

Transport and Environment Committee

10.00am, Thursday, 25 April 2024

Electric Vehicle Charging – Programme Update

Executive/routine
Wards

Executive
All

1. Recommendations

- 1.1 Transport and Environment Committee are asked to:
 - 1.1.1 Note the update on the Electric Vehicle (EV) Charging Point programme including progress on the funding application;
 - 1.1.2 Note that the outcome of the procurement of this requirement will be taken to the Finance and Resources Committee for approval prior to award in line with the Council's Contract Standing Orders; and
 - 1.1.3 Approve the changes proposed regarding maximum stay periods and delegate authority to the Head of Network Management and Enforcement to amend maximum charging periods to respond to any issues which arise (with Business Bulletin updates to Committee).

Paul Lawrence

Executive Director of Place

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Electric Vehicle Charging – Programme Update

2. Executive Summary

- 2.1 This report provides updates in response to the adjusted motion approved by Committee in March 2023 regarding Electric Vehicle (EV) charging infrastructure, as well as outlining the next steps for procuring a commercial partner to support the Council in rolling out EV charging in the city.

3. Background

- 3.1 Committee have received and approved a range of reports and updates through the life of the EV Programme – see EV Programme Briefing note in Appendix 1.
- 3.2 In March 2023, Committee approved a [project update](#) and requested [further actions](#) be progressed. A further [update](#) was provided in September 2023 and this report responds to the remaining outstanding actions.

4. Main report

Charging Arrangements

- 4.1 The maximum stay periods are reviewed annually, informed by feedback received from customers and elected members. For example, rapid chargers were introduced in spring 2022 with a 30 minute maximum stay period and this was doubled to 60 minutes in spring 2023 as a result of the feedback received.
- 4.2 It is proposed to further increase the rapid charger maximum stay period to 90 minutes, aligned with feedback received from customers over the last 12 months. Such an increase would better meet demand whilst still helping to achieve a turnover of vehicles and customers using rapid chargers.
- 4.3 Similarly, feedback has been received from customers that the three hour maximum stay period for the 22kW fast chargers is too short. On this basis, and in recognition of increases in vehicle battery sizes, it is proposed to increase the maximum stay period for fast chargers.
- 4.4 Recent changes to the payment service provider used by Charge Place Scotland (which is used by all Scottish Local Authorities to host their chargers) mean that

maximum stay periods must now be applied 24/7, meaning there is no option presently to continue our charging arrangement that had removed the overnight (between 8pm - 8am) time limit. However, there is a 12-hour maximum stay period for 7kW chargers which allows for overnight charging at on street chargers.

- 4.5 It is therefore proposed to increase the maximum stay period for 22kW chargers to eight hours, as this will support some overnight charging whilst also ensuring a turnover of vehicles using these chargers. A 12 hour maximum stay period was considered, but this was deemed inefficient as vehicles would remain at the charger once fully charged, with only two vehicles per day likely benefiting from each charger, whereas a third vehicle can potentially benefit from an eight hour time limit.
- 4.6 Officers will continue to work closely with Charge Place Scotland and Transport Scotland to explore more flexible options, as well as closely monitor charger utilisation and customer feedback.
- 4.7 With specific regard to two 22kW fast chargers at Park and Ride sites, it is proposed to change the existing maximum stay period from three hours to 16 hours. This means people spending the day in the city for work or other purposes need not rush back to attend to their vehicle. Conversely, a 16-hour limit also prevents people blocking 22kW Park and Ride chargers for a full day or longer.
- 4.8 For the same reasons, it is also proposed to increase the maximum stay period associated with the 7kW standard chargers at Park and Ride sites from 12 to 16 hours. This also has the benefit of supporting the use of Park and Ride sites for charging and onward travel by public transport. All time period changes, summarised below, are proposed to come into effect from spring 2024.

Charger type	Current maximum stay	Proposed maximum stay
7kW standard charger	12 hours	16 hours: Park and Rides 12 hours: elsewhere in city
22kW fast charger	3 hours (enforced 8am – 8pm)	16 hours: Park and Rides 8 hours: elsewhere in city
50kW rapid charger	60 minutes	90 minutes: all locations

- 4.9 Going forward, Committee is asked to delegate authority to the Head of Network Management and Enforcement to amend maximum stay periods to respond to any future issues if required. Committee will be kept updated on any changes made through Business Bulletin updates.

Battery Charging

- 4.10 Unfortunately, the Charge Place Scotland network does not have the required functionality to stop units from charging once a vehicle battery reaches a certain level (e.g. 80%), so such an approach is not currently feasible.

Strategy and Expansion Plan

- 4.11 Commercial and Procurement Services (CPS) are leading a programme for the proposed route to market and weekly meetings throughout 2024 will progress the development of a procurement plan for future EV charging facilities. A suite of tender documents and evaluation criteria is being developed to support the assessment of submissions received from prospective future partners.
- 4.12 The procurement programme, alongside the development of a Procurement Strategy, will support the development of a report seeking approval for contract award being submitted to the Finance and Resources Committee upon completion of the tender exercise, in-line with the Council's Contract Standing Orders.
- 4.13 A workshop will be arranged with Committee members to discuss the draft Procurement Strategy and scope of the specification once these have been developed. Thereafter, Committee will be kept updated on progress with the procurement process and contract award through Business Bulletins.
- 4.14 In-order to effectively undertake thorough market engagement and other procurement activities, the Council is engaging with other Local Authorities and seeking support from external organisations to support the development of the Strategy and associated documents.
- 4.15 Once a preferred commercial partnership has been determined and approved by Finance and Resources Committee, officers will begin to work with the partner to explore opportunities for the provision of additional types of chargers (e.g. ultra-rapid chargers or lamp column chargers) after an appropriate needs analysis has been undertaken. However, electric bus charging is currently out-of-scope, with Transport Scotland's Pathfinder funding focused on publicly available charging.

Operations and Enforcement

- 4.16 Officers continue to work closely with BP Pulse, Scottish Power Energy Networks, Charge Place Scotland and Transport Scotland to resolve any issues across the charger network as quickly as possible. This has resulted in some recent improvements to incident response times.
- 4.17 The electricity connection problems at the Ingliston Park and Ride site are soon to be resolved, meaning that the chargers will be recommissioned once the appropriate testing has been completed.
- 4.18 Parking Attendants will continue to proactively monitor and prioritise EV charging places, with visits being made throughout the day and in the evenings to ensure the bays are being used correctly and appropriate enforcement action is taken if vehicles which are parked in an EV charging place and are not plugged in.
- 4.19 Officers will also continue to lobby Transport Scotland for additional enforcement powers, including the use of CCTV enforcement for appropriate contraventions.

5. Next Steps

- 5.1 If approved, the new charging arrangements will be implemented by early summer 2024. Committee will be updated on any further changes through Business Bulletin updates.
- 5.2 Continued engagement with partners will ensure issues across the charger network are dealt with as quickly as possible. Proactive monitoring will also continue.
- 5.3 Officers will also continue to consider and monitor alternative charging opportunities for the city to help towards improving air quality and achieving net zero, whilst balancing the requirements of the [City Mobility Plan](#) which is aimed at managing levels of private car usage and congestion, with private cars being lowest in the [sustainable transport hierarchy](#).
- 5.4 The programme developed by CPS sets out the key next steps ahead of submitting a report to Finance and Resources Committee following completion of a tender exercise. Timescales and key milestones are currently being reviewed and updated to reflect:
 - 5.4.1 A delay in receiving a funding decision from Transport Scotland. It is anticipated that the amount of funding to be awarded will be significantly less than the £1.1m bid made by the Council;
 - 5.4.2 Working closely with SEStrans and neighbouring authorities to explore partnering opportunities for developing procurement documentation and routes to market; and
 - 5.4.3 Additional support being secured to provide technical input to guide procurement activity.
- 5.5 Officers will continue to work closely with Scottish Futures Trust and Transport Scotland to gain clarity on, and seek to maximise, the funding available to support the future commercial partnering arrangement to advance the roll out of EV chargers in the city.
- 5.6 Committee will be kept informed of progress with the procurement process.

6. Financial impact

- 6.1 The implementation of the EV chargers to date has been funded through Transport Scotland's Switched on Towns and Cities Challenge Fund, as well as the Office for Zero Emission Vehicles' On-Street Residential Chargepoint Scheme funding.
- 6.2 Such centralised funding sources can no longer be sustained, hence why Transport Scotland through Scottish Futures Trust are guiding local authorities to develop EV Infrastructure Strategy and Expansion Plans aimed at securing commercial partnerships to roll-out future EV charging infrastructure.
- 6.3 To support this, Transport Scotland have offered some short-term funding. The Electric Vehicle Infrastructure Strategy and Expansion Plan developed by the

Council with support from Scottish Futures Trust, sought funding of £1.1m to be utilised to lever in greater levels of investment from new commercial partners.

- 6.4 A decision on this funding has been delayed and initial feedback has emphasised that the level of funding is likely to be substantially less than £1.1m. As part of the funding application process, officers will work with Transport Scotland and Scottish Futures Trust to gain clarity on, and seek to maximise, the funding available.

7. Equality and Poverty Impact

- 7.1 The [City Mobility Plan](#) (CMP) sets out Edinburgh's strategic framework for achieving sustainable and effective mobility across the city. Policy measure Movement 32 within the CMP is focused on cleaner vehicles: 'Encourage the switch to cleaner vehicles by supporting the growth of EV infrastructure, including the development of a citywide charging network....'.
- 7.2 The 2019 CMP had an Integrated Impact Assessment (IIA) undertaken, and in December 2023 a 'Delivering Actions for Parking – Electric Vehicle Charging' IIA was finalised as part of the broader CMP Implementation Plan. The [CMP](#) and the <https://www.edinburgh.gov.uk/directory-record/1549305/parking-action-plan-waiting-and-loading-restrictions-on-main-traffic-routeselectric-vehicle-charging> IIAs are published and publicly available on the Council's website.

8. Climate and Nature Emergency Implications

- 8.1 As a public body, the Council has statutory duties relating to climate emissions and biodiversity. As part of the CMP a [Strategic Environmental Assessment](#) was carried out, which concluded that the cumulative impacts of managing private car use and other means of improving air quality, as supported by cleaner vehicles and EV charging, would have a positive impact on reducing environmental impact and responding to climate change.

9. Risk, policy, compliance, governance and community impact

- 9.1 A market engagement exercise was previously undertaken with charge point operators in October 2022 to establish those interested in working with the Council, and the nature of the delivery models and charging solutions. A further, more detailed market engagement exercise will occur in 2024 to strengthen the Council's understanding of the charging infrastructure options available.
- 9.2 Working with commercial partners through the Pathfinder project presents significant opportunity to engage the public on locations and charger types.

10. Background reading/external references

10.1 [Implementing Electric Vehicle Charging Points](#), 31 March 2022

11. Appendices

Appendix 1 – EV Programme Briefing Note

Appendix 2 – EV Infrastructure Strategy and Expansion Plan Business Case

Appendix 1

On-Street Electric Vehicle Charging Programme – Briefing Note

Operational Services
Place Directorate
25 April 2024

1. Introduction

- 1.1 This briefing note provides elected members with an overview of the Council's On-Street Electric Vehicle (EV) Charging Programme.

2. Background

- 2.1 Committee have approved a range of reports and updates through the life of the EV Programme.
- 2.2 Committee was presented with the first [Electric Vehicle Action Plan](#) on 7 December 2017 which was designed to increase charging infrastructure across the city and to encourage the uptake of EVs.
- 2.3 This was followed by the [Electric Vehicle Infrastructure: Business Case](#) on 4 October 2018 which was developed in partnership with Transport Scotland and the Energy Savings Trust (EST). In this Business Case numerous locations, hosting multiple charging points, were identified across the city to serve as strategic charging hubs for users.
- 2.4 Finance and Resources Committee approved a new enforcement and charging regime - [Electric Vehicle Programme: Enforcement and Tariffs](#) - on 10 October 2019 which has been applied to all Council owned public charger sites.
- 2.5 A significant update was then reported to committee on 31 March 2022. The [Implementing Electric Vehicle Charging Points](#) report detailed the outcome of the advertisement of the draft Traffic Regulation Order (TRO) for introducing on-street EV charge points at various locations, considered objections and sought authority to remove the India Street location and proceed with the remaining locations. It also provided a progress update on the EV Programme implementation and outlined additional work packages relating to EV charging, including:

- Increasing the initial scope to deliver a total of 81 charging points, serving 141 parking places at 12 sites across the city: Ingliston and Hermiston Park and Ride sites and 10 on-street locations.
- The best practice review of the October 2019 EV Enforcement and Tariffs report (originally approved by the Finance and Resources Committee) resulted in tariff increases to cover operational and management costs (staff costs, electricity, maintenance and ChargePlace Scotland fees). These tariff increases were set-out in the Coalition Budget Motion for 2022/23 and agreed by the City of Edinburgh Council on [24 February 2022](#).
- Details of the development of an EV charging factsheet for inclusion to the Edinburgh Street Design Guidance to provide design principles/details and a consistent approach for the installation of EV chargers.
- Details of the partnership working with Enterprise Car Club to identify locations where existing car club bays can be used to install chargers for their EV fleet.
- The Council's application to the UK Government's Office for Low Emission Vehicles for On-street Residential Chargepoint Scheme (ORCS) funding to install EV chargers in residential locations as informed by the EST Business Case.
- The Council selection by Scottish Futures Trust (SFT) to submit an EV Pathfinder Business Case outlining how future financing and delivery of EV charging infrastructure might be undertaken. The aim of the Pathfinder Business Case is to secure funding for a pilot scheme which could deliver the next round of EV charging point installations in the city and help the Council to procure a contract to satisfy the city's EV infrastructure needs up until 2030.

2.6 Various business bulletins have also been submitted to committee in recent years:

- 14 October 2021 - [Electric Vehicle \(EV\) On Street Charger Business Bulletin](#): project update covering ongoing work with Scottish Power Energy Networks (SPEN), Procurement and Scottish Government in planning the delivery of on-street EV charging infrastructure, as well developing strategy and Edinburgh Street Design Guidance EV factsheets.
- 8 December 2022 - [Business Bulletin](#) responding to a motion requesting that officers consider opportunities for allowing residents to suggest new EV charging point locations and for this information to be used to determine the locations of future charging points.
- 2 March 2023 - [Response to motion by Councillor Arthur and Project Update - Electric Vehicle Charging](#) which agreed to continue working with Scottish Futures Trust and Transport Scotland on the EV Pathfinder Business Case, by undertaking further detailed market engagement with Charge Point Operators to further refine/finalise the future scope and commercial arrangements. The finalised Business Case will be submitted to Transport Scotland to seek

further planning and development funding, with a further update to be provided to Committee prior to commencing procurement.

- 2.7 In addition to physical infrastructure, the programme has ensured the sustainability of EV charging provided by the Council, through the introduction, review and updating of charging tariffs on the Council's EV chargers. The introduction of such tariffs is to ensure that all costs to provide and maintain the service, including staff costs, are covered. During 2023/24, Finance colleagues will support the development of a financial model to more robustly forecast EV tariffs.

3. Main Points

- 3.1 In addition to the formal reports and business bulletins that have been provided to Committee, Officers have provided information and regular updates through the Council's website – [Electric vehicle charging points – The City of Edinburgh Council](#).
- 3.2 The Council have procured a mix of charging units which are positioned across the city to service the differing needs of our customers:
- **7kW (standard)** - Standard chargers are ideal for charging vehicles when they can be left for longer periods of time. This might be in residential areas for people who do not have off-street parking or for commuters at Park and Ride sites.
 - **22kW (fast)** - Fast chargers are ideal for when a vehicle needs a substantial charge over a period of up to three hours (this is being recommended to change to eight hours). This might be in residential areas for people who do not have off-street parking or close to shops and services.
 - **50kW (rapid)** - Rapid chargers are ideal when a vehicle needs a substantial charge quickly, often in a busy part of the city.
- 3.3 All of the Council's chargers are on the Charge Place Scotland network, which was a stipulation of the funding. Charge Place Scotland covers all publicly available charging units across the country - [Charge Place Scotland](#)
- 3.4 The following points summarise the main delivery aspects achieved through the EV Programme by the Parking Development team since Autumn 2020:
- 40 charging units serving 69 charging bays have been installed across the Hermiston and Ingliston park and ride sites, requiring the installation of a new electricity substation at each site.
 - 41 new charging units, serving 72 charging bays have been delivered at 10 on-street locations, including within the World Heritage Site, all which have been live since May 2022.

