practice approach seen in other cities1 (London, Dundee, Nottingham) – it aligns with the operation of sustainable vehicle types (taxis, shared cars) and in turn supports modal shift ambitions



The post-2022 deployment required corresponds to ca. 45 rapid EVCPs per year - in line with the min. deployment agreed in the initial contract

ESB are contracted as BCC's EV Charge Point Development Partner to 2032, and are eager to stimulate the EV market in Birmingham and continue to support the Council in the deployment of charging infrastructure on a commercial viability basis

ESB are ideally placed to deliver fast and rapid charging, and where there is an identified need for other charging types (e.g. lamp posts), ESB can partner with the market leading providers.

Slide 8-There is uncertainty around how the slow-fast charging market will develop, but BCC are well placed to track this and assess the optimal deployment approach

As mentioned, initial analysis shows that Birmingham's requirement for public slow and fast charging will be ca. 9,000 chargers by 2030

It is estimated that roughly half of these will be on-street chargers, providing a home charging alternative to those without private parking:

BCC has already started identifying priority areas for on-street charging *(see below),* based on analysis of off-street parking, EV uptake etc.

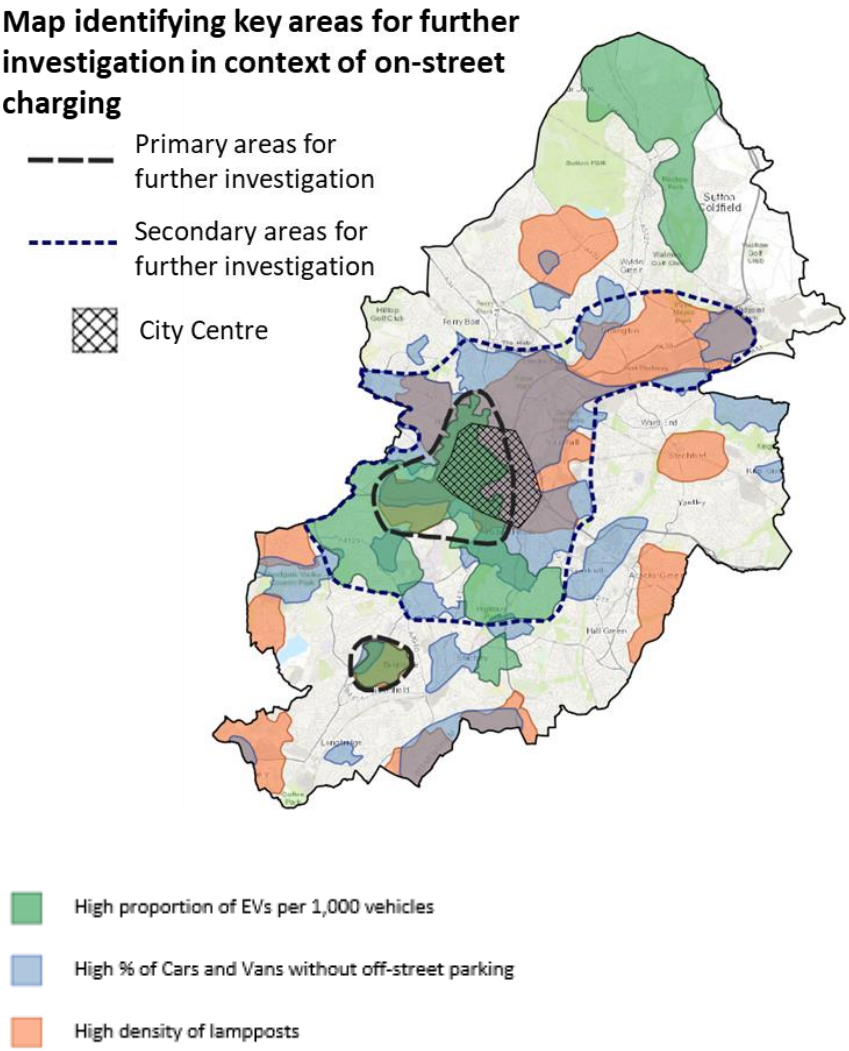
BCC is also an 'observer' partner for an Innovate UK project trialing an innovative on-street charging solution next year

The remaining slow and fast chargers will be at a range of locations: public car parks, supermarkets, shopping centers etc.

