

# Transport and Environment Committee

10am, Thursday 5 December 2019

## Electric Vehicle Programme: Enforcement and Tariffs— referral from the Finance and Resources Committee

Executive/routine  
Wards  
Council Commitments

### 1. For Decision/Action

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1.1 The Transport and Environment Committee is asked to note this report.

**Laurence Rockey**

Head of Strategy and Communications

Contact: Martin Scott, Committee Services

Email: [martin.scott@edinburgh.gov.uk](mailto:martin.scott@edinburgh.gov.uk) | Tel: 0131 529 4237

# Referral Report

## Electric Vehicle Programme: Enforcement and Tariffs – referral from the Finance and Resources Committee

### 2. Terms of Referral

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- 2.1 On 10 October 2019 the Finance and Resources Committee considered a report by the Executive Director of Place. The report set out both a proposed enforcement regime and the tariffs to be applied to both on- and off-street EV charging hubs.
- 2.2 The Finance and Resources Committee agreed:
  - 2.2.1 To approve the enforcement and charging regime for the on-street electric vehicle programme and to note that this regime will also be applied to all Council off street sites.
  - 2.2.2 To agree that the review after 6 months would consider continuous penalties and include further information on whether the EV Programme could pay for itself in a way that was weighted more on the per KW hour charge and less on the connection charge.
  - 2.2.3 To refer the report to the Transport and Environment Committee for noting.

### 3. Background Reading/ External References

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- 3.1 Minute of the Finance and Resources Committee of 10 October 2019.
- 3.2 [Finance and Resources Committee – 10 October 2019 - Webcast](#)

### 4. Appendices

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Appendix 1 – report by the Executive Director of Place

# Finance and Resources Committee

10.00am, Thursday, 10 October 2019

## Electric Vehicle Programme: Enforcement and Tariffs

Executive/routine	Executive
Wards	All
Council Commitments	<a href="#">C18</a>

### 1. Recommendations

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- 1.1 Committee is asked to approve the enforcement and charging regime for the on-street electric vehicle programme and to note that this regime will also be applied to all Council off street sites.

**Paul Lawrence**

**Executive Director of Place**

Contact: Janice Pauwels, Sustainable Development Manager

E-mail: [janice.pauwels@edinburgh.gov.uk](mailto:janice.pauwels@edinburgh.gov.uk) | Tel: 0131 469 3804

## Electric Vehicle Programme: Tariffs and Enforcement

### 2. Executive Summary

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- 2.1 A new enforcement and charging regime is needed for the use of on-street electric vehicle (EV) charging to ensure appropriate use of charging bays. Based on existing parking enforcement measures, a new regime has been developed and is detailed in the report along with proposed financial charges to apply to users of the EV charging network. Consideration is being given to the application of this new regime to existing off street electric vehicle charging where appropriate. Connection charges are also recommended to enable the programme to become self financing.

### 3. Background

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- 3.1 The Council approved a Business Case for on-street electric vehicle (EV) chargers in [October 2018](#). This was followed by an implementation plan approved in [March 2019](#) for the installation of a mix of 66 fast and rapid EV chargers in 14 hubs across the city, providing access for EV users, primarily residents, with no off street parking.
- 3.2 The March report indicated that because the EV hubs would be operational 24 hours per day, an enforcement regime would be needed to ensure the proper use of the EV bays. In addition, the report highlighted that financial charges would also be needed but that further work would be required to assess the financial impact of these on the Business Case.
- 3.3 This report sets out both a proposed enforcement regime and the tariffs to be applied to both on- and off-street EV charging hubs.

### 4. Main report

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- 4.1 Current work on the Council's plans for on-street EV charging is focussed on procuring a suitable contractor for the installation of the infrastructure. Once operational, this needs to be supported by robust policies and procedures to ensure appropriate controls are in place. A key outcome of the EV programme is that it becomes self-financing to cover future resourcing and maintenance costs.