- New charging tariffs, maximum stay periods and enforcement penalties were introduced across all Council owned EV chargers on 1 May 2022, bringing an end to years of fully subsidised charging using Council owned chargers in the city.
 - An updated charging tariff and terms of use were introduced across all Council owned EV chargers on 2 May 2023, enabling overnight charging at fast chargers (as is the case with standard chargers), and doubling the maximum stay period at rapid chargers.
 - An Edinburgh Street Design Guidance EV Infrastructure factsheet has been developed, focused on design principles with a particular emphasis on streetscape, physical accessibility and heritage considerations. The finalised EV factsheet has been published, along with others, and will serve to guide designers of future EV charging infrastructure in the city.
 - 23 chargers serving 46 charging bays have recently been installed across [ten on-street locations](#), with nine of the ten sites going live imminently once the required third party testing and commissioning has been completed. The remaining site - Rose Lane, Queensferry – is anticipated to go live by summer 2024 once our third-party contractors resolve underground power connection issues.
 - 36 chargers serving 72 charging bays have recently been installed at 35 on-street locations for exclusive use by car club vehicles. These chargers are also expected go live as soon as the required third-party testing and commissioning has been completed, which will allow for the electrification of some of the car club fleet.
- 3.5 In three years, the EV Programme has delivered 140 chargers serving more than 250 charging bays, many of which have been realised at on-street locations. Supporting EV design guidance has also been produced to help impart delivery experiences, to guide future designs, and to provide a consistent framework for designers to develop outline designs from.
- 3.6 The Council continues to work with Transport Scotland, Charge Place Scotland and BP Pulse to deliver partnership solutions to challenges faced in delivering successful and reliable EV charging infrastructure.
- 3.7 As referenced earlier, the Council's [EV charging webpage](#), which provides a range of information and guidance (including maximum stay periods and tariffs and a video that was developed to guide new or inexperienced users in how to operate the Council's new chargers), will continue to be updated as projects develop and new chargers are installed.
- 3.8 A further update will also be provided to Councillors once the Council's Pathfinder Business Case and Procurement Strategy are finalised, outlining how the Council proposes to engage with private sector operators to provide further EV charging infrastructure across the city.
- 3.9 Further useful information on EV charging can be found on various websites, including:

- Traffic Scotland - [How to charge an electric vehicle | Traffic Scotland](#)
- Transport Scotland [Mission Zero for transport | Transport Scotland](#)
- AA – [Electric and hybrid cars | Ultimate beginner's guide | The AA](#)
- RAC - [Electric cars | RAC Drive](#)

4. Next Steps

- 4.1 Officers will continue to work with BP Pulse's Chief Operating Officer and Transport Scotland to deliver resolution to challenges faced by the project, with particular focus on any charger reliability issues.
- 4.2 Officers will continue to work with Scottish Futures Trust and Transport Scotland to guide the Pathfinder Business Case, and report back to Councillors ahead of a procurement exercise to acquire a charge point operator partner.

5. Contact Details

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**THE CITY OF EDINBURGH COUNCIL
ELECTRIC VEHICLE
INFRASTRUCTURE STRATEGY & EXPANSION PLAN**

2024/05 – 2026/07

SCOTTISH
FUTURES
TRUST

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THE CITY OF EDINBURGH COUNCIL

PROJECT
CENTRE

Contents

Glossary	3
1. Executive Summary	4
2. Background & Scope	7
Study Area.....	7
Vehicle Groups.....	14
Charging Types.....	15
3. Baseline Position at March 2022	16
Current Approach to Service Delivery	16
Electric Vehicle Infrastructure (EVI).....	16
Revenue and Operations	19
4. Part 1 – Public EV Charge Point Strategy	21
Vision, Outcomes and Priorities.....	21
A well-designed, comprehensive and people-focused network.	21
An accessible, and reliable public network of charge points that works for everyone.....	23
Supporting the principle of a Just Transition.....	23
Attracts Private Sector Investment.....	28
Supporting Active and Public Transport choices.	31
5. Part 2 - Public EV Infrastructure Expansion Plan	32
The Economic Case	32
Forecasting Demand	32
Preferred Charge Point mix.....	34
Public and Private provision.....	34
Site Identification and Grid Connection.....	35
Capital Investment Pipeline & Estimated Costs.....	36
6. The Commercial Case	38
Contract Structure and Risk Allocation	38
Local Authority Retained Works and Services	39
Procurement Options	40
Specification, Standards & Contract Terms	40
7. The Financial Case	41
Funding Sources.....	41
Financial Viability of Service/Concession Type Contracts.....	41
8. The Management Case	42
Governance and Management	42
Risk Management and Mitigation.....	43
Timetable and Next Steps	44
9. Conclusion	45
Appendix 1	49
Relevant Technical Guidance Documents.....	49

Relevant Standards & Legislation	50
EV Charging Equipment Technical Standards	51
Appendix 2	53
Private Charge Point Providers Expansion Plans	53

Glossary

BEV	Battery electric vehicle
CEC	City of Edinburgh Council
CCC	Committee on Climate Change
CPS	Charge Place Scotland
COSLA	Convention of Scottish Local Authorities
DNO	Distribution Network Operator
EST	Energy Saving Trust
EV	Electric Vehicle
EVI	Electric Vehicle Infrastructure
EVIF	Electric Vehicle Infrastructure Fund
FES	Future Energy Scenarios (4 future energy needs modelled by National Grid)
ICCT	International Council of Clean Transportation
IRR	Internal Rate of Return
PHEV	Plug-in hybrid vehicle
PIV	Plug in Vehicle (inclusive of BEVs and PHEVs)
RCV	Refuse Collection Vehicle
SCOTS Network	Society of Chief Officers of Transport in Scotland (scotsnet.org.uk)
SoTC	Switched on Towns and Cities
SFT	Scottish Futures Trust
SPEN	Scottish Power Energy Networks
TS	Transport Scotland

1. Executive Summary

Baseline

By the end of June 2022 there were 2,743 battery electric vehicles (BEV) and 1,540 plug-in hybrid vehicles (PHEV), which have both electric motors and internal combustion engines, registered in Edinburgh. With around 200,000 vehicles registered in the city, electric vehicles (EVs) represent about 2% of the total. But the total number of EVs is projected to grow exponentially over the coming decade, with a ban on the sale of new cars and vans powered purely by petrol or diesel coming into force in 2030. By 2026 the mid-range projections are that EVs will make up 10% of vehicles in Edinburgh, nearly 20,000 vehicles. The existing charge point infrastructure needed to refuel this fleet must be expanded.

In Scotland the state has been largely responsible for funding the development of the EV charge point network. At the end of June 2022 there were 259 charge points available to the public in Edinburgh with just over half provided by the public sector. However, the adoption of EVs in Scotland has now reached a tipping point where it is commercially viable for private operators to make major investments in electric vehicle infrastructure (EVI).

Strategic Case

The latest round of grant funding available to local authorities from Transport Scotland for EVI, the Electric Vehicle Infrastructure Fund (EVIF), aims to secure significant match-funding investment from the private sector. The City of Edinburgh Council (CEC) have written this Strategy and Expansion plan for EVI to guide future investment and set out how we will deliver a charging network which meets the objectives set out in the Scottish Government's [vision for electric vehicle charging infrastructure in Scotland](#). This is for:

- A well-designed, comprehensive, and people-focused public charge point network.
- An accessible, and reliable public network of charge points that works for everyone regardless of their circumstances.
- A just transition to electric vehicles (EVs) – supporting communities without home charging and ensuring convenient access at a fair cost.
- A network that attracts private sector investment and supports active and public transport choices.
- A good geographic spread of charge points across the city so everyone is within a reasonable distance from a charging point.

Economic Case

Underpinning this Strategy and Expansion plan CEC have commissioned modelling work to better understand; how many charge points are needed in financial years 2024/25 to 2026/27, where in the city charge points are needed, what the costs of this work will be and what revenue charge points could generate. Because we wish to maintain an equitable roll-out of EVI, an aim of our modelling was to identify what level of state funding is needed to ensure that less commercially attractive areas are not left behind.

As the body that manages public roads in the city, we have an important role to play in continuing to facilitate the delivery of charge points, particularly in areas where households lack off-street parking. The areas of greatest need for public charging infrastructure have been identified and we will seek to ensure that all households have reasonable access to a nearby charge point.

The table below summarises the level of EVI provision in 2022 and our assumptions and target outcomes for 2026.

	Q2 2022	2026
Plug-in-vehicle uptake	4,283	19,829
Total number of public charge points needed (all networks)	259	1,042
Number of public charging sockets (all networks)	459	1,985
Proportion of public charge points with >50kW output	21%	11%
Charge points per 100,000 of the population	48.7	191
EV to public charge point ratio	17.2	19.0
EV to public charge point ratio (supply metric)	13.2	12.4
Households with no off-street parking	90,547	90,547
Households with no off-street parking (% of total)	36%	36%

Table 1: Summary of key assumptions and 2026 outcomes

Our forecasts are that by 2026 a total of 1,042 charge points will be needed, which is an additional 783, to serve approximately 20,000 plug-in vehicles. We have assumed that the private sector will install approximately 281 new EV charge points and CEC should aim to install 502 up to 2026. CEC installed an additional 22 public 7kW chargers in the second quarter of 2023 so the total number of new charge points is 480. Charge points come in different power outputs ranging from 7kW up to 350kW, with more powerful chargers re-charging an EV much more quickly. Lower power charge points tend to be used where vehicles will be parked up for long periods.

Commercial Case

We estimate that 846 charge points will be 7kW chargers aimed at satisfying home charging demand, something that CEC is well placed to lead on delivering. The remaining 196 chargers will likely have power outputs between 22kW-150kW, although our modelling set the upper range at 50kW. These will be located for people to charge enroute and at destinations like town centres or leisure facilities. CEC will take opportunities that exist to install enroute and destination chargers in strategic locations, such as town centres and alongside strategic roads, where there are opportunities to do so. However, our focus will be to install lower powered charge points that serve areas where most of the households lack off street parking and the private sector is unable or unwilling to meet this demand.

Financial Case

Our financial modelling indicates that we need a grant of approximately £1.1M, over three years, from Transport Scotland to attract private sector investment. The grant will enable the installation of 482 additional charge points over this period as forecasted through the Field Dynamics model, while we will continue to operate and renew our existing EVI. The remaining 560 forecasted charge points required by 2024/2027 will be delivered by the private sector. We envisage installing 398 7kW charge points, primarily in neighbourhood hubs, serving home charging demand and 40, 22kW and 44, 50kW+ rapid chargers. Tariffs for using the charge points will be on a commercial basis but we will seek to keep costs down and the end price to the consumer competitive.

Once the Strategy and Expansion plan is finalised, we will develop a detailed Procurement Strategy and tender documents so that procurement can begin in early 2024, with contract award anticipated

autumn 2024. The implementation period will thereafter be determined in liaison with the appointed contractor.

Management Case

It is the role of the Transport and Environment Committee to approve this Strategy and Expansion plan and the associated Procurement Strategy. Upon receiving approval, funding from the Electric Vehicle Infrastructure Fund (EVIF) can be unlocked, enabling CEC to proceed with the rollout of charge points across the city.

CECs Network Management & Enforcement Team are experienced in delivering charge points within Edinburgh. This team will be responsible for daily governance of the charge point rollout programme and will work closely with other departments such as the Corporate Services directorate who will provide specialist procurement, legal, and financial advice.

2. Background & Scope

Study Area

This Strategy and Expansion plan for Electric Vehicle Infrastructure (EVI) is focused on the City of Edinburgh Council's (CEC) administrative area, shown in the image below. EVI needs to cater to different types of drivers; residents and businesses based in the city, taxi and private hire drivers, and commuters and other visitors. For the purposes of EVI delivery the council has divided the city into three zones. Zone 1 is the city centre, zone 2 covers residential areas of the city within the Edinburgh bypass and zone 3 is the periphery of the city. Each zone has different charging needs and Chapter 4 of this strategy details the different approaches taken to providing EVI in each zone.

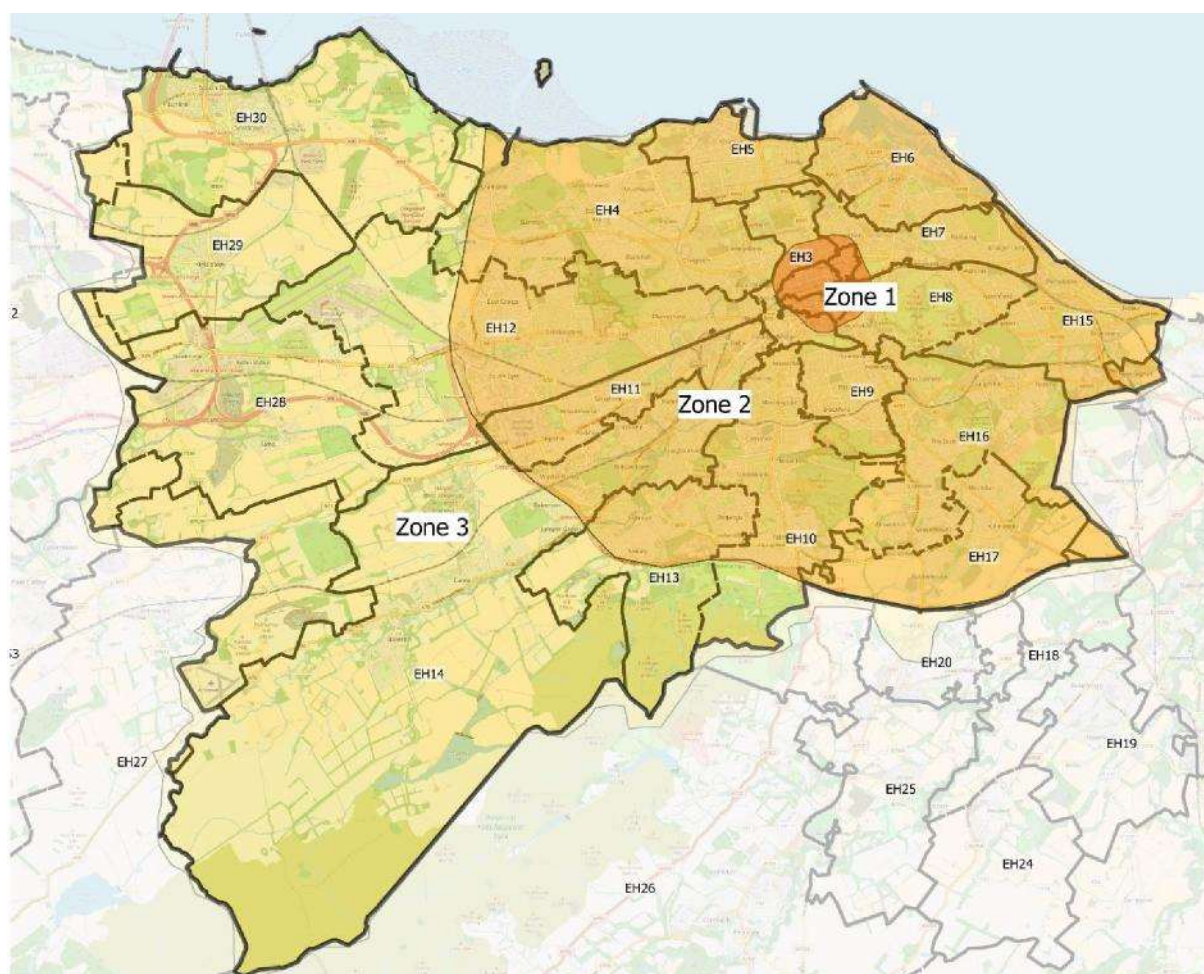


Figure 1: Study Area showing 3 zones, each having a different approach in the provision of EVI

Residents & Businesses

Demographics

Edinburgh's population is growing. In the ten years leading up to 2020 it grew by 12.3% from 469,930 to 527,620 people¹. For comparison in the same period, Scotland's population grew by 3.9%. The National Records for Scotland forecast that Edinburgh's population will continue to grow at a similar rate. By 2026 there are projected to be 546,524 people in the city.