ESB will deliver 194 fast EVCPs in the initial 2-year contract, and support the Council in expanding this deployment out to 2032

It is important to note that the slow on-street charging market is in a development phase, with no "winning" technology emerging yet

As such, prioritizing fast & rapid charging in strategic car parks while assessing which on-street solutions should be targeted will be the approach taken, and one being taken by other regions (Nottingham, London boroughs)



Slide 9- Discussion around fleet charging needs in Birmingham

Buses & Freight

Buses are expected do the vast majority of charging in the depot

En-route “opportunity charging” for buses likely to play a part- this will be led by Transport for West Midlands

The zero-emission freight market is still in the very early stages, with the future roles of electric and hydrogen trucks uncertain

Projections of zero emission freight deployment only show very few sales by 2030 (<5%), which means that charging for electric trucks is not a key consideration currently, and it will also be depot focused

Vans

Due to typical shift patterns and operational requirements, vans tend to charge once and overnight

This would either be done at home or public chargers, or at a depot

Adopters of electric vans in the short-mid term would likely have access to home or depot charging

The case of van charging needs is explored further on the following slide

Slide 10-While vans present a significant decarbonisation challenge, Birmingham's charging infrastructure plans will support the electrification part of the solution

The challenge:

There has been significant growth in van demand between 1990 and today, partly due to increases in home delivery services

Decarbonizing the van fleet therefore presents a big challenge

However, electric vans only make up ca. 0.3% of UK vans, and ca. 1% of sales (2019)

As part of the 2030 net zero analysis, we assessed the fastest introduction of zero emission vans (ZEV) considered feasible:

ZEV sales assumed to grow from <2% in 2020 to 100% in 2030

This was shown to achieve carbon savings of ca. 41%

Significant reduction in van use and modal shift therefore required to meet a 2030 (or similar) net zero target

Supporting the transition:

ESB fast & rapid charging network will provide charging for vans at key locations throughout the city (site assessments consider metrics that indicate van demand)

The specific case of van charging will be assessed as part of the upcoming city-wide EV charging strategy for Birmingham

BCC plan is to develop strategic commercial fleet charging facilities (e.g. Tyseley Energy Park – likely to be the first)

UK car stock (millions)-represents growth of 11%

Year	Stock number
2010	28
2011	28
2012	29
2013	29
2014	30
2015	30
2016	31
2017	31
2018	32
2019	32
2020	32

UK van stock (millions)-represents growth of 28%

Year	Stock number
2010	3.2
2011	3.2
2012	3.3
2013	3.4
2014	3.5
2015	3.6
2016	3.8
2017	3.9
2018	4.0
2019	4.1

Year	Stock number
2020	4.1

Slide 11-The geographic fast & rapid deployment approach is based on the assessment of several metrics which indicate future EV charging demand-draft from upcoming fast and rapid strategy

The metrics below were assessed as they help to indicate areas in which fast and rapid chargers would be effective in supporting the growing needs of electric taxis (incl. PHVs), cars and vans in Birmingham. For each criterion, the relevant user group is indicated.

Metric assessed	Rationale	Most relevant user groups
Taxi ranks	Taxi ranks indicate areas with high taxi operation and analysis has proven that proximity to taxi ranks drives EVCP utilisation	Taxis
Work-related car trips	A high number of work-related car trips in an area indicates high taxi operation. This metric is proven to correlate with high EVCP utilisation.	Taxis
Taxi driver homes	Areas where taxis are parked overnight indicate potential off-duty charging demand, particularly where the availability of off-street parking is low	Taxis
Amenities	Analysis of real-world charging data shows that a high number of nearby amenities attracts EV drivers to EVCPs and drives utilisation	Taxis, Cars, Vans
Traffic Flows	Routes with high traffic flows will develop higher en-route charging demand as EV uptake grows, due to the overall throughput of vehicles	Taxis, Cars, Vans
Off street parking levels	Areas with a low availability of off-street parking will be more reliant on public charging infrastructure, as fewer residents can charge at home	Cars, Vans

Metric assessed	Rationale	Most relevant user groups
EV uptake	The number of EVs relative to total vehicles indicates areas where people have been more likely to buy an EV to date	Cars, Vans

NB- a map which combines assessment of these matrices and highlights priority deployment areas will be included in the upcoming strategy.