## Enforcement

- 4.2 The EV charging hubs will be operational 24 hours per day and will not be designated as parking bays but strictly for the charging of EVs. It will be important that EV users have confidence that bays will be used correctly and only by electric vehicles. Consequently a new enforcement policy has been developed by the Sustainability and Parking teams and is based on current parking enforcement practices.
- 4.3 Appendix 1 details the proposed enforcement regime. A key element will be the enforcement of exclusivity which will be carried out by the Council's traffic attendants who will ensure that only EV's will be able to use the charging bays. Under the new regime, any non-electric vehicle parking in an EV bay will incur an immediate fixed penalty notice and any EV occupying a charging bay but not charging will also incur a fixed penalty. Parking Attendants will know the locations of all hubs and be able to monitor their use.
- 4.4 ChargePlace Scotland (CPS) is the current contractor appointed by Transport Scotland to provide a "back office" function including management of all software and administrative functions that enable reporting of faults, collection of payment and collation of data. CPS has confirmed that they will be able to support the Council's enforcement policy by being able to monitor both maximum stay and no return periods. Upon nearing a maximum stay the driver will be alerted (by text or email) that they have 10 minutes of time left after which a fixed penalty will be applied directly to the drivers CPS account. The charges will be recovered to the Council via a recharge arrangement with CPS.
- 4.5 Table 1 below details the enforcement role of the Traffic Attendants and Charge Place Scotland along with the penalties that will be applied.

ROLE	ENFORCEMENT RESPONSIBILITY	PENALTY
<b>Council Traffic Attendants</b>	Ensuring that only EVs are using charging bays.	£60.00 fixed penalty reduced to £30 if paid within 14 days.  If paid after <b>28</b> days the fine increases to £90.
<b>Council Traffic Attendants</b>	Checking that EVs are actually plugged into charging bays and not just using a bay for parking.	<b>SAME</b> penalty as above.
<b>Charge Place Scotland</b>	Responsible for monitoring the maximum stay period	A £30.00 charge for overstaying the maximum stay period (after a 10 min period of grace)

**Table 1: Summary of Enforcement Roles and Penalties**

- 4.6 New maximum stay and no return periods will also be introduced to ensure that charging bays are available as much as possible. Penalties will be applied to any

EV user who stays in the charging bay past the maximum stay period. Table 2 below summarises the proposed new procedures.

Charger Type	Main User(s)	Max Stay	No Return Period
Slow (7kW)	Commuters/Visitors	10 hrs	N/A (Note: Ingliston Park and Ride no access between 02:00 – 04:00am)
Fast (22kW)	Residents	3 hrs	4 hrs
Rapid (50kW)	Taxi/Private Hire and General Use	30 mins	4 hrs

**Table 2: Proposed Maximum Stay and No Return Periods by Charger Type**

- 4.7 Different criteria will be applied to different EV chargers. For example long maximum stays (10 hours) will apply to slow chargers such as those at the park and ride sites as these take around 8 hours to fully charge. This potentially allows two cars to charge within a 24 hour period if required. In contrast, the much shorter maximum stay periods are applied to rapid chargers, where these vehicles can take around 30 minutes for a charge enabling a more “topping -up” approach. Quicker turn-around times here can ensure maximum use of these charging bays throughout the day.
- 4.8 Other elements of the enforcement regime include the need for Traffic Regulation Orders (TROs) allowing the Council to designate part of the carriageway for use by a certain group of vehicles. TROs support the enforcement of issuing penalty notices to those who park in contravention of the regulations.

### **Connection Charges and Tariffs**

- 4.9 Currently EV users have been able to charge their vehicles for free even although the use of these charges incurs a number of fixed and variable costs. This has been a policy decision by Scottish Government to encourage the uptake of this technology to support targets for the reduction of carbon emissions and combat climate change. It has also been a condition of the grants from Transport Scotland to make charging sites free and publicly accessible. To date the costs have been small and councils in Scotland have been able to absorb these.
- 4.10 However as more EV charging units are being installed it is not feasible to continue to provide free electricity especially also as energy costs continually increase. Transport Scotland has proposed criteria for local authorities to introduce tariffs for publicly accessible charging infrastructure and recommended that a per kilowatt hour (KWh) charge is preferable and that this should not exceed 20p/KWh.
- 4.11 There are also other costs in addition to the cost of the electricity. This includes resourcing of the programme, maintenance costs to support the network and deal with repairs and upgrades, and costs for a back-office function including fault reporting, usage data and charging information. The Business Case [report](#) in October 2018 proposed a standard tariff to cover the cost of electricity and also a

number of connection charges (varying with charger type) to cover other associated costs. These original costs are detailed in Table 3 below.