¹ Edinburgh City Council, '[Edinburgh by Numbers 2021](#)'

Car Ownership

There are currently 250,404 households in Edinburgh, 45% of which do not have access to a car². At the end of June 2022 there were 205,000 cars, vans and motorbikes registered in Edinburgh. Other vehicles such as HGVs and buses will not use the EVI proposed in this strategy. For public EVI provision, it is also key to know whether households have access to off-street parking. Charging an EV takes place when the vehicle is parked. Households with off-street parking can install a charger at their home which will meet most of their charging needs. In contrast car owning households without access to off-street parking will rely on publicly available EVI to refuel. Table 2 below shows the proportion of houses that have off-street parking in Edinburgh and Figure 2 illustrates the spatial demand for public EVI. An analysis, undertaken by Field Dynamics, categorises the city into 5 different zones based on household availability of off-street parking.

	Edinburgh Households	Percentage of Households
Access to Off street Parking	90,547	36%
No Access to Off Street Parking	159,857	64%

Table 2: Household access to off-street parking ³

- Commercial:** Areas with a lot of commercial units (eg supermarkets) that could deliver EVI.
- Minimum Need:** Areas of minimal commercial and residential activity with little demand for EVI
- Off-street:** Predominantly residential areas where households have access to off-street parking.
- Public Need:** Predominantly residential areas where households lack access to off-street parking.
- Visitor:** Areas where a high level of visitor traffic is expected.

² Edinburgh City Council, [City Mobility Plan 2021-2030](#)'

³ Field Dynamics, Proprietary Data analysis

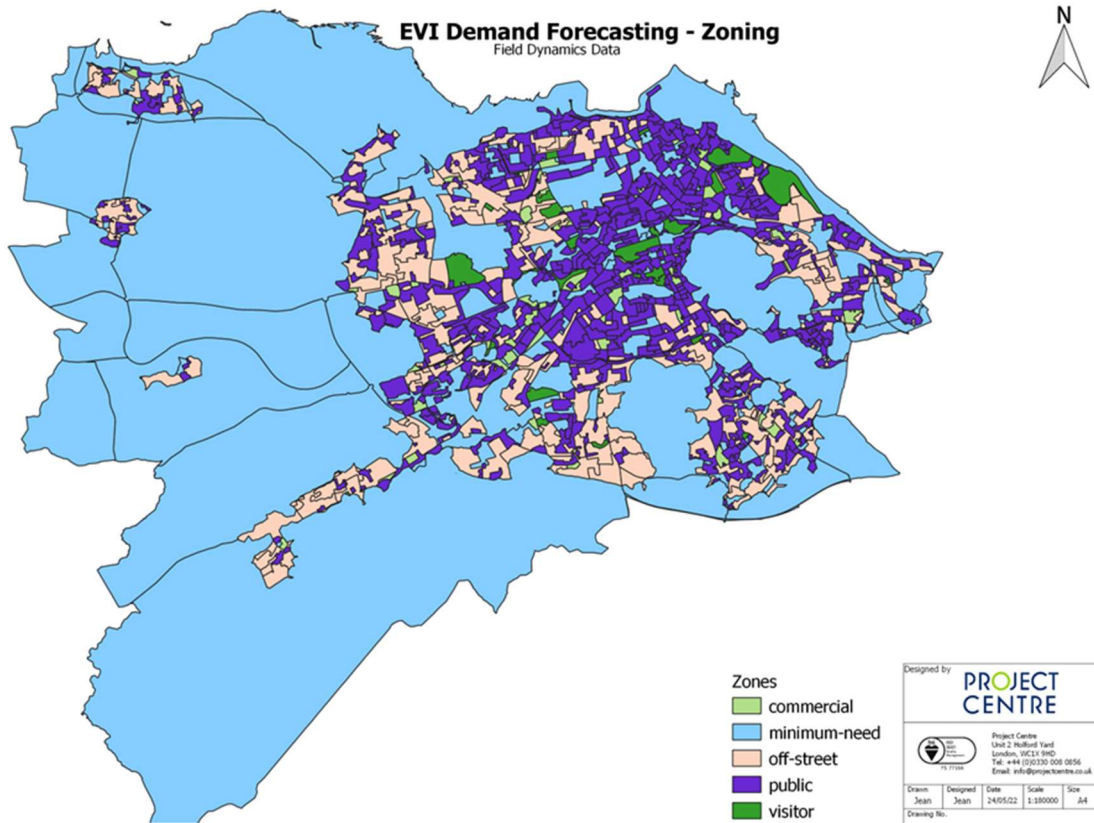


Figure 2: Analysis of public charging need

There is potential for home charging for 36% of households with the availability of off-street parking, located primarily in the peripheries of Edinburgh study zone 2, including Drum Brae, Inverleith, Craightenny, Liberton and Colinton. Whilst 64% of households are 'public need' areas without off-street parking. These households are located both in study area zone 1 and zone 2 as you move away from Edinburgh City Centre. CEC will focus on delivering a comprehensive charging network in public need areas, that provides convenient access to EVI. Also ensuring to identify commercial sites attractive for private investment as part of the strategy.

The heatmap below shows the density of dwellings without off-street parking available. High density tenement areas which lack off street parking; Newington, Marchmont, Tollcross, Dalry, Leith Walk and Easter Road will require the highest density of public EV charge points. The proportion of dwellings with off-street parking becomes higher as you move outwards from these central wards.

Density of dwellings without parking spaces

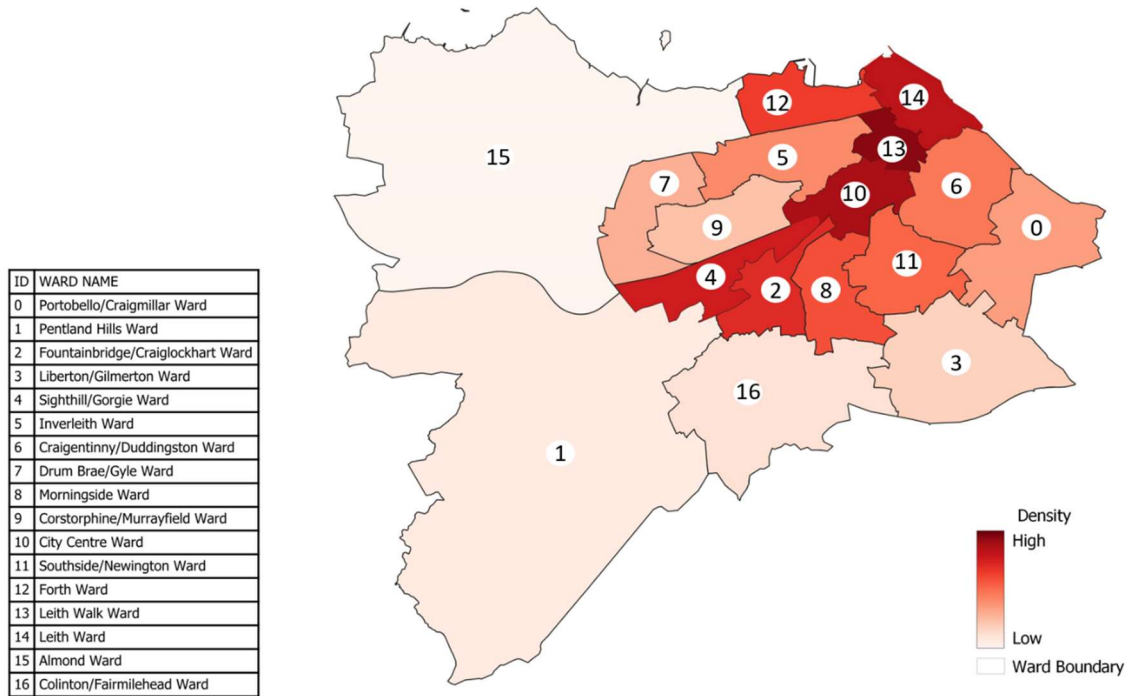


Figure 3: Density of dwellings without off-street parking

Businesses

The exact needs of businesses are harder to quantify as they vary depending on the mileage, utilisation and off-road parking facilities of each business. In modelling of future EVI needs, 8 driver types were identified. Section 2.2 considers the recharging needs of different driver groups. Nearly 15% of people in Edinburgh are employed in the health sector¹, with almost 10% employed by the finance and insurance sector. Edinburgh has a large proportion of workers in high-skilled employment, with 42.7% of all people in employment in higher-skilled jobs compared to 5% in low-skilled jobs. The section below outlines the key trip generators for commuting traffic.

Commuters

As of 2020, 290,000 people worked in the Edinburgh area⁴, and with an estimated 64,000 commuting in from outside the Edinburgh administrative boundary.⁵ The wider travel to work area extends beyond North Berwick to the east and Stirling to the west. The main employment hubs are shown on the map below, alongside tram infrastructure and active travel routes.

⁴ Nomis, Official Labour Market Statistics 2020

⁵ Connecting our City, Transforming out places (2018)

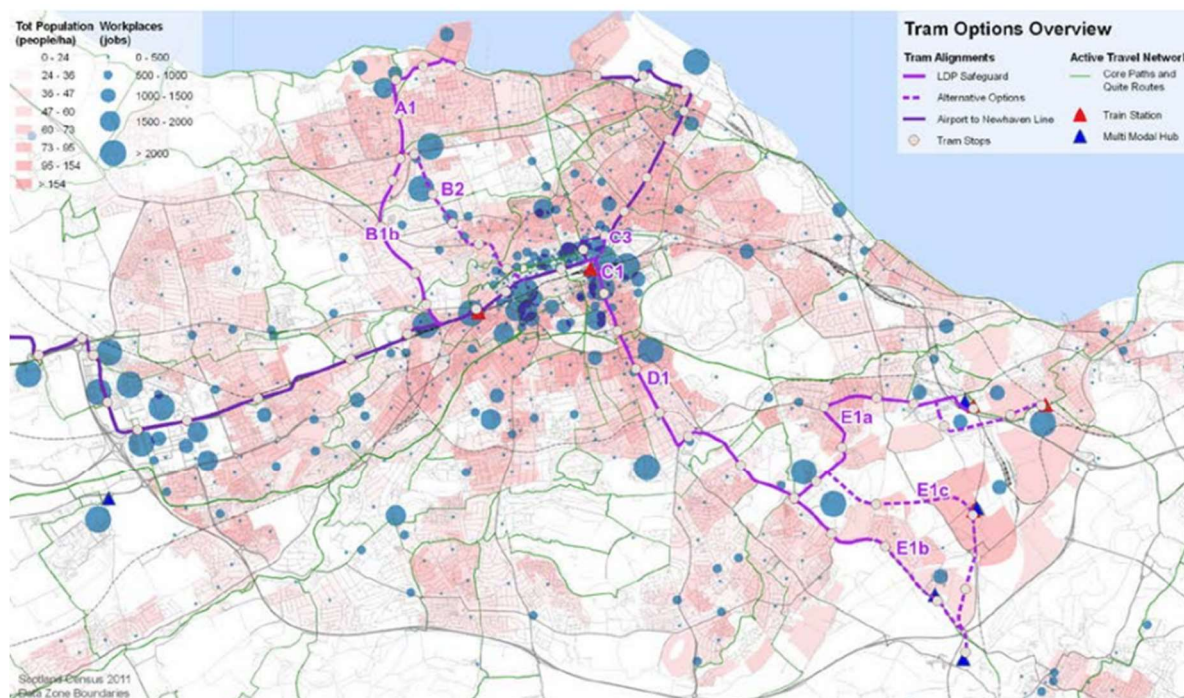


Figure 4: Main employment centres

There are seven Park and Ride sites, three of which are operated by CEC. These provide key opportunities for EVI to reduce the number of private vehicles making journeys to the inner zones of the city when travelling to workplaces. The seven P&R services, as follows:

- Ingliston (west) Operated by CEC
- Hermiston (west) Operated by CEC
- Newcraighall (east)
- Ferrytoll (north)
- Sheriffhall (south)
- Straiton (south) Operated by CEC
- Wallyford (east)

Visitors

Tourism is one of the primary generators of income for Edinburgh. Both domestic and international visitors are likely to navigate the city using vehicles, for example hiring taxis to and from the airport or train stations. The City Mobility Plan highlights the necessity of reducing vehicle emissions and congestion as a key factor in securing net zero by 2030 - tourists comprise a significant element of this target.

According to Edinburgh by Numbers (2021), the top five visitor attractions in the city are:

- National Museum of Scotland
- Edinburgh Castle
- Scottish National Gallery
- St Giles Cathedral
- Royal Botanic Gardens Edinburgh

Table 3 below summarises some other tourism statistics for the city.

	Domestic	Overseas	Total
Number of Visits / Trips	2.7 million	2.2 million	4.9 million
Number of Nights	6.8 million	12.4 million	19.2 million
Average trip duration (nights)	2.5	5.6	4.5
Tourist Expenditure	£674 million	£1.19 billion	£1.87 billion
Average Expenditure per visit	£250	£541	£382

Table 3: Tourism statistics from Edinburgh by Numbers 2021

Major Parking Areas

Because refuelling an EV is often done while the vehicle is conveniently parked up, rather than drivers making a dedicated trip to a fuel station, existing car parks present opportunities to install EVI. Analysis has shown that within the private sector there are:⁶

- 12,000+ parking spaces from 10 shopping or retail centres (Gyle Shopping Centre, Hermiston Gait Retail Park, Westside Plaza, Craighleith Retail Park, Cameron Toll Shopping Centre, Fort Kinnaird, Meadowbank Shopping Park, Ocean Terminal, Fountain Park, and Edinburgh West)
- 10,000 parking spaces from over 40 different supermarkets within the Edinburgh boundary.
- 23,000 parking spaces from over 1,000 offices within the city boundary.
- 3,800 parking spaces from three Universities and three college campuses (with one additional University campus, Queen Margaret University located just outside the authority boundary)
- 4,400 parking spaces at schools across Edinburgh with around 3,100 parking spaces at around 90 CEC owned school premises.

These locations, along with land owned by CEC which may be suitable to host EVI, are shown on the map below.