Slide 12-When selecting and approving specific sites on which to install EVCPs, there are a range of factors which must be considered, some of which can impact deployment timelines

Examples of factors which need to be considered when choosing sites:

Traffic Regulation Order (TRO) – must be applied for and approved for on-street charge point deployments. This Council process involves both formal and informal consultations and can be ca. 6-9 months in total.

Electric vehicle signage – appropriate road signs must be designed by the Council and approved by the Department for Transport. The approval process is a minimum of 12 weeks long.

Grid capacity assessments – before a site is taken forward, Western Power Distribution (WPD) must confirm that there is sufficient power capacity – if there is not the site is either discounted or re-designed in terms of the planned charge points. This process is done with batches of sites for efficiency but is dependent on WPDs resourcing and ability to turn these around.

Public realm improvements – EVCP siting must account for planned public realm improvements / highway developments (e.g. pedestrianisation, car park closures, cycle lanes) – this is a fluid area currently due to COVID-19

In addition to the factors shown to the above each site is analysed based on a series of metrics:

- Metrics assessed in site assessment
- Taxi ranks in local area
- Taxi operation in local area
- Taxi driver home locations
- Nearby traffic flow
- Distance to nearest major road
- Car trip counts / patterns in local area
- Amenities in local area
- Number of EVs in local area
- Off-street parking availability in local area
- Number of existing EVCPs in local area

Geospatial analysis of the metrics above feeds into a comprehensive site assessment process which generates a "site score" – this shows how attractive the site is and how well it would serve EVs in Birmingham

Slide 13- Draft from upcoming fast & rapid strategy

Slide 14-Appendix: A review of Council EVCP strategies was undertaken to assess best practice, lessons learned and how Birmingham compares

City	ECVP's	Approach to EVCP locations so far	Approach to EVCP charging speeds so far	Approach going forward
London	9000	Majority of EVCPs are on-street - significant lamppost deployment Remaining EVCPs are mostly at private and public car parks	Half of EVCPs are slow due to early installations + focus on lamppost chargers- many not in use. ca. 14% are rapid EVCPs given size of the network	Focus is on rapid hubs aimed at range of users TfL moving away from supporting lamppost EVCPs
Nottingham	380	Almost 75% of EVCPs are at either private or public car parks Only 6% of EVCPs are installed at on-street locations	Majority of devices are fast – focus on destination charging locations 33% are rapid due to the concession framework	Likely to continue targeting rapid deployment (all users) Additional funding has been requested for rapid
Oxford	150	Significant share of EVCPs are on-street – for residents without off-street parking Remaining EVCPs mostly in private car	Ca.30% of chargers are slow due to on-street technology focus of the Council Most EVCPs are fast - in line with the high share of	Energy Superhub Oxford due to open by end 2020 Likely to deploy lamppost chargers based on trial

City	ECVP's	Approach to EVCP locations so far	Approach to EVCP charging speeds so far	Approach going forward
		parks, led by private sector	destination car park deployment	

London's network is the most developed but almost half the EVCPs are slow, and around half of these are lamppost chargers designed for slow overnight charging. This is not consistent with Birmingham's preferred model of Charge & Go, which supports modal shift away from private car ownership. *It should be noted that London's focus is now rapid hubs and novel slow charging solutions (incl. car park hubs) – moving away from lamppost approach.*

The city review has shown that for places where there is a significant need for public EVCPs and lampposts are a viable option (*from a technical / practicality standpoint*), they provide a simple and quick way to deploy charging infrastructure – *but are not a scalable or long-term approach*