Charger Type	Per kWh charge (£)	Connection fee
Slow (7kW) (P&R)	0.20p	£2.00
Fast (22kW)	0.20p	0.30p
Rapid (50kW)	0.20p	£1.00

**Table 3: Tariff and Connection Charges Proposed in Original EV Business Case**

- 4.12 During consultation, feedback from EVAS<sup>1</sup> suggested that a tariff for rapid chargers might be a pence *per minute* rather than per KW. They and taxi associations also suggested that connection charges might act as a deterrent to users. It was felt important to take the views of users into account and to assess the impact of changing the tariff for rapid chargers and removing the connection charges.
- 4.13 Consequently, the Energy Savings Trust (EST) was asked to carry out further investigations and run a number of scenarios on the financial modelling. The outcomes of these are seen in Appendix 2. The modelling demonstrated that a charge per KWh was the most appropriate and practical charge. However the modelling showed that the removal of the connection charges would have a detrimental impact on the revenue stream such that the project would not be financially viable. This impact is seen in Figure 2 of the Appendix showing the scheme running at nearly a £0.1m loss per annum with the removal of the connection charges.
- 4.14 The concept of connection charges as a deterrent is understood. However even with the application of these, the costs associated with EV charging will be far cheaper at around 9-12p per mile in comparison to a non EV car having to use petrol or diesel fuels at a cost of 15-16p per mile. The Energy Savings Trust also modelled costs for the KWh and the connection charges. Based on average charging sessions, the costs to an EV user for the different types of chargers was as follows:
- 4.14.1 For a rapid charge (11kWh of charge at 30 minutes) £3.22
  - 4.14.2 For a fast charge (9.8 KWh of charge at 3 hours) £2.26
  - 4.14.3 For a slow charge (9.6KWh of charge at 8 hours) £3.92.
- 4.15 Currently, there is no standardisation of charging tariffs across Scotland. The Council is aware of a few other local authorities that have introduced charging but these are very variable. For example, Moray Council is charging a flat fee of £3.80

<sup>1</sup> EVAS: The Electric Vehicle Association of Scotland

for each charging session irrespective of charge type while Orkney and Dumfries and Galloway Councils are charging 25p per kWh as a flat rate. The Council is also aware of a private developer in Edinburgh proposing to charge a flat rate of £10 *per hour* irrespective of the type of charger or how long the charging time.

- 4.16 Consequently, the original tariffs as seen in Table 3 and developed by the Energy Savings Trust (EST) are proposed for the Edinburgh on-street EV programme. In developing these charges EST was asked to look at other council charges, ongoing costs, usage levels, guidance from Transport Scotland and the use of restriction times. All of these factors have been considered in the proposed tariffs and assessed to maximise the potential revenue to the Council. The proposed charges are considered affordable and striking a balance between cost and time limits as well as generating revenue. They will on average be much cheaper than current petrol or diesel charges. As shown in Figure 1 (Appendix 2) these rates will also generate a reasonable level of revenue (nearly £0.09m) per annum that will allow the Council to cover maintenance costs and upgrades to the network. Any surplus that might be generated will be reinvested back into future expansion of the network.
- 4.17 The introduction of EV charging is a new policy area for many councils. Therefore it is important that these procedures and charges are kept under review to assess any adverse impacts. There are two variables that the Council can change if necessary – the pence per kWh charge and the connection charge. The first review will be six months from the date of approval and then a further review six months later. Any proposed changes to financial charging and tariffs will be reported back to Committee for approval.
- 4.18 The Council also has a number of off street sites including those at community centres and leisure facilities. It is proposed that the Council takes on the management of these including the ongoing maintenance. Therefore the new charging and enforcement regime detailed in this report will also need to apply to all Council off street locations.

## **5. Next Steps**

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- 5.1 The new enforcement and charging regime will be incorporated into the procurement specification for the on-street EV programme. For the off street sites notice will need to be given to EV users that new charging and enforcement procedures will be coming into operation. It is recommended that a period of 4 weeks' notice is given from the date of Committee approval if given.