⁶ Information from Edinburgh Workplace Parking Survey 2019-2020

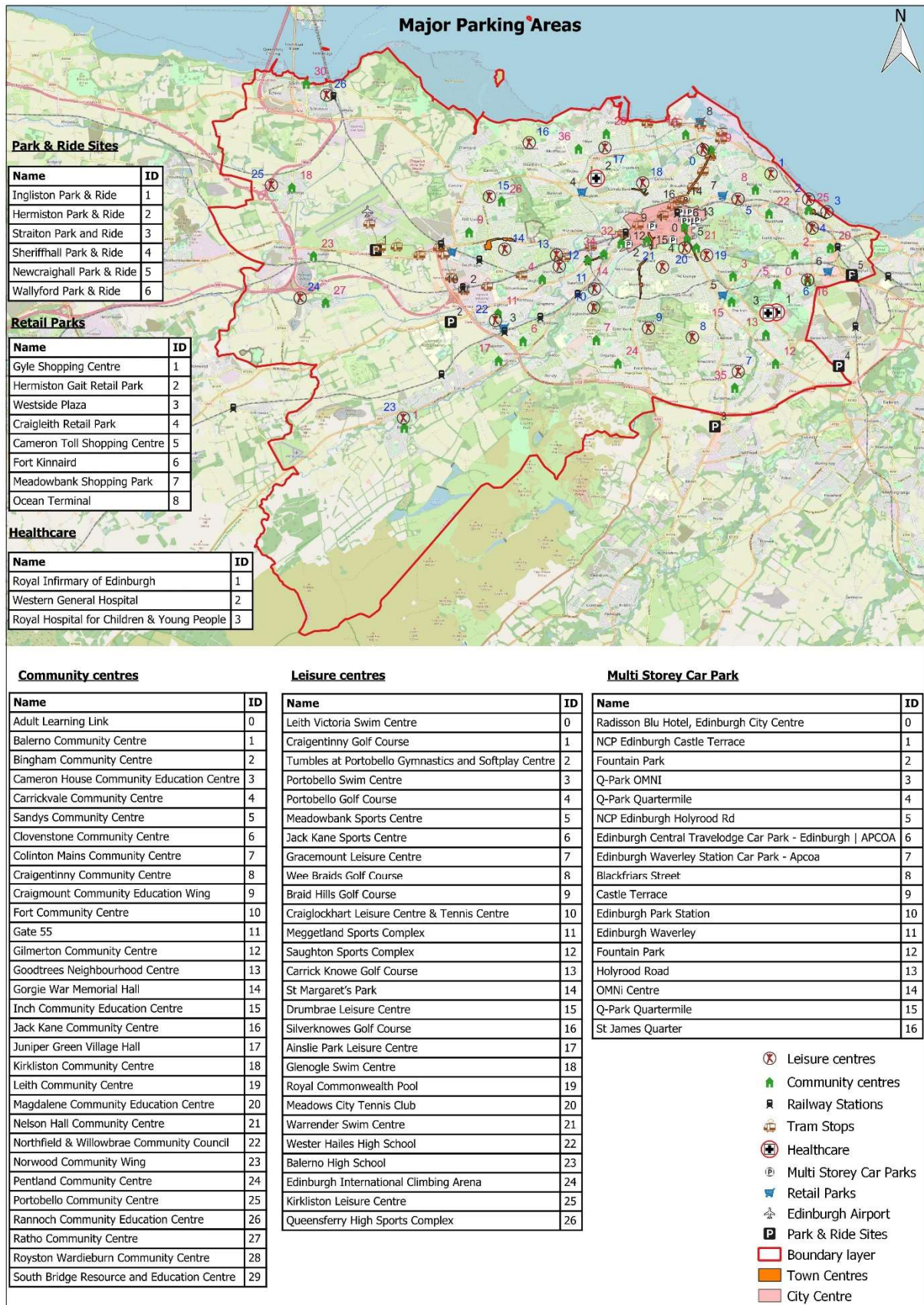


Figure 5: Car parking sites within Edinburgh.

Vehicle Groups

EVs can be classified into PHEVs (Plug-in Hybrid Vehicles) or BEVs (Battery Electric Vehicles). PHEVs will have both an electric motor and internal combustion engine (ICE). PHEV batteries tend to be much smaller than BEVs, as the latter are solely powered by an electric motor. Both require EVI but for BEVs it is critical and they have greater power needs.

The market for public EVI can be segmented into different user groups according to vehicle type, driving habits and refuelling needs. The table below provides a matrix defining how different user types have different recharging habits and EVI needs⁷. These recharging habits can be categorised into three categories; ‘near home’ or ‘at depot’; ‘while grazing’ or ‘at workplace’; and ‘on-the-go’. ‘Near home’ or ‘at depot’ charging relates to overnight charging while the vehicle is parked. ‘Grazing’ refers to refuelling whenever the opportunity presents, such as at destinations that the user may visit with workplaces being a key destination for many. ‘On the go’ refers to drivers refuelling as a break in their journey, waiting for the vehicle to recharge, most likely at a rapid charger. The power output of the EVI required will depend on the dwell time at each location, with shorter dwell times needing more powerful charge points.

Different user types, are shown in the table below. Light Goods Vehicles (LGVs), taxis, private hire cars, car clubs and privately owned vehicles all have their own unique charging needs, which can often be dependent on mileage and their level of access to depot charging. In terms of CEC licenced taxi and private hire cars, the DVLA publish data on the number of registered vehicles. LGVs and commercial vehicles are the most challenging group to estimate their EVI needs as data identifying how many of such vehicles visit the city is not readily available.

User groups	No. of EV in CEC (Q2 2022)	Vehicle type	‘Near home’ or ‘at depot’ 3.5-7kW	‘While grazing’ or ‘at workplace’ (any charge speed)	‘On-the-go’ or in transit (typically rapid charge)
Company fleet LGVs (Q1 2022)	138	¹ BEV	Regularly to nightly	Rarely to occasionally	Occasionally to daily
		² PHEV		Rarely or never	Occasionally
Privately owned LGVs (including ‘gig economy’) (Q1 2022)	17	BEV	Regularly to nightly	Occasionally to regularly	Regularly
		PHEV			Occasionally
Taxi	97	BEV	Nightly	Rarely or never	Regularly to daily
		PHEV			
Private hire	38	BEV	Nightly	Rarely or never	Regularly to daily
		PHEV			
Shared vehicles (e.g. car clubs)	25	BEV	Regularly to daily	Occasionally to regularly	Regularly
		PHEV			Regularly
Private cars Including company cars	3,040	BEV	Regularly	Occasionally	Occasionally to regularly
	1,039	PHEV	Regularly	Occasionally to regularly	Occasionally

Table 4: Overview of EV user types and charging habits from TfL Infrastructure Delivery Plan 2019

⁷ Adapted from [TfL’s 2019 Infrastructure Delivery Plan](#)

For context the total number of each vehicle type registered in Edinburgh is shown below.

Cars	Motorcycles	Light Goods Vehicles	Other vehicles	Total
179,900	5,000	14,600	5,600	204,900

Table 5: Total number of registered vehicles in Edinburgh

Charging Types

EV charge points are primarily defined by the power (in kW) they can deliver and therefore how fast they can charge an EV. The speed of charging is dependent both on the technology built into the vehicle and the charging infrastructure. For example, when the charging capability of the vehicle is less than that of the charger, then the vehicle will charge only at the maximum speed allowed by the vehicle. Charging speed will also vary for every vehicle depending on how much charge there is in the vehicle. Once a battery is at 80% capacity the charging speed falls for the remaining 20%. Charging times are therefore often quoted up to 80% rather than 100%. The types of charging sockets, charging time and suitable locations for each charge point type is shown in the table below:



Charger Type	Ultra-rapid 100kW+	Rapid: 50kW	Fast: 7-22kW	Lamp-column: 3.5-5.5kW
Charging time 60kWh BEV*	20-40 minutes	50 minutes	2-5 hours	7-10 hours
Charging time 150kWh BEV*	50-100 minutes	120 minutes	4 -13 hours	16 -26 hours
Charging standards/sockets	CHAdEMO & CCS 		Type 2 	
Number of EVs served	2	1	2	1
Suitable locations	Charging hubs, service stations, taxi ranks	Charging hubs, service stations, taxi ranks	Hospitality, retail and public car parks. On-Street	Residential areas, conservation zones

Table 6 Charging type specifications

The type of charger which is suitable for any given location is dictated by the dwell time of vehicles. Chargers alongside strategic roads will cater to drivers seeking to refuel on-route to somewhere. The more powerful the charger and shorter the charging time the more attractive it will be to consumers. For home charging, where vehicles will be parked for several hours, less powerful chargers are more suitable.

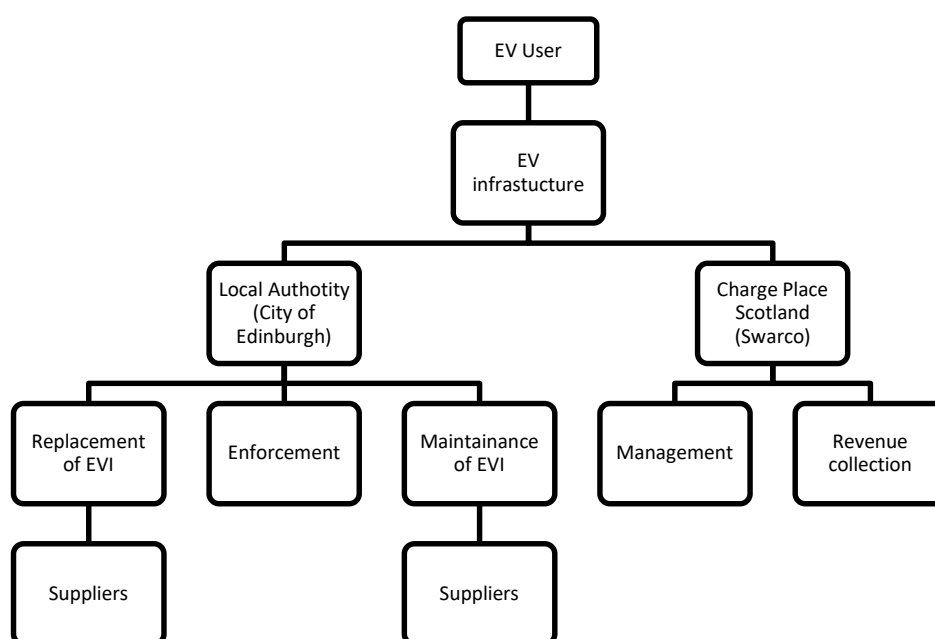
3. Baseline Position at March 2022.

Current Approach to Service Delivery

CEC own and operate the EVI they have installed to date using grants from Transport Scotland to cover the capital costs. An award of £2.2m from the Switched-on Towns and Cities Programme funded the installation of 81 charge points, providing an additional 141 EV bays. While BP Pulse were procured to install and maintain these charge points, as the asset owner CEC will be ultimately responsible for the maintenance of the assets once the initial contract term finishes. CEC rely on ChargePlace Scotland (CPS) to provide the back-office functions of the Charge Point Network Operator.

The CPS website allows customers to find charge point locations, check availability and learn more about charging costs. CPS also has a mechanism in place that allows customers and owners of charge points to report faults online, with the matter resolved either through CPS, or the equipment suppliers are notified directly. A service centre offers further assistance to resolve any issues raised, for example smart card replacement, charger reset and tariff adjustment.

The organisational arrangement for operating, managing, maintaining and replacing the existing local authority EVI network is as follows:



In terms of identifying gaps in provision, CEC’s 2017 EVI Business Case, outlined a system where resident requests for EVCPs could be logged, helping to identify areas where demand is growing. In addition to this CEC would use CPS data to gain insight on where charge points are getting close to their maximum utilisation and therefore in need of further EVI nearby.

Electric Vehicle Infrastructure (EVI)

The below table and map provide a snapshot of the EVI within the CEC area in September 2022. Within Edinburgh there are a total of 259 public charging devices provided by the public and private sectors.

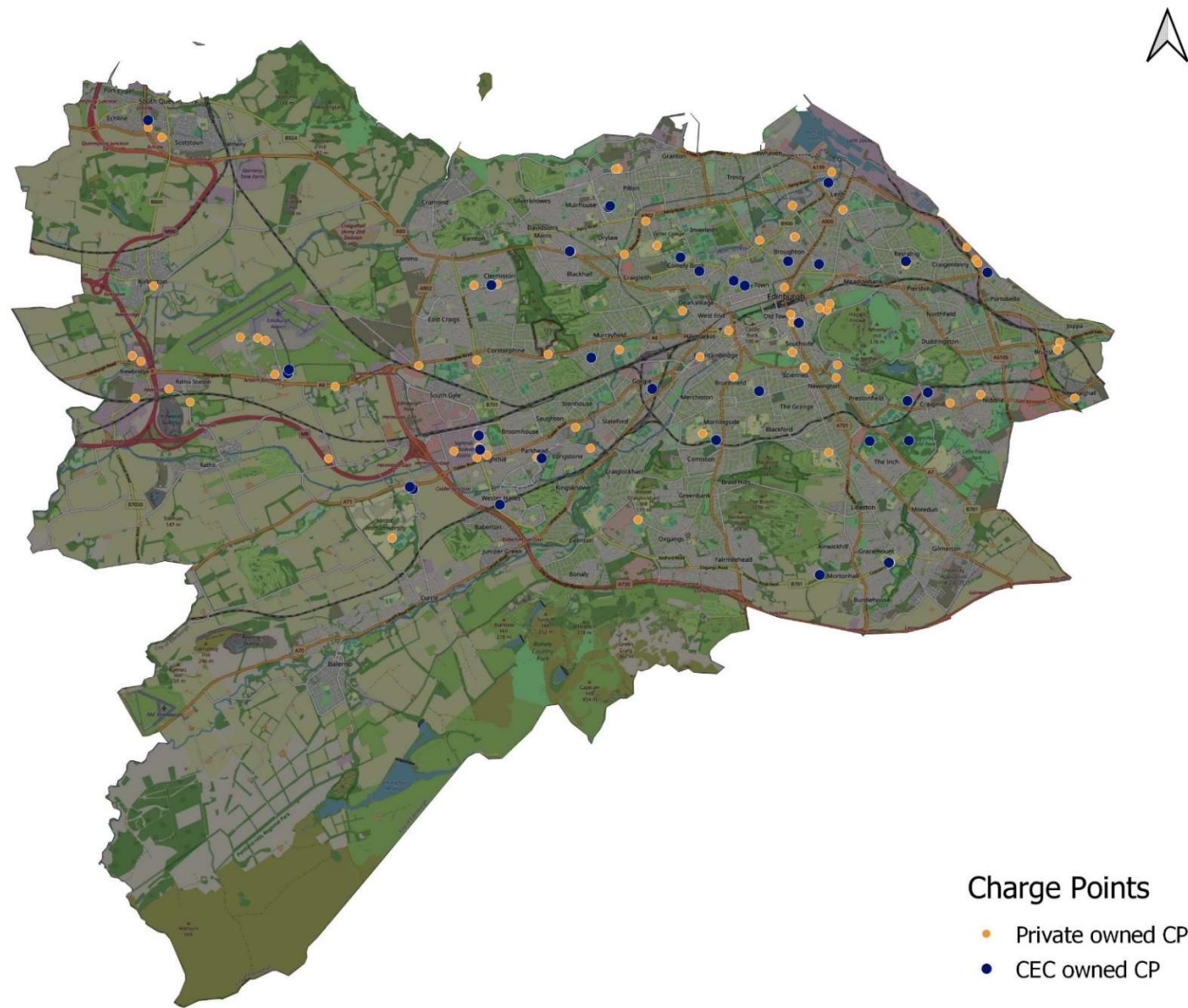


Figure 6: Locations of charge points in Edinburgh

Local Authority area	LA Tariff per kWh			Population	Public Devices (All)	CPS Public (CEC owned)	CPS Public (CEC owned) %	%Non-CPS	%Non-CPS %	Public Devices (50kW+)	% 50kW+	Run Rate Last Qtr* ^c (All charge points installed)	Run Rate Last Qtr* ^c (50kW+ charge points installed)	Current Estimated Charging sockets	Current EVCP per 100k Population	Current charging opportunities per 100k population	Households	% of population without access to off street parking
	7kw AC	22kW AC	50kW DC															
CEC	£0.25	£0.30	£0.35	527,620	259* _a	131* _b	51%	128	49%	55	21.1%	21	6	459	48.7	87	250,404	36%

Table 7: Summary of 2022 EVI Provision

*^a October 2022 figures. For comparison with authorities using March 2022 figures there were 181 public charging devices

*^b This figure excludes 20 additional charge points CEC own which are not publicly accessible

*^c Run rate refers to number of charge points installed.

Edinburgh EV charge point supply, as of Q2 2022 consisted of 259 chargers, 55 of which are rapid and, although no charge points listed on zap-map are over 150kW output, 14 devices do have a stated power output over 100kW. CEC have installed 39 charge points with a power output of 22kW. The power output determines how quickly a charge point can recharge an EV with an ultra-rapid charger capable of refuelling many more vehicles in a day than a standard 7kW charge point.

Power output	Connector	No. of charge points within Edinburgh	Total power output
3-7kW	Type 2 AC	165	1,155
11-22kW	Type 2 AC	39	429
50kW	CCS DC	41	2,050
100kW +	CCS DC	14	1,400
Total		259	5,034

Table 8: Calculation of Edinburgh's Public Charging Supply

Ultimately any charging network needs to be capable of meeting demand from the number of EVs that it serves. In 2014 the EU set a target that there should be 1 public charger for every 10 EVs. This has recently been replaced with a more sophisticated measure that takes account of charge points having different power outputs. The latest target is for countries to have 1kW of public charging output for every BEV and 0.66kW of public charging output for every PHEV.

The DfT publish quarterly figures on the numbers of EVs registered in each local authority and in October 2022 there were a total of 4,283 plug in vehicles registered in Edinburgh. 2,743 of these were BEVs and 1,540 were PHEV. The EVI supply meets the EU supply target as the number of EVs requires a total power output of 3,759kW from the EVI installed in the city.

Revenue and Operations

Since the 1 May 2022 tariffs have been charged at CEC owned charge points. The tariff rates were set to cover the operational cost of maintaining the existing EVI network although they were set prior to large increases in the wholesale electricity price. In response to the dramatic rise in wholesale electricity cost tariffs were revised upwards in May 2023. The tariff is differentiated by charger type, shown in the table below. This reflects the higher capital cost of installing chargers with higher power outputs.

Charge Type	No of Charge points	Tariff per kWh		Electric Consumption p.a (kWh)
		May '22	May '23	
Standard 7kW	31	£0.25	£0.45	182,935
Fast 22kW	25	£0.30	£0.50	279,484
Rapid 50 kW	9	£0.35	£0.55	545,156
Total	65			1,007,575

Table 9: Adapted from CEC Enforcement and Tariff Report 2022

The projected income was originally set to cover the annual operational costs of £288,500, set out in the table below. This included; the cost incurred by CEC for electricity, CPS transaction fees per charging session, CEC staff costs, maintaining the assets and generating enough revenue to pay for asset replacement at the end of their life. Given the large rise in wholesale electricity costs the financial modelling exercise has used different cost assumptions from those set out below.

Annual OPEX	Cost
Electricity	£126,854
Transaction fees	£18,483
CEC staff costs	£44,979
Maintenance	£15,405
Replacement	£82,779
Total	£288,500

Table 10: CEC Enforcement and Tariff Report 2022

4. Part 1 – Public EV Charge Point Strategy

Vision, Outcomes and Priorities

CEC has delivered approximately half of the EVI that currently exists in Edinburgh. We anticipate that this split between public/private provision will continue in the short term, up to 2026 CEC will need to provide about half of the required charge points. In the latter half of the 2020's we expect the private sector to deliver an increasingly large share of public charge points as the market grows. Our vision is that CEC will play an important role to ensure that charge point deployment reaches all areas of the city, using sustainable commercial approaches.

For the purposes of EVI delivery the city is divided into three zones. The 2017 EV action plan set out that in zone 1 the focus would be on rapid charging hubs, fast charging hubs in zone 2 and in zone 3 hubs in strategic locations such as park and ride sites. This approach has been honed so that areas of the city identified as having a public need for charge points will be the focus of EVI delivery. The city centre, zone 1, will still need rapid chargers to serve taxis and commercial vehicles but there will be a greater focus in providing standard chargers in neighbourhood hubs across all zones where there is public need for home charging.

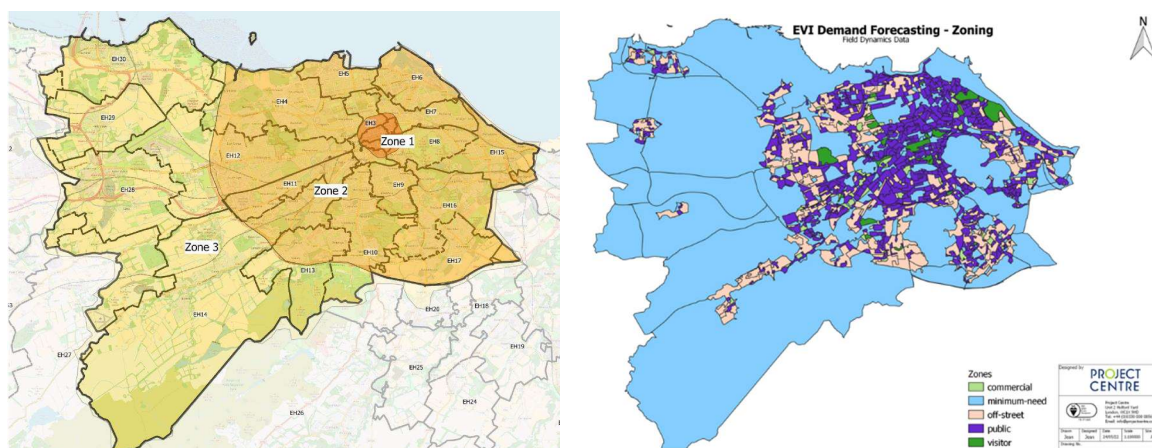


Figure 7: The type of charge points provided by CEC will be guided by which zone the location is in and whether there is public need for charge points (purple sharded areas)

In January, The Scottish Government published its [draft Vision for Scotland's Public Electric Vehicle Charging Network](#). The following section headings are taken from the draft vision and we have set out how CEC's strategy has been aligned with each objective.

A well-designed, comprehensive and people-focused network.

To ensure a well-designed and people-focused network we have engaged with EV drivers, charge point operators and third parties such as the local power distribution network operator (DNO), Scottish Power Energy Networks (SPEN).

EV drivers

For the end user we know, from a UK wide consultation on the consumer experience at public charge points, that the main areas where they wish to see improvement on the public charging network are:

- Charge point reliability.
- Ease of payment.
- Live data on charge point availability.
- Pricing transparency.

To supplement the UK wide research we held two focus groups with CEC residents. One with people who already own an EV and one with people who currently drive non-electric vehicles. The local EV owners echoed the findings of the national consultation with reliability and live information on charge point availability being the chief issues. The main findings from the focus groups in addition to that were:

- Existing EV drivers want the maximum waiting time at rapid chargers extended to an hour.
- Existing EV drivers wanted to see more standard chargers near to where they live so they can charge overnight, rather than a focus on rapid chargers.
- 5 minutes was considered the maximum distance most people would want to walk to walk to leave their EV at a charging hub.
- That nearby amenities at charge points, such as coffee shops, are highly valued but some CEC rapid locations lack this.

The UK Government has proposed solving issues of reliability, ease of payment, data on charge-point availability and pricing transparency by mandating new rules. For example, the adoption of the Open Charge point Interface Protocol (OCPI) and requiring that rapid chargers on the strategic road network must meet 99% reliability. The legislation required to mandate new rules has already been passed; Part 2 of the Automated and Electric Vehicles Act 2018. This gives the Secretary of State powers to make regulations, which will apply to the whole of the UK.

Charge Point Operators will be aware of the coming legislation and should be preparing for the introduction of the new rules. However, it is likely that CEC will procure supplier(s) of EV charge points before these new rules are introduced. As part of the tender exercise for new charge points we will require bidders to set out how they will address these challenges and what systems are in place ahead of the new regulations coming into force.

Scottish Power Energy Networks (SPEN)

Liaison with SPEN has taken place regarding the pipeline of projects that CEC wish to bring forward and include in the procurement exercise for future EVI. SPEN did advise that delivering new power supplies in Edinburgh city centre was typically 25% higher than other locations because of more complex traffic management and the need to reinstate more expensive materials, such as cobbles. Shortlisted locations have been forwarded to SPEN. We plan further engagement with SPEN to secure budget quotes throughout 2023. SPEN also advised that the main constraint when installing rapid charging hubs was finding space to accommodate the new substation/feeder pillar.

Charge Point Operators

CEC undertook a PIN exercise in January 2022 which asked CPOs about their preferred delivery model and how the aesthetic impact of charge points in sensitive locations in the city could be reduced. A subsequent supplier day was held in October 2022 to engage with the market. A total of 26 suppliers were invited and 17 attended. At the event CEC set out what their plans for expansion were and asked two questions of the suppliers. The first question asked what their suggested approach would be to ensure households reliant on the public charging network do not pay significantly more than those with access to off-street parking. The second asked what their suggested approach to ensure all areas of Edinburgh have good EV network access, regardless of income or other factors.

To minimise the price difference paid by those without off-street parking the main tool is likely to be variable tariffs for those charging during periods of low demand for electricity. One operator was able to offer £0.29 per kWh at their on-street chargers for night-time charging. Operators also stressed the importance of; lobbying for VAT rules to be changed so that users had access to the lower 5% VAT rate applied to domestic electricity consumption, accessing low-cost capital financing, and maximising utilisation of charge points.

Many CPOs are small or medium enterprises which concentrate on one type of charger. However, they indicated that they are amenable to working in partnership so that bundling of high and low value locations together is feasible. Rapid charger sites tend to have greater revenue potential and this can be used to cross subsidise low value locations. All operators want to be involved in the selection of locations and one notable suggestion was annual adjustment of the network plan in line with feedback on usage.

An accessible, and reliable public network of charge points that works for everyone.

Aesthetic Impact

CEC has created a Street Design Guidance document which provides guidance on how various types of infrastructure should be delivered in the city. A factsheet will be finalised in 2023 which covers delivery of EV charge points. This includes aesthetic concerns and minimising the visual impact on sensitive areas such as the World Heritage Site. It recommends:

- Grouping street furniture together and maintaining colour schemes where possible.
- Keeping branding to a minimum.
- Avoiding the introduction of new posts for EV signage.
- Maintaining original paving and kerb materials, and covering concrete foundations.

Ease-of-use

As previously noted in section 4.1 the UK Government has proposed tackling issues of reliability, ease of payment and data on charge-point availability through legislation contained in Part 2 of the Automated and Electric Vehicles Act 2018.

Inclusivity & Accessibility

In October 2022, The British Standards Institute (BSI) published PAS1899:2022 which provides detailed guidance on how to install charge points so they are accessible to people with disabilities. As this guidance is voluntary we intend to implement this standard by including compliance with it as part of the contract with the supplier. The standard covers:

- Physical design and specification of the charge point itself e.g., height of sockets, user screens, cable length etc.
- Positioning of the charge point and its surrounding environment e.g., kerb heights, orientation of charge point, ground surface etc.
- Digital platforms and information provision, e.g., smartphone apps, payment methods, compliance with Open Charge Point Interface Protocol (OCPI).

The CEC's Street Design Guidance factsheet focused on EVs already includes reference to the PAS1899:2022 and reiterates some key details such as socket heights, bollard placement and space requirements around the charge point. The Street Design Guidance recommends that in locations where four or more EV parking bays are provided, one should have the larger dimensions of a disabled bay to improve the ease of access for disabled drivers.

A full list of technical guidance documents which will be referred to when drawing up the tender specification is provided in appendix 1.

Supporting the principle of a Just Transition.

We have taken into consideration the following issues so that the transition to EVs is equitable:

- What access those without home charging will have to the public charging network.
- What tariffs those without home charging will pay using the public charging network.

- What access those in socially disadvantaged areas of the city will have to public chargers.
- What access those living in villages outside of the city will have to public chargers.

Households with access to off-street parking will find it much easier to transition from fossil fuel powered vehicles to EV. This is illustrated in Figures 8 and 9, below, which shows that EV registrations are concentrated in areas where most households have off-street parking. Not only do these households benefit from the convenience of charging an EV while it is parked at home they can access cheaper domestic electricity tariffs too.