## **6. Financial impact**

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- 6.1 The installation of new on-street EV charging requires new enforcement procedures along with the introduction of financial charges to cover costs and ongoing

maintenance and back office functions. A flat connection charge is proposed which will vary dependent on the type of charger.

- 6.2 These costs are detailed in the report and as detailed in paragraphs 4.14-4.16 will generate a level of revenue of over £0.09m per annum.

## **7. Stakeholder/Community Impact**

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- 7.1 Consultation has already been carried out on the EV Business Case. Organisations such as EVAS had already been consulted with in the development of the tariffs and proposed enforcement procedures. While their view was that introducing fees such as connection charge might be a deterrent, they have accepted that charges will be introduced by local authorities.
- 7.2 The delivery of EV on street charging will have a range of benefits particularly on carbon reduction and air quality. Compared to conventional cars, EVs emit substantially less carbon emissions thus contributing positively to the Council SEAP and carbon targets. The vehicles are also cleaner with far less exhaust emissions so delivering direct air quality improvements.

## **8. Background reading/external references**

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- 8.1 4 October 2018 [Report](#) for Transport and Environment Committee: EV Business Case
- 8.2 5 March 2019 [Report](#) for Transport and Environment Committee: EV Implementation Plan

## **9. Appendices**

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- 9.1 Appendix 1 - Electric Vehicles Enforcement and Charging Regime
- 9.2 Appendix 2 - Financial Scenarios Run by the Energy Savings Trust

### Introduction

The Council is pursuing the installation of on-street electric vehicle (EV) charging places. The first phase proposes the installation of a mix of 66 rapid and fast charging bays in 14 hub locations operating 24 hours a day, seven days a week. In addition there is also existing off-street EV charging across a number of locations in the city. Currently any charging using the existing sites has been free with no payment needed for the electricity used. Transport Scotland has acknowledged that local authorities will need to introduce financial tariffs as the market in EVs matures and more vehicles are registered.

To support the ongoing programme of work a new enforcement regime is needed that will apply *where appropriate* to **both** on and off-street charging. Using similar approaches to parking restrictions and penalties, this document sets out new procedures and charges for EVs to ensure appropriate use and turnover of charging bay.

### Enforcement Requirements

#### 1. Exclusivity

There will be no parking costs associated with using the charging bays. However, the charging bays are not intended to provide unrestricted parking within Controlled Parking Zones (CPZ). **Only EVs will be permitted to use charging bays and only when they are plugged in and charging.**

#### 2. Road Markings and Traffic Regulation Orders

The introduction of the EV charging bays requires the promotion of a Traffic Regulation Order (TRO). This process allows the Council to designate part of the carriageway for use by a certain group and importantly for enforcement, allows the issuing of penalty tickets to those who park in contravention of the regulations.

To ensure the TRO is properly enforced, **each parking hub will require; bay markings, road legend(s) and appropriate signage.** An example is shown below:



Some considerations for the road markings include:

- New signs may need to be designed to indicate the relevant restrictions to motorists.
- New signs may add to street clutter, but efforts will be made to combine with necessary charging infrastructure or attaching to existing walls/fences.

### 3. Maximum Stay and No Return Periods

**Maximum stay and no return periods will apply at EV charging places** to provide for as high a turnover of vehicles as possible and to ensure EV drivers have access to suitable charging facilities when most needed. The use of maximum stay and overstay penalties will be important to ensure this accessibility. An example of a stay period restriction from the City of Westminster Council is shown below.



For Edinburgh the maximum stay and no return periods are detailed in Table 1 below. The intention is to maximise the use of the rapid chargers by only having a 30 minute stay period. On average this would still provide the EV with a good charge of 70-80% (on a near zero or low battery charge). Longer periods for slow chargers i.e park and ride sites could allow two cars to charge in a 24 hour period.