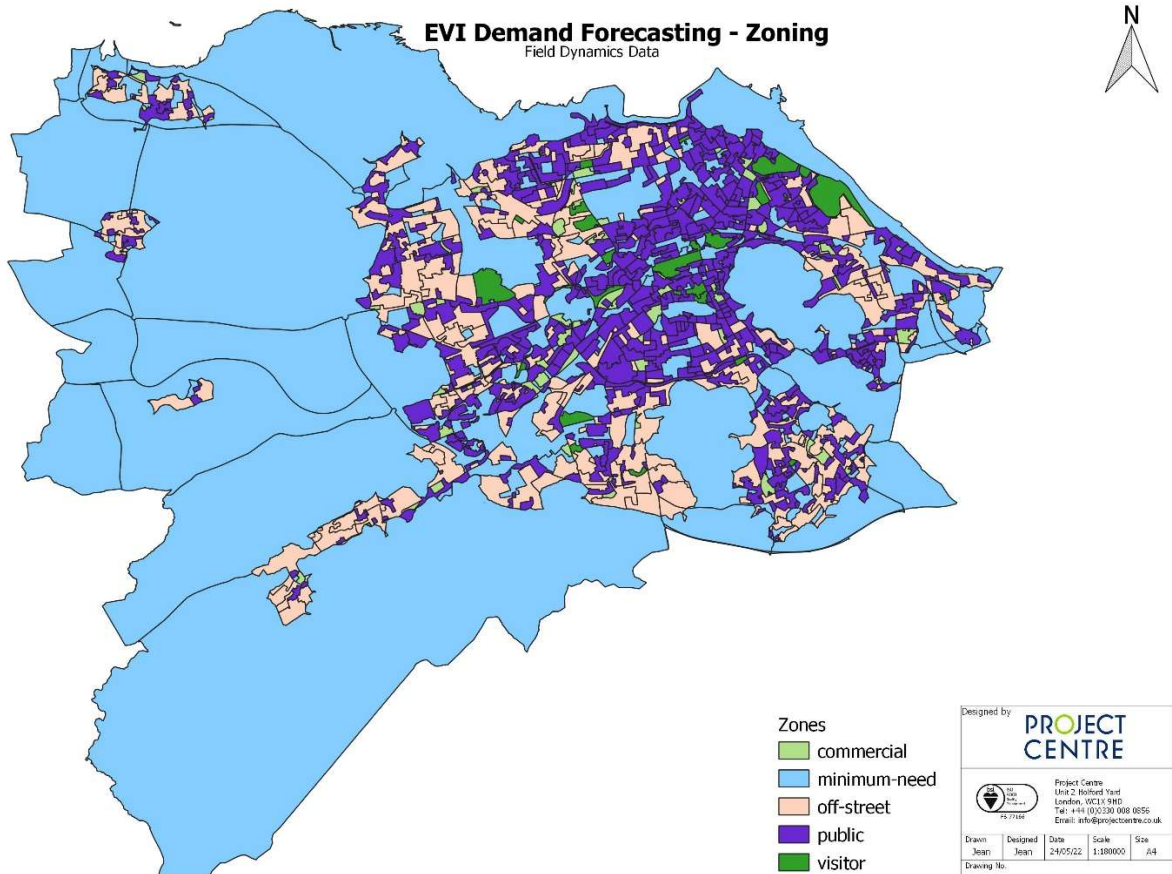


Figure 8: Zones showing access to off street parking

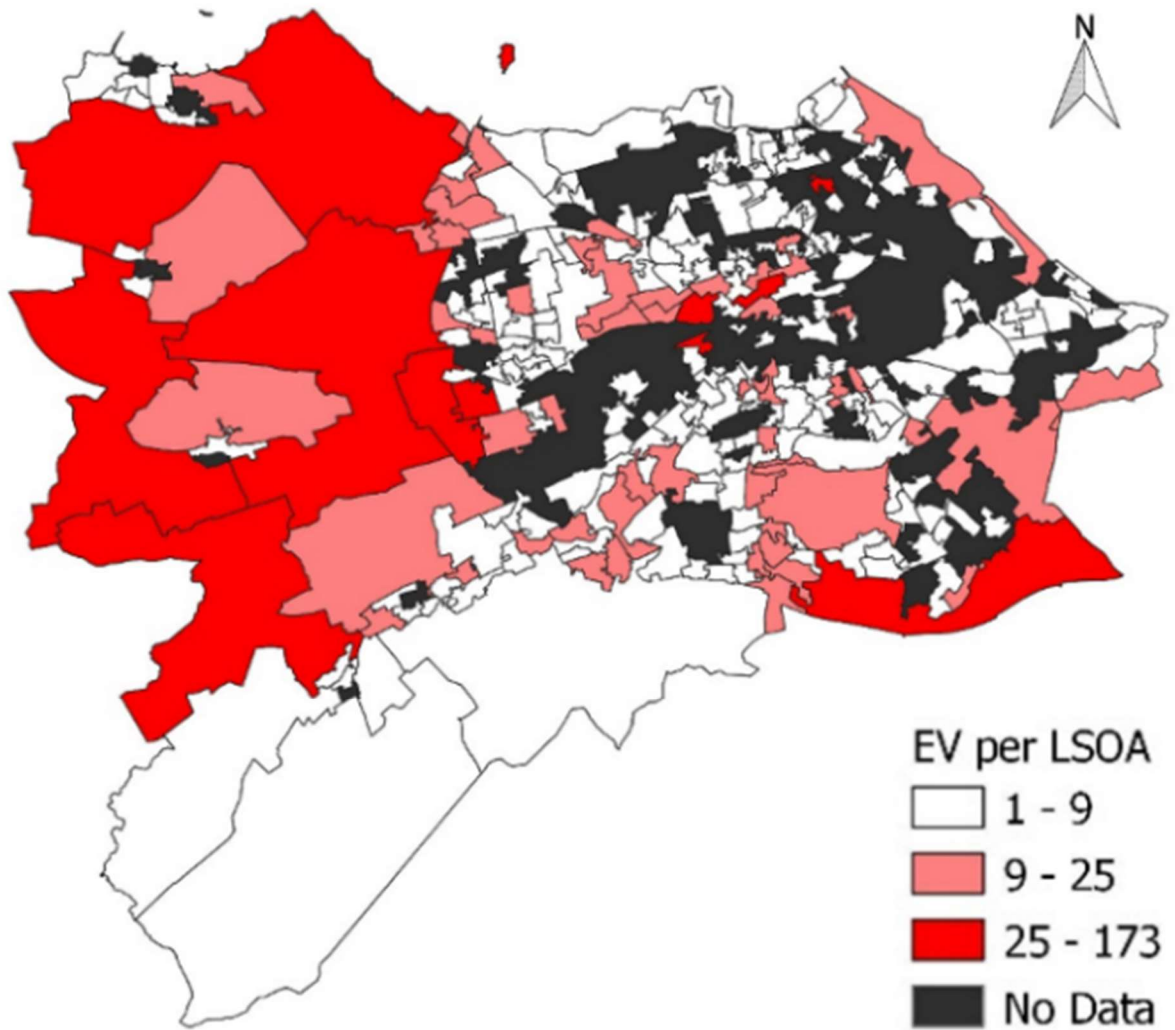


Figure 9: Concentration of registered EVs

Figure 10, below, shows the multiple indices of deprivation map of the city, which has been zoned according to household access to off-street parking and a map of deprivation. In the map of deprivation, the most deprived areas are highlighted in red. In the map of household access to off-street parking shown in figure 8, the zones shaded purple (labelled as public need) are where there is the greatest need for public charging, because a high proportion of households lack off-street parking. Together maps shown in Figure 8 and Figure 10, illustrate that affluent neighbourhoods such as Newington, Morningside and Stockbridge as well as deprived neighbourhoods such as Granton, Leith and Craigmillar are areas where a high proportion of households lack off-street parking. However, because EVs are more expensive to buy than a fossil fuel equivalent it is the more affluent who are early adopters of EVs.

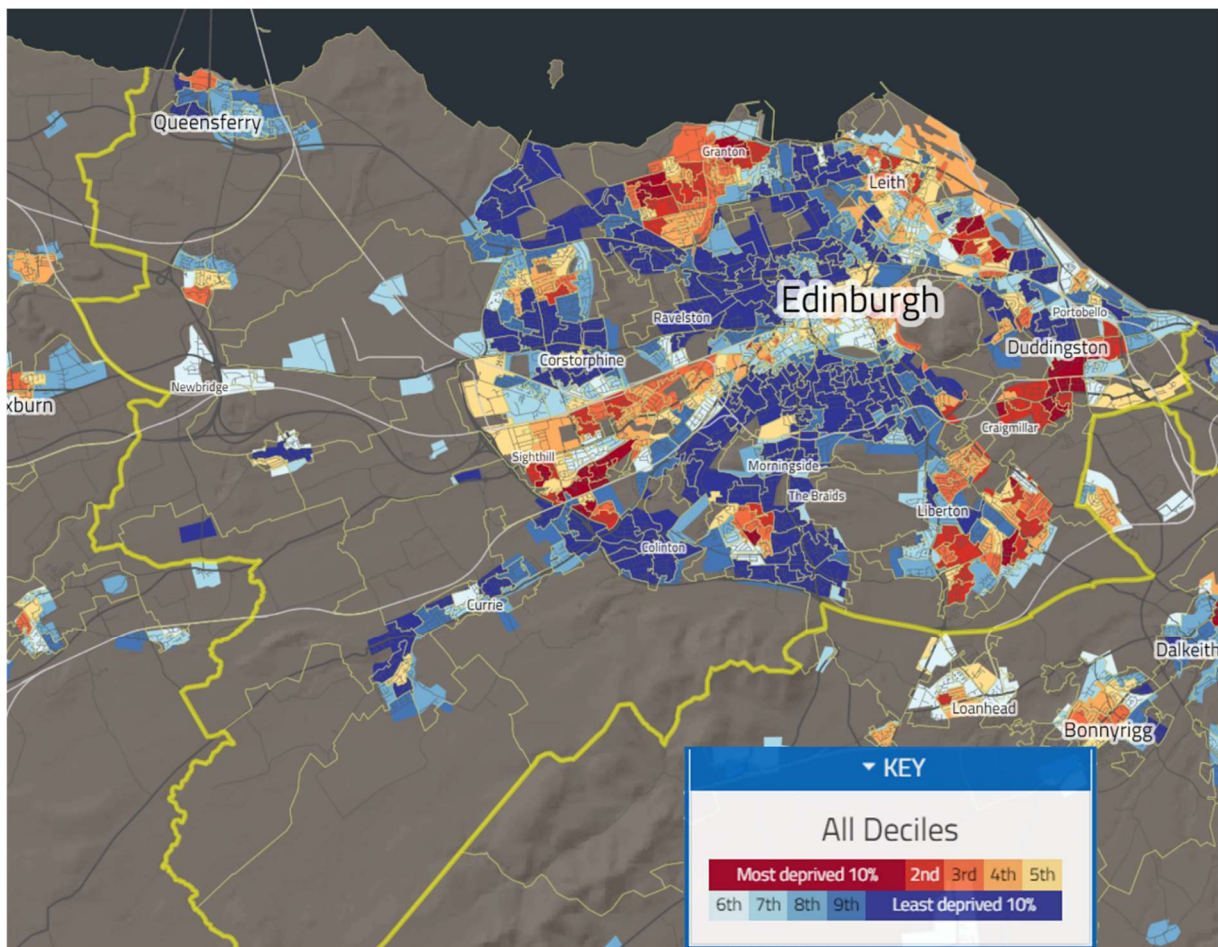


Figure 10 Indices of deprivation (*deprivation measures averaged within each data zone) SIMD 2020

When service provision is left wholly to the market it can mean that deprived areas are underserved. For example, the phenomenon of ‘food deserts’ where it is harder for residents of economically deprived areas to access affordable, healthy fresh food. We aim to ensure that deprived areas of the city are not neglected in the transition to EVs as it is these areas where it will take longer for there to be a concentration of EVs which are sufficient for EVI to be commercially successful. When compiling our pipeline of sites for installing charge points we aimed to ensure that there is a good geographic spread of charge points across the city. We propose bundling together sites in commercially attractive neighbourhoods with those in less commercially attractive areas. Taken as a whole the sites will be commercially viable and it will mean that all parts of the city, which have been identified as public need, are provided with a good minimum level of service.

Our approach will be to focus on the areas of the city that have been identified as ‘public need’ as shown in Figure 11 and aim to deliver a network in these areas that is comprehensive and offer EV drivers an opportunity to access a charge point within a convenient distance. This includes Leith, Leith Walk, Newington, Morningside, Portobello, Liberton, Sighthill, Forth and Drum Brae. Whereas, in Almond and Pentland hill, many dwellings have off-street parking. The density of dwellings within each identified area that lack access to off street parking is referenced in Chapter 2.

For households that have access to off-street parking, charge points will not be provided in the same density and rapid chargers will be provided a short drive away.

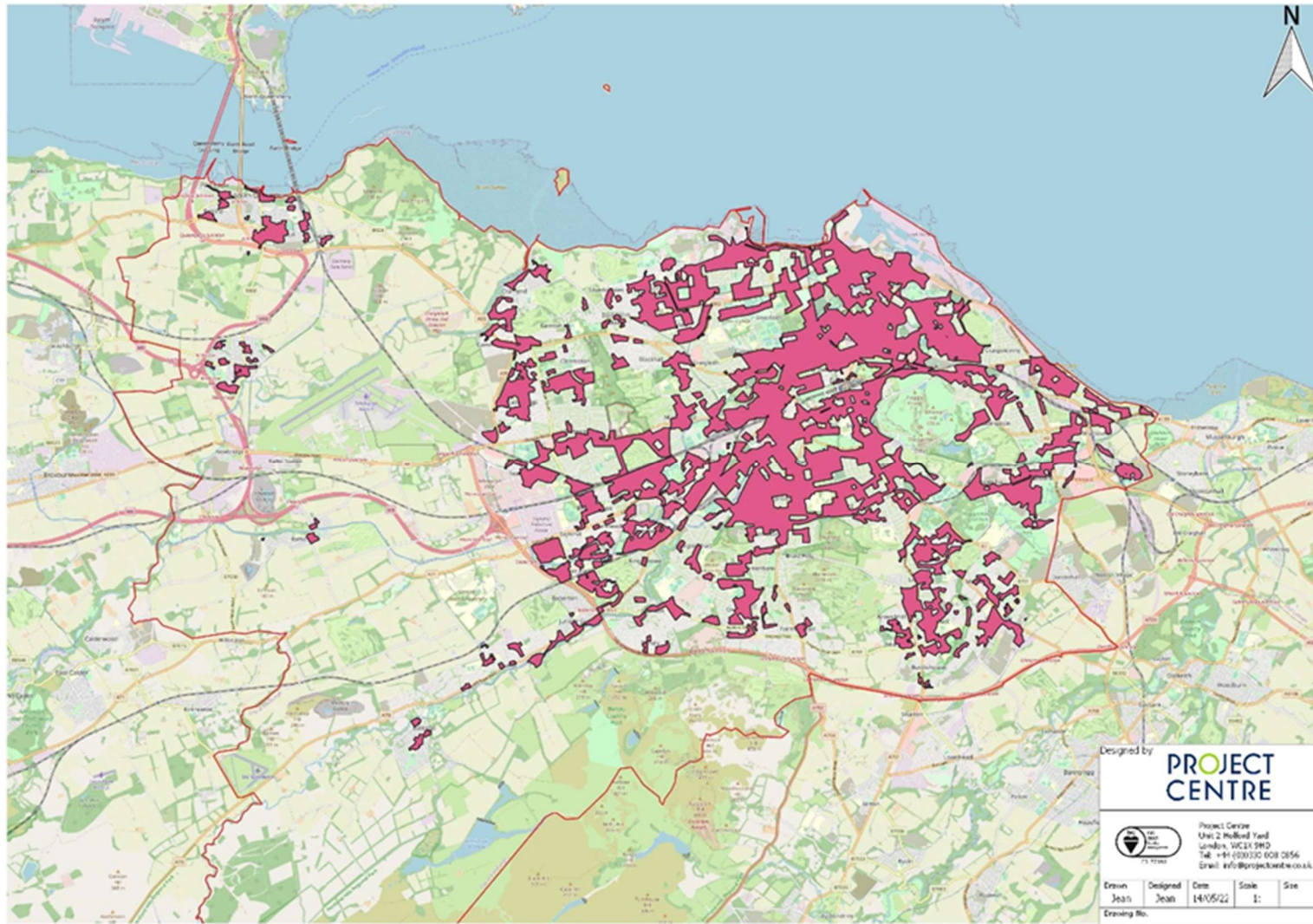


Figure 11 Field Dynamic: Public need zones

The price differential between home charging and public charging is in part because the cost of connecting a charge point to a domestic property with an existing power supply is lower. Public chargers require a dedicated power supply and have higher on-going maintenance demands. They are more sophisticated and expensive than domestic chargers as they need to handle payments from different users. The electricity at public charge points is also taxed at a 20% VAT rate, as opposed to the 5% VAT rate applied to domestic electricity. The result for the consumer is that those charging at home can do so for approximately 20p less per kWh. The cheapest domestic electricity tariff in the winter of 2022/23 is 34p kWh while rates at public chargers are generally over 50p kWh.

There are examples of cheaper public charging rates, with one supplier offering charging rates of £0.29 per kWh between midnight and 7am, when demand for electricity is much lower. To ensure that residents that rely on the public charging network receive good value we will include an evaluation of public tariffs as part of the tender process. This will most likely exclude the wholesale cost of electricity, which will be treated as a through cost, and focus on the operator's proposed margins.

The Scottish Government objectives include areas with various traffic flows are supplied with public charge points so that EV users can travel conveniently throughout Scotland. All areas within the CEC administrative area are within relatively short drives to roads with high traffic flows where commercial charge points are viable. While the majority of Edinburgh's area is urban there are settlements in the peripheral zone 3 such as Queensferry, Kirkliston, Ratho, Currie and Balerno, which are satellite settlements. The map of charge points shows that Ratho and Currie have no charge points currently installed, although there are pockets of housing with no off-street parking in both settlements. In the case of Ratho there are approximately 100 households without off-street parking. Public charge points are a short drive away from both settlements.

Attracts private sector investment.

CEC intend to enable delivery of EVI by making suitable sites available for private operators. There will be a particular focus on providing neighbourhood charging hubs in residential areas where it is unlikely that private landowners can meet demand and kerbside locations will be the most convenient option.

We will work with the chosen charge point operator to select sites that ensure comprehensive coverage of areas that have the greatest need for public charging. Site identification criteria were developed and detailed in the Strategy and Expansion plan, chapter 5.5. Shortlisted sites will be prioritised for installation of EVI and are listed in Table 11 below.

Ref. Number	Address	Rapid 50kW	Fast 22kW	Standard 7kW
8&9	5, Kirk Loan, Corstorphine, EH12 7HD,	2		
12	52, Albert Street, Brunswick, Leith, EH7 5LG		2	2
32	115 Stenhouse Dr, Edinburgh EH11 3NP	1		1
39	23, Durward Grove, Gilmerton/Inch, EH16 5GE,		1	1
45	60 Niddrie House Park, Edinburgh EH16 4UT		1	1
51	19 Magdalene Dr, Edinburgh EH15 3DX		1	1
61	16, Polwarth Crescent, Polwarth, EH11 1HS		1	1
71	SCRM, Little France Drive, Little France, EH16 4UU	3		
72	7, Tower Place, The Shore, Leith, EH6 7BZ		2	
95	Muirhouse Post Office, 53-55, Muirhouse, MEH4 4TD			2
105 & 173	Enterprise Car Club, Melville Street, EH3 7PE,	4		
114	130 Ferry Rd., Edinburgh EH6 4ET	2		1
120	Royal Commonwealth Pool Car Park, 21 Dalkeith Rd, Edinburgh EH16 5BB	2	2	
121	50, St Patrick Square, St Leonards, EH8 9EZ	1	2	
136	Dalmeny Station Car Park, South Queensferry EH30 9PJ			4
138	Stokrotka, West Side Plaza, Wester Hailes Road, EH14 3HR		1	1
147	29, Waterloo Place, Greenside, EH1 3BQ	3		
160	1 Chambers St, Edinburgh EH1 1HR	2	1	
161	Enterprise Car Club, Bruntfield Terrace, EH10 4EX	2		2
178	134C, Portobello High Street, Rosefield, EH15 1AJ		2	1
191	Jeffrey Street, Canongate, Old Town, EH8 8FS	2		
192	New Street Car Park (for Waverley Station) EH8 8BH	2		
200	1, Summerhall Square, St Leonards, EH9 1QD,	2		
207	20 Westbank St, Portobello, Edinburgh EH15 1DR		3	
213	5-9 Atholl Cres, Edinburgh, EH3 8EJ	2	2	
214	King's Stables Rd, Edinburgh EH1 2EW	2	2	
215	7 Bankhead Ave, Edinburgh EH11 4BT	2		
216	230 Oxfangs Road North, EH13 9BQ		1	1
217	1 Ryehill Terrace, EH6 8EW			2

Table 11: Shortlisted Charge Point Sites

Priority zones for charging infrastructure are firstly shown in Figure 12, defined by Field Dynamics as areas where residents do not have access to off-street parking and charging. These areas are the highest priority for CEC to install EVI.

This is followed by a map with location features, including:

- Existing charge points
- Proposed new charge points
- Potential charge point locations that the EST business case has identified.
- Retail parks
- Petrol stations
- Multistorey car parks
- Leisure Centres
- Community Centre
- Park and Ride Sites
- Transport hubs e.g., Rail Station

Figure 12 shows the final map areas (in white) overlaid on the priority zone. The white area represents a gap analysis showing a five-minute (400m) walking distance around the location's features listed above.

While CEC has not made any commitments around how close residents can expect to find their nearest charge point 400m is felt to be a reasonable catchment area where people can park their car to refuel and return home on foot. The expectation is that the private sector is in a good position to lead on providing the required EVI within the areas marked in white including: petrol stations, supermarkets, retail parks or existing sites of EVI. The gaps in the network may be filled by kerbside provisions.

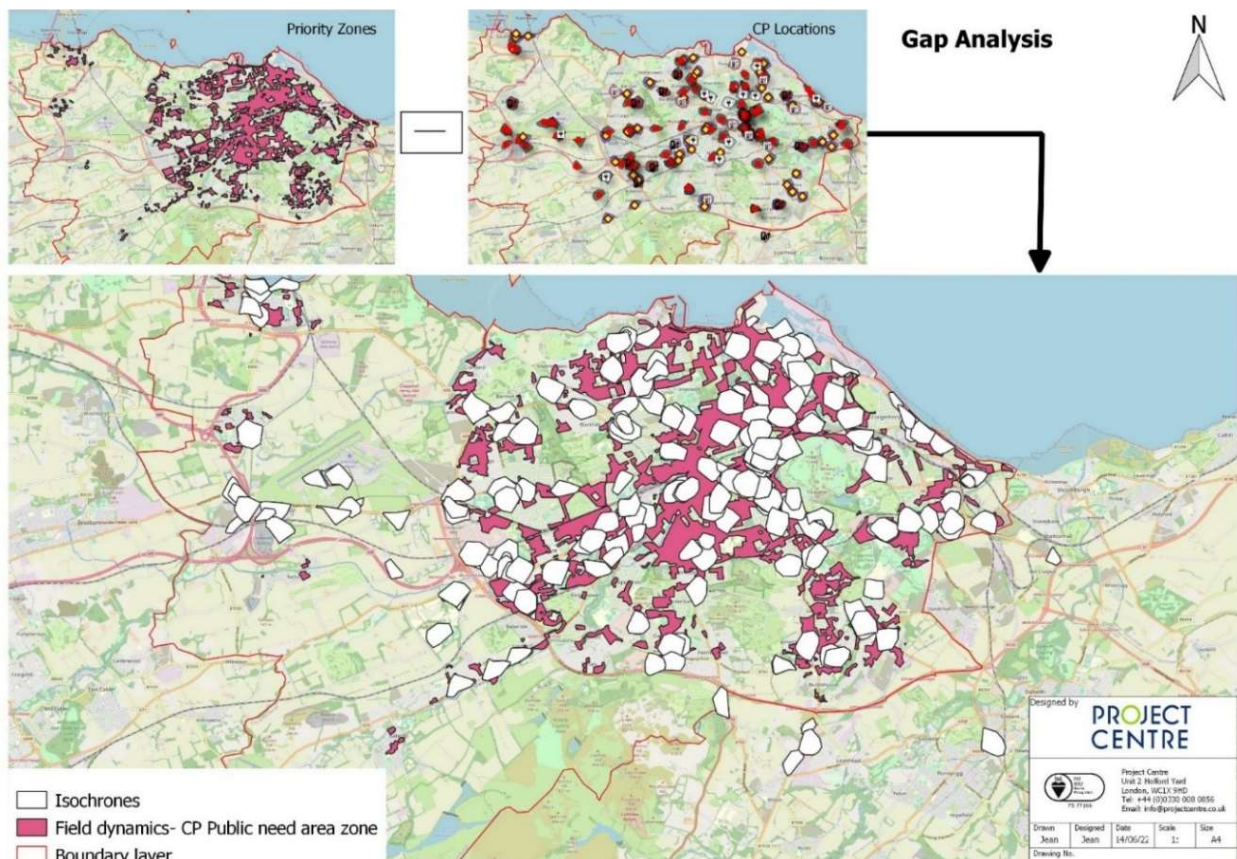


Figure 12: Areas of public need shown in red overlaid with 5 minute walking distance from sites with potential

CEC will look to bundle together low and high utilisation locations to ensure that all areas identified as 'public need' will have comprehensive coverage regardless of how affluent they are. Tariffs are already in place on existing CEC charge points and we will keep prices under review to adjust them in line with changes in the wholesale cost of electricity so that CEC is not subsidising the tariff.

Supporting active and public transport choices.

We will seek to support modal shift to active and public transport by giving these locations priority when selecting sites for EVI. Locating charging hubs at public transport interchanges can help encourage EV users to make journeys into the city by public transport, contributing to the city's modal shift ambitions. This has long been our approach and we have provided EVI at Park and Ride sites that we own and in the near future will be enabling electrification of the city's car club fleet by providing approximately 30 charge points serving over sixty car club bays/vehicles.

We have sought to identify future locations which are close to tram and train stations. We will continue to work with our chosen supplier to identify future locations that can support mobility hubs which the city is looking to introduce. This strategy envisages that EV hubs can be enablers of future shared mobility opportunities including car clubs, and thus further support the uptake of sustainable modes of travel.

5. Part 2 - Public EV Infrastructure Expansion Plan

The Economic Case

Forecasting Demand

The main driver of demand for charge point infrastructure is the number of EVs on the road. Forecasting the rate of adoption of EVs goes a long way to help us understand how many charge points will be needed in the future. While it is impossible to predict the rate of EV adoption with 100% accuracy, modelling possible scenarios helps establish what the likely range of EV ownership in future years will be, and to then plan infrastructure provision accordingly.

The National Grid have undertaken modelling of how rapidly EVs will be adopted as part of their Future Energy Scenarios (FES) work. These scenarios are publicly available and are regularly updated with data showing what the actual rate of EV adoption is⁸. While the power distribution network operator for the CEC area, SPEN, have also carried out localised modelling of EV uptake, EV-UP!⁹, the datasets are not publicly available. The National Grid data has been used for this strategy as it will allow CEC to easily monitor the pace of EV adoption and compare it with the forecasts. The four FES are called;

- **Falling Short** – general progress made towards decarbonisation but would not achieve Net Zero by 2050.
- **Consumer Transformation** – Net Zero targets met through significant societal change and high levels of electrification of transport and heating.
- **System Transformation** – in addition to consumer efforts, large scale reliance on hydrogen to decarbonise heavy transport and more difficult aspects of the heating sector.
- **Leading the Way** – Quickest route to net zero and incorporates high level of societal change along with strong utilisation of electric and hydrogen low carbon technologies.

At the national level the FES forecast that the number of EVs in the UK by 2025 will range between 2.1 million and 3.5 million. The 5-year forecast, which is a mid-point of the four scenarios is for there to be 2.9m. By 2030 the number of EVs in the UK fleet is estimated to be between 6.5m to 14m vehicles (17%- 37% of the total number of vehicles). The chart below, taken from the 2022 FES report, shows actual BEV car sales figures alongside projected EV sales in the four FES.

⁸ [Future Energy Scenario data and reports](#)

⁹ [Scottish Power Energy Network – EV UP](#)

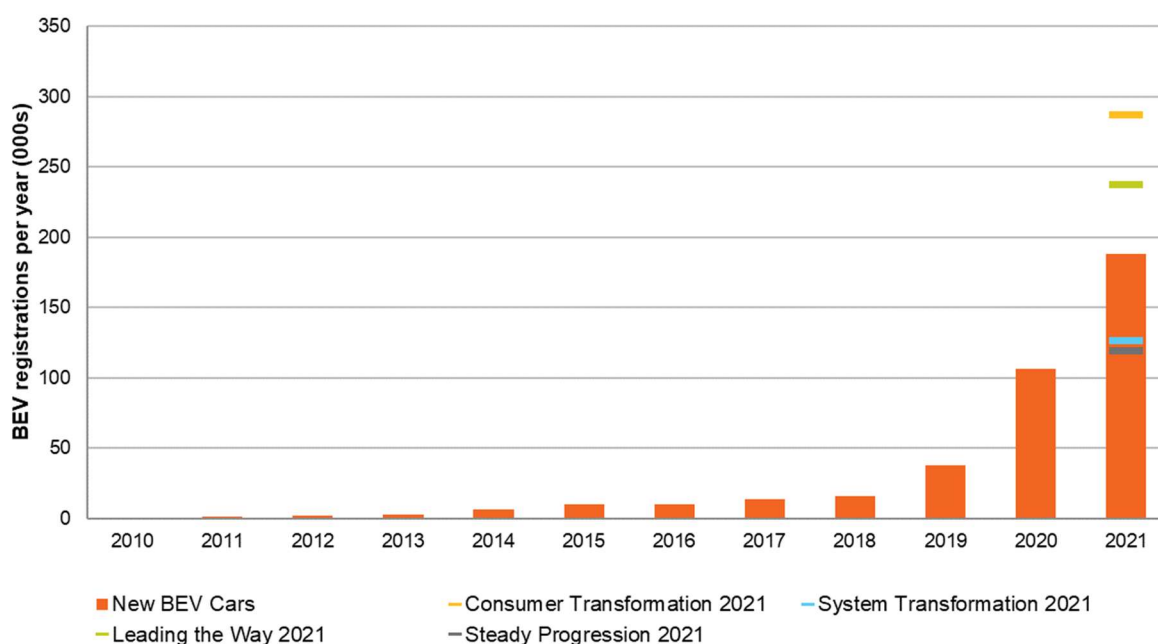


Figure 13: Source – National Grid 2021 BEV sales compared with 2021 modelled sales in each FES scenario.

In 2021 BEV car sales were greater than those modelled in the Steady Progression and System Transformation scenarios but lower than those modelled in Leading the Way and Consumer Transformation. When modelling how many EVs there will be in Edinburgh we have used the Consumer Transformation scenario as the upper range, Steady Progression as the lower range and the FES 5-year forecast, which is an average of the four scenarios, as our mid-range scenario.

Field Dynamics used data showing that there are 192,000 registered vehicles of all types in Edinburgh (13,000 less than the DfT figures for June 2022), which is approximately 0.5% of the total UK fleet. Assuming that Edinburgh’s proportion of the UK fleet is constant we have applied the national rates of EV uptake from the three chosen scenarios to Edinburgh’s car, van and motorcycle fleet. HGVs and buses are excluded as they will not use the same EVI. The table below shows the forecast number of BEV and PHEV vehicles in Edinburgh, along with what percentage of the total vehicle parc EVs will constitute.

Scenario		2022	%	2023	%	2024	%	2025	%	2026	%
Upper range	BEV	3,987	2.1	6,206	3.4	9,711	5.3	14,437	7.9	20,647	11.3
	PHEV	1,605	1.0	2,107	1.1	2,423	1.3	2,740	1.4	3,117	1.6
Mid range	BEV	3,473	1.8	5,349	2.8	7,964	4.1	11,487	5.9	16,156	8.3
	PHEV	1,893	1.0	2,267	1.2	2,679	1.4	3,135	1.6	3,673	1.9
Lower range	BEV	2,981	1.6	4,065	2.1	5,504	2.8	7,351	3.8	9,696	5.0
	PHEV	1,910	1.0	2,328	1.2	2,797	1.4	3,324	1.7	3,979	2.0

Table 12: Projected number of EVs and percentage of total registered vehicles in Edinburgh from selected FES

Full year figures for vehicle registrations in 2022 have not yet been released but the figures for the second quarter of 2022 suggest that Edinburgh has a greater level of EV uptake than the national average and is somewhere between the mid and upper range.

To assist local authorities when developing their Strategy and Expansion plans SFT have provided analysis produced by Field Dynamics. The analysis uses the Consumer Transformation scenario (or upper range) when estimating the number of EVs that will be on the road. To calculate how many charge points will be required to support the EV fleet 8 driver personas have been identified with different charging needs. These are split between on street and off-street drivers. An estimate has

been made about what proportion of the EV fleet will belong to the different driver personas and where those drivers will need to recharge. The outputs are an estimate of the quantity of EV charge points needed along with a breakdown of what type of charge points are needed.

Preferred Charge Point mix

There is considerable uncertainty on what consumer recharging preferences will be and the required quantity of different charge point types. It is common to think of three charger types; home charging, destination charging and enroute charging. Home charging favours a greater number of 7kW charge points as vehicles are parked for long periods. Destination charging will see a greater number of fast 22kW and rapid chargers, depending on the vehicle dwell time at each location. On-route charging relies on rapid and ultra-rapid chargers as speed is all important for those recharging mid-journey.

The Field Dynamics model can be flexed to account for different charging behaviour or level of EV uptake. The table below shows the number of charge points required if the overnight charging behaviour is 75% and 50% of that anticipated in the base model provided by Field Dynamics. This sensitivity has been applied as the Consumer Transformation scenario is the upper range of expected EV adoption.

Required Public Chargers by 2026	Nearby 3.5-7kW	Secondary destination 50KW	Primary Destination 7-22kW	Total
Base model	1,127	221	41	1,389
75% of base model	846	166	30	1,042
50% of base model	564	110	20	694

Table 13: Estimated number of charge points required in Edinburgh using Field Dynamics model

We have based our assumptions on the required number of charge points on the 75% of base model charge point usage as a conservative estimate of need.

Public and private provision

In the second quarter of 2022 there were 18 charge point operators in Edinburgh. The largest being ChargePlace Scotland, Podpoint, Connected Kerb and Tesla. Podpoint operates 65 charge points across 14 locations. These are often supermarket carparks although the St James Quarter retail center has 45 charge points, serving 90 of its 1,499 spaces. The split of charge point provision between public and private providers is shown in the table below. We have also shown an estimated split of provision in 2026. As the EV refueling market grows it will become increasingly attractive to private sector landlords. We have assumed that private sector delivery will greatly increase pace after 2026 but that in the short term those facilitated by the public sector will continue to deliver the bulk of charge points.

	Q2 – 2022		Q4 – 2026		Additional charge points provided 2024-2027
	Charge points	%	Charge points	%	
CEC owned	133	51%	635	61%	502
Privately owned	126	49%	407	39%	281
Total	259	100%	1,042	100%	783

Table 14: Projected split of charge point provision between the public and private sectors

Supermarkets, retail parks and fuel stations are likely to account for a lot of private sector provision. While some landlords have announced their network expansion plans, see appendix 2, detailed plans specific to Edinburgh, are not available. There are at least 35 fuel stations within Edinburgh, 40 supermarket sites, 10 large retail parks and 5 dedicated car parks with a combined total of 2,930 spaces.

If we assume that by 2026 the large, dedicated car park sites supply 6% of their spaces with charge points, half of the petrol stations install 4 charge points, half the retail parks install 15 charge points and half the supermarkets install 5 charge points by 2026 then this will account for 331 chargers. The table above is based on a more conservative level of provision by the private sector.