Charger Type	Main User(s)	Max Stay	No Return Period
Slow (7kW)	Commuters/Visitors	10 hrs	N/A (Ingliston no access between 02:00 – 04:00)
Fast (22kW)	Residents	3 hrs	4 hrs
Rapid (50kW)	Taxi/Private Hire and General Use	30 mins	4 hrs

**Table 1: Proposed Maximum Stay and No Return Periods by Charger Type**

For **residential zones** there will be **no** maximum stay applied for **fast chargers only** between the hours of 2200 and 0800 Monday to Sunday.

**Maximum stay periods** however **will** still be in force for **rapid chargers** to ensure maximum availability.

In some locations, both AC and DC Fast units will be introduced to cater for all EVs – as some vehicles require different charging infrastructure. However while charge times can vary, the longer max stay period **will** apply to all spaces to ensure a consistent approach at each charging place.

#### 4. Back Office Function

Charge Place Scotland (CPS) is the current contractor appointed by Transport Scotland to provide a “back office function” for EVs nationally. This includes monitoring usage of chargers, dealing with faults, promoting free and/or available charging spaces and providing information on a monthly basis via CPS software to the Council. **CPS has agreed to provide an enforcement function for the Council by monitoring the length of time that each EV will stay in a charging space.** Upon nearing the maximum stay, the driver will be alerted that they have 10 minutes of time remaining (sent as a text/email) after which a fixed penalty will be applied if they don't comply with the maximum time restriction. This fixed penalty will be applied to the card holders account (all EV users need to register an account with Charge Place Scotland to use the bays).

The back office function also needs to automatically enforce the no return period, by recognising when a vehicle has completed a charge to prevent it from disconnecting and restarting to gain another charge period.

#### 5. Penalty Tickets

It is proposed to use similar parking enforcement procedures for EVs such as the use of fixed penalty tickets.

**Parking Attendants** who observe a vehicle which is **not an EV** will issue an instant penalty ticket to that vehicle.

**Parking Attendants** who observe an EV waiting in the charging place that is **not plugged in or charging** will issue an instant penalty ticket to the vehicle.

**Note:** a charging cable cannot be removed from the vehicle unless the appropriate key card holder has stopped charging. Therefore, if a cable has been removed this may be due to vandalism. Similar to current procedure, a penalty ticket will still be issued, but if challenged and further evidence is received, the Council can review this.

Should an EV **not park considerably** within the bay markings or park between charging bays, which may prevent another EV using the place, then an instant penalty ticket will also be issued.

#### 6. Removals

Electric vehicles will **only** be physically removed in the unlikely event of an emergency i.e. a gas/water leak or at the request of Police Scotland/Paramedics. Any connecting cables will be removed and the cost of replacement can be sought from the Council.

Out with the hours specified above, **EVs can park** for an unlimited period overnight and in some locations at weekends. This will reduce the enforcement burden and allow motorists to charge overnight without moving their vehicle. This will be kept under review especially if use increases and there is pressure on charging bays.

## Summary of Enforcement Roles and Penalties

These are seen in Table 2 below:

ROLE	ENFORCEMENT RESPONSIBILITY	PENALTY
<b>Council Traffic Attendants</b>	Ensuring that only EVs are using charging bays.	£60.00 fixed penalty reduced to £30 if paid within 14 days.  If paid after <b>28</b> days the fine increases to £90.
<b>Council Traffic Attendants</b>	Checking that EVs are actually plugged into charging bays and not just using a bay for parking.	SAME penalty as above.
<b>Charge Place Scotland</b>	Responsible for monitoring the maximum stay period	A £30.00 charge for overstaying the maximum stay period (after a 10 min period of grace)

**Table 2: Summary of Enforcement Roles and Penalties**

### Financial Tariffs

The introduction of on street EV charging incurs a range of fixed and variable costs including the cost of the electricity consumed, service costs payable to Scottish Power, maintenance, resources and costs of the back-office function. In particular, the service costs or DUoS (Distribution use of service costs) payable to Scottish Power can be considerable for high energy demand infrastructure.

Transport Scotland has published advice on charging fees for local authorities with a recommended tariff not to exceed 20p per Kilowatt hour (KWh) of electricity. The Council EV Business Case proposed that charging would be necessary to create a self- financing programme going forward.

The charging costs are detailed in Table 3 below. The tariff cost per KWh covers the cost of the electricity, However connection charges are also proposed to cover all other associated costs. In terms of the financial viability of the programme going forward , it would not be viable to remove the connection charges without increasing the fee per KWh to offset the impact. The connection fees will vary according to the types of charger. For the slow chargers such as the park and ride sites where cars are liable to be sitting for over 7 hours a £2 connection fee is proposed. It is anticipated that users will not be paying this on a daily basis.

Charger Type	Per kWh charge (£)	Connection fee
Slow (7kW) (P&R)	0.20p	£2.00
Fast (22kW)	0.20p	£0.30

Rapid (50kW)	0.20p	£1.00
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**Table 4: Proposed Charges and Tariffs**

It is **not proposed** to charge motorists for **parking** time on top of connection fees and electricity costs.

### **Blue Badge Holders**

The main aim of on-street EV charging places is to create a network of charging hubs around the city. Allowing blue badge users to park without time limit within the charging places may enable users to occupy such places indefinitely. This would restrict the turnover of spaces and charging opportunities for other users. Therefore, it is recommended that blue badge users are also subject to the maximum stay periods in EV charging places. Badge holders would still be expected to pay connection and electricity charges, as these are not related to parking costs.

### **Monitoring and Review**

The introduction of EV charging is a new policy area for many councils. Therefore these procedures and charges will be kept under review to assess any adverse impacts. The first review will be six months from the date of approval and then a further review six months later. These will be reported to the EV Project Board. Any changes to financial charging and tariffs will be made through the appropriate Committee processes.

# APPENDIX 2: Financial Scenarios run by Energy Savings Trust

## Scenario 2A

Table 7 – Mixed Specification Hubs (50kW Rapid DC, 22kW Fast AC & 7kW Slow Park & Ride)

- Optimistic levels of use - 18 rapid sessions per charger, 6 fast sessions per charge point, 1 slow session per charge point (P&R), per 24hr period.
- 20p per kWh flat rate end user fee (all chargers).
- £1 connection charge all rapids, £0.30 fast and £2 slow (P&R).

Scenario	Hub Quantity	2020				2023															
		50kW DC	22kW DC (P&R 7kW)	Total Quantity (Charge Units)	Capital Costs	Annual OpEx	Use of System Costs (of which)	Annual Revenue	Annual Surplus	RoI (years)	Hub Quantity	50kW DC	22kW DC (P&R 7kW)	Total Quantity (Charge Units)	Capital Costs	Annual OpEx	Use of System Costs (of which)	Annual Revenue	Annual Surplus	RoI (years)	
Residents (Zone 2)	High	10 1	1 0	3 2	42	752,000	482,223	100,806	528,053	45,830	16	24	2	6	192	3,000,000	2,165,726	417,657	2,439,625	273,899	11
	Mid	8 1	1 0	3 3	35	617,000	399,475	83,395	436,301	36,826	17	13 1	2 2	6 5	111	1,742,500	1,253,922	241,982	1,413,216	159,294	11
	Low	8 1	1 0	3 2	34	606,000	389,743	81,479	426,402	36,659	17	9 1	2 2	6 4	78	1,235,000	883,550	170,721	996,713	113,163	11
Trad, Private Hire & General Use	High	3 1	3 4	0 0	13	520,000	218,351	47,867	274,679	56,327	9	10	4	0	40	1,600,000	671,023	146,501	845,165	174,142	9
	Mid	1 3	3 2	0 0	9	360,000	151,607	33,556	192,291	40,683	9	5 1	4 3	0 0	23	920,000	385,928	84,323	485,970	100,042	9
	Low	1 3	3 2	0 0	9	360,000	151,607	33,556	190,162	38,555	9	3 1	3 4	0 0	13	520,000	218,351	47,867	274,679	56,327	9
Park & Ride	High	1 1	0 0	11 13	36	270,000	91,279	14,889	104,069	12,789	21	3	0	49	147	1,102,500	369,410	57,664	424,948	55,538	20
	Mid	1 1	0 0	12 13	25	187,500	63,359	10,312	72,270	8,911	21	2 1	0 0	25 27	77	577,500	194,012	260,063	222,592	28,579	20
	Low	2	0	11	22	165,000	55,842	9,156	63,598	7,756	21	3	0	19	57	427,500	143,899	22,982	164,776	20,877	20
Totals	High	18	23	68	91	1,542,000	791,854	163,563	906,800	114,947	13	37	88	291	379	5,702,500	3,206,159	621,823	3,709,737	503,579	11
	Mid	15	17	52	69	1,164,500	614,441	127,262	700,861	86,421	13	23	51	160	211	3,240,000	1,833,862	586,368	2,121,777	287,915	11
	Low	15	17	48	65	1,131,000	597,192	124,190	680,161	82,970	14	17	33	115	148	2,182,500	1,245,800	241,570	1,436,167	190,367	11

Figure 1: Costs for Mixed Specification Hubs for 2020 and 2023 WITH Connection Charges

## Scenario 2B

Table 7 – Mixed Specification Hubs (50kW Rapid DC, 22kW Fast AC & 7kW Slow Park & Ride)

- Optimistic levels of use - 18 rapid sessions per charger, 6 fast sessions per charge point, 1 slow session per charge point (P&R), per 24hr period.
- 20p per kWh flat rate end user fee (all chargers).
- No connection fees.

Scenario	Hub Quantity	2020				2023															
		50kW DC	22kW DC (P&R 7kW)	Total Quantity (Charge Units)	Capital Costs	Annual OpEx	Use of System Costs (of which)	Annual Revenue	Annual Surplus	RoI (years)	Hub Quantity	50kW DC	22kW DC (P&R 7kW)	Total Quantity (Charge Units)	Capital Costs	Annual OpEx	Use of System Costs (of which)	Annual Revenue	Annual Surplus	RoI (years)	
Residents (Zone 2)	High	10 1	1 0	3 2	42	752,000	477,428	100,806	420,305	-57,123	-	24	2	6	192	3,504,000	2,188,470	455,721	1,935,049	-253,421	-
	Mid	8 1	1 0	3 3	35	617,000	395,557	83,395	348,263	-47,294	-	13 1	2 2	6 5	111	2,033,000	1,266,934	263,922	1,120,194	-146,740	-
	Low	8 1	1 0	3 2	34	606,000	385,884	81,479	339,678	-46,206	-	9 1	2 2	6 4	78	1,438,000	892,515	186,053	789,101	-103,415	-
Trad, Private Hire & General Use	High	3 1	3 4	0 0	13	520,000	214,551	47,867	189,269	-25,282	-	10	4	0	40	1,600,000	659,329	146,501	582,365	-76,964	-
	Mid	1 3	3 2	0 0	9	360,000	148,976	33,556	131,032	-17,944	-	5 1	4 3	0 0	23	920,000	379,204	84,323	334,860	-44,344	-
	Low	1 3	3 2	0 0	9	360,000	148,976	33,556	131,032	-17,944	-	3 1	3 4	0 0	13	520,000	214,551	47,867	189,269	-25,282	-
Park & Ride	High	1 1	0 0	11 13	36	270,000	88,941	14,889	51,509	-37,432	-	3	0	49	147	1,102,500	359,859	57,664	210,328	-149,531	-
	Mid	1 1	0 0	12 13	25	187,500	61,734	10,312	35,770	-25,964	-	2 1	0 0	25 27	77	577,500	189,010	260,063	110,172	-78,838	-
	Low	2	0	11	22	165,000	54,412	9,156	31,478	-22,935	-	3	0	19	57	427,500	140,195	22,982	81,556	-58,640	-
Totals	High	18	23	68	91	1,542,000	780,919	163,563	661,082	-119,837	Loss	37	88	291	379	6,206,500	3,207,657	659,887	2,727,741	-479,916	Loss
	Mid	15	17	52	69	1,164,500	606,267	127,262	515,065	-91,203	Loss	23	51	160	211	3,530,500	1,835,147	608,308	1,565,225	-269,922	Loss
	Low	15	17	48	65	1,131,000	589,272	124,190	502,187	-87,084	Loss	17	33	115	148	2,385,500	1,247,261	256,902	1,059,925	-187,336	Loss

Figure 2: Costs for Mixed Specification Hubs for 2020 and 2023 WITHOUT Connection Charges