Site Identification and Grid Connection

Preferred locations for 2024/25 installations have been identified and budget quotes requested from Scottish Power Energy Networks for the new grid connection costs. Once quotes have been received the locations will be refined and finalised.

Site identification was done by scoring CEC land holdings to identify sites that would be suitable to host EV charge points. Scoring was done using a mix of GIS analysis and desktop analysis of satellite imagery of the sites. The scoring criteria is shown below.

Criteria	Definition	Score Range
Field Dynamics Zone	Sites within zones that Field Dynamics identified as public need scored 2 points and visitor need scored 1 point.	0-2
Existing charge point provision	Sites that are more than 400m from an existing charge point or proposed future charge point sites scored 2 points.	0-2
Meeting CEC priorities	Sites that are in areas which CEC identified as scoring highly in meeting their wider transport objectives scored 2 points.	0-2
Close to amenities	Sites close to public amenities such as cafes scored 2 points, those that had high pedestrian footfall scored 1 point.	0-2
Commercial potential	Sites were scored as 0, 2 or 4 for commercial potential based on whether the site was on a road with high traffic flows, how easy vehicular access was, whether it was close to a trip generator and whether there were competing charge points nearby.	0-4
Delivery constraints	Sites were scored highly if there were no physical objects that would have to be moved and no specialist parking restrictions such as loading or disabled bays.	0-2

Table 15: Scoring Criteria for CEC owned sites

The scoring acted as a guide when shortlisting sites, rather than the highest scoring sites automatically being included on the shortlist. CEC wish to see charge points installed at strategic locations such as the city centre, each of the eight town centres and at public transport hubs. Sites in these locations therefore received particular focus and were given priority when shortlisting.

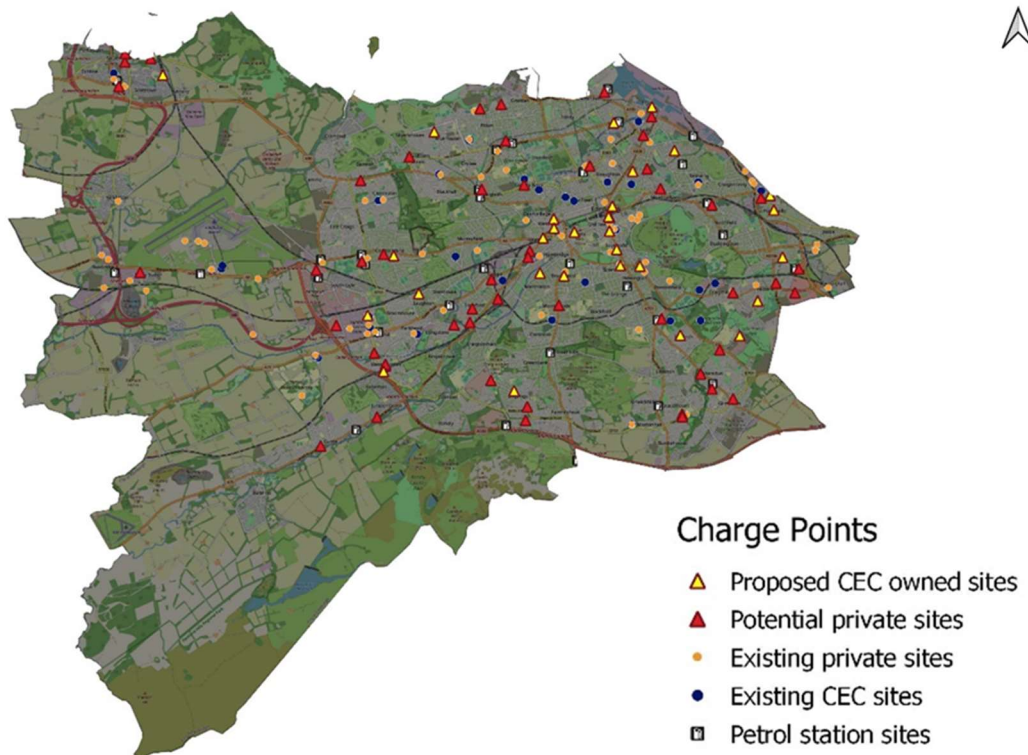


Figure 14: Shortlisted charge point locations

Figure 14 shows the location of shortlisted sites. CEC owned assets and adopted highways close to the assets were screened for potential location for siting EVI's.

CEC Assets	Rationale for inclusion in screening
City-Development	Park & Ride sites, retail and industrial land.
Culture-Leisure	Parks also including associated car parks
FFF	Two sites, including car park near Waverly
Health-Social	Health centers with associated car parks
Leased-in	Assumed that lease will allow CEC to develop EVI
South-East-Wedge	One site – incorporating tram car park
Svcs-Communities	Mix of housing, cemeteries, golf clubs. Housing land
Trams	Public transport hubs and layer includes car parks

Table 16 CEC assets screens for site identification for EVI

Consideration was also given to ensuring that there was a good geographic spread of charge points and that all areas of public need had some provision.

Capital Investment Pipeline & Estimated Costs

Between the second quarter of 2022 and the second quarter of 2023 CEC are finalising the installation of an additional 22 7kW public charge points and 36 charge points which serve car club spaces. These have been added to the financial modelling and the projected number of new public charge points CEC are expected to provide over the coming three years has been reduced by 22, from 502 to 480.

We have assumed that the rate of installation will increase year on year to match the pace of EV growth, with the greatest number of charge points installed in the third year of the programme.

Financial Year	7kW	22kW	50kW	Total	Estimated Costs
2024/25	80	12	12	104	£967,000
2025/26	159	12	16	187	£1,625,000
2026/27	159	16	16	191	£1,749,000
Total	398	40	44	482	£4,341,000

Table 17: Annual installation of charge points

The estimated cost of the capital investment for the above charge points is £4.3m. Cost estimates used in the model have been based on figures provided by SFT, with some amendments made where robust Edinburgh specific data existed to suggest that costs would be different.

In the modelling, costs were split into three main categories. Enabling Costs includes work to prepare the site for EVI installation, such as kerb build outs, and any new Traffic Orders needed to create EV parking bays. EVI and install costs include the cost of the charge points and their installation and the Distribution Network Operator costs includes the cost of providing a new grid connection to the charge point.

Proposed units	Enabling Costs	EVI and Install cost	DNO cost
7kW	£2,350	£5,650	£2,000
22kW	£2,350	£9,478	£2,000
50kW	£2,650	£33,400	£4,000

Table 18: Costs used in financial model

The enabling costs have been adjusted from those recommended by SFT as have the EVI install costs for 22kW units. Previous installations in Edinburgh have shown that there is a weak correlation between the enabling costs of the site and the charger type. The enabling costs for 7 and 22kW units is £150 higher than those recommended by SFT with those for 50kW £1,350 less. The EVI and install costs for 22kW units has also been increased in the model by an extra £3,478 on those recommended by SFT, based on the actual cost of recent installations. No significant enabling works or network upgrade costs at a specific location have been included as these have not been identified on the shortlisted locations.

6. The Commercial Case

Contract Structure and Risk Allocation

CEC wish to play an active role in the delivery of EVI in the city so that we can influence how charge points are rolled out and ensure that the transition to EVs compliments the wider transport strategy. We seek to develop a strong partnership with a charge point operator who will jointly plan the future EV charging network with us and be responsible for installing and maintaining public EVI on CEC land.

Many areas of the city will be commercially attractive to charge point operators and where this is the case we propose allowing the appointed charge point operator greater freedom to decide on the exact locations, type and quantity of charge points that should be installed. As the commercial entity they will be best placed to take on this risk. However, in areas of the city where there is a need for public charge points, but the level of demand is not yet sufficient for a charge point to be commercially viable, we will determine where these charge points should be located. By bundling together opportunities in the commercially viable areas of the city with the requirement to install charge points in less commercially attractive areas we aim to secure a just transition to EVs.

The following operating models have been considered with a concession type contract found to be the most suitable in attracting private investment but allowing CEC to maintain influence and control over locations and tariffs. We would seek to transfer the management of existing assets to the chosen operator but retain control of all the below ground infrastructure.

The key objectives for CEC in choosing an operating model have been defined as:

- Minimise risk to public funds.
- Maximise CEC's income potential.
- Retain CEC's key influence over future investment decisions.
- Retain CEC's key influence over the EVI asset register.

The operating models summarised below have been scored from -2 to +2 based on how well the models achieve CEC's objectives.

Operating Model	Objective				Total Score
	Minimise risk	Maximise income potential	Influence over future investment	Influence over EVI asset register	
Own and Operate	-2	+2	+2	+2	4
Match Funded Concession	+1	+1	+1	+1	4
Fully Funded Concession	+2	-2	-2	-2	-4
Leased	-1	0	+1	+2	2

Table 19: assessment of operating models

The Own and Operate, and Match Funded models are considered to best suit CEC's requirements overall. However, the Own and Operate model takes on the highest level of risk. Therefore, on balance, the Match Funded option best meets each objective.

Own and Operate

This model would represent the highest level of involvement from CEC. All costs would have to be met by CEC and all revenue retained. A charge point operator could be appointed to manage the charge points but CEC would be responsible for site selection and installation of the equipment. Own and

operate presents the greatest revenue opportunity for CEC but also the greatest risk. In this model, CEC would have control over all aspects of how the charge point is operated, including tariffs and network compatibility. However, this model would not effectively mobilise private capital.

Concession Contracts

Under a concession model much of the risk to CEC is mitigated in exchange for a lower share of revenue. Local authorities can establish the number, location, and capacity of the charging infrastructure required under a concession model. By sharing the risk and revenue more evenly than is the case with the lease model, a concession model can, in some ways, be considered as the middle-ground between public intervention and private enterprise. The risks associated with installation and service delivery across multiple sites, including asset utilisation, are transferred to the private partner. CEC would also wish to transfer the operation and maintenance risk of its existing asset base to the private partner so that all CEC assets are run to the same standard and tariff structure.

The private partner finances the capital and maintenance expenditure, after taking available grant funding into account. It sets tariffs and retains the revenue it generates from EV users. The contract term would reflect the period required by the private partner to recoup and make a return on the invested capital.

The local authority will include provisions to monitor the partner's performance during the contract term and to regulate how tariffs are adjusted. The local authority may also seek to charge rent and/or seek to take a share of the profit secured by the private operator.

These options are not exclusive, and a mix or combination of the above options may be appropriate. It may be the case in some circumstances local authorities wish to retain the traditional owner/operator model or consider the merits of establishing a more complex joint venture with a private sector organisation.

Leased

Under a leasing arrangement CEC would offer sites we own to a private partner via a lease which affords the opportunity to install and operate charge points. The private partner retains installation and service delivery risk and must finance all the capital and maintenance expenditure. The operator would set tariffs and retain all the revenue generated from EV users. The lease model requires the lowest level of investment from the landowner and involves the least exposure to financial risk but also the least opportunity for revenue generation.

The success of this model relies on external suppliers being willing to accept the financial risk, which will be dependent on the type of site being offered and the revenue generating potential that it presents. CEC is unlikely to retain control over usage tariffs and the operator may wish to have a longer lease period. Another factor to consider is ownership of the electrical connection point. There may be additional costs to transfer this asset transfer at the end of the contract period.

Local Authority Retained Works and Services

We propose transferring the existing CEC asset base to the chosen supplier. This will allow harmonisation of pricing, streamlined contract management and a simpler customer experience. The management of the charge point services with service level agreements covering key performance metrics including reliability and availability of charge points are being developed and agreed upon with input from SFT. The expansion of the network will be planned collaboratively between CEC and the operator. CEC will look to retain control on deciding the location of approximately 20% of sites to deliver a network that serves all areas of public need. The operator can take the lead on proposing the appropriate density of charge point installations in commercially viable areas of the city. At contract

award a minimum number of charge points will be agreed, based on a set level of public funding. The contract will be structured to allow additional fully privately funded charge points to be installed. An annual review of charge point utilisation, and growth of the local EV market will determine the pace of charge point rollout.

Procurement Options

There are several options for the procurement process available to CEC, including Open and Restricted Procedures, and more complex routes such as Competitive Procedure with Negotiation. There are also various Framework Agreements let by Central Purchasing Organisations such as Scotland Excel (SXL), Crown Commercial Services (CCS), and Eastern Shires Purchasing Organisation (ESPO). Utilising one of these Framework Agreements usually ensures a quicker procurement exercise and can reduce certain risks, however may exclude new entrants to the market. An options appraisal of the procurement routes is therefore being undertaken as part of the overall Procurement Strategy.

The current aim of the procurement exercise is to establish a contract with a supplier who can deliver all types of charge points: on-street, destination and rapid, and which delivers a turn-key solution in terms of supply, installation and commissioning of chargers. This may take the form of a standard contract, or may result in a partnership, depending on the final approach taken. The only expected exclusion from the contract is likely to be where CEC has identified parcels of land that could function as an ultra-rapid charging hub. This would require provision of a retail outlet and a covered forecourt. Should these sites be identified they would be a separate commission.

The market engagement to date has established that Edinburgh is an attractive market for private operators. Further engagement with the market may be undertaken as the detailed Procurement Strategy and specification documents are compiled.

Specification, Standards & Contract Terms

A template specification is being prepared by SFT and will be developed by Corporate Procurement Services in conjunction with the service area. Input from Legal Services is likely to be required to tailor Terms and Conditions of Contract and to ensure legislative requirements are met.

Corporate Procurement Services will seek to collaborate with other local authorities to share information, expertise and best practice in developing the overall procurement approach and specification. CEC will benefit from shared lessons learned from other local authorities in Scotland and across the UK who are at a further stage of EV infrastructure development.

The financial modelling indicates that a 12-15 year term is the minimum necessary to make the investment attractive to private operators.

7. The Financial Case

Funding Sources

The Scottish Government's Electric Vehicle Infrastructure Fund (EVIF) will be one source of funding that CEC will bid for based on the modelling and expansion plans set out in this strategy. The modelling also assumes that substantial levels of private sector match funding will be forthcoming to install the charge points and update the existing assets that CEC will transfer to their management.

The proposed contract structure will have a core element whereby a set amount of public subsidy will be supplied and the operator will commit to an agreed number of charge points to be delivered, making use of privately provided match funding. There will also be the option of the operator delivering fully privately funded charge points.

Financial Viability of Service/Concession Type Contracts

Section 5 of this report sets out the number and type of charge points that have been used in the financial model provided by SFT. The model assumes a 20-year contract term and that the utilisation growth rate will be 6%. It is important to note that these modelling inputs do not commit the City of Edinburgh Council to enter into a contract on this basis. It may well be possible to secure shorter contract lengths of between 12-15 years in practice but this may result in higher prices for consumers or a requirement for greater public subsidy. Key modelling assumptions are shown below.

AC Tariff (excl VAT)	£ 0.43 per kWh
DC Tariff (excl VAT)	£ 0.54 per kWh
Base Electricity Cost	£0.28 per kWh
Projected Utilisation Growth Rate	6%
Inflation Rate	2.5%
Length of operations	20 years

The margin from the base electricity cost used in the model is £0.15 per kWh on the AC tariff and £0.26 per kWh on DC charging. The level of capital subsidy required is projected to be £1,129,136.

8. The Management Case

Governance and Management

The Transport and Environment Committee is the executive decision-making body which will approve this Strategy and Expansion plan and the supporting Procurement Strategy which will enable the delivery of charge points using funding from the Electric Vehicle Infrastructure Fund (EVIF).

At the corporate level CEC is organised into four directorates, each led by an executive director. The day-to-day governance of the EVIF programme will be handled by the Network Management & Enforcement Team, headed by Gavin Brown. This team is within the Place Directorate, headed up by Paul Lawrence. Officers within the Network Management & Enforcement Team have experience of installing charge points. In financial year 2021/22 they oversaw the installation of 81 charge points with a value of £1.25m. The team has recently taken on additional staff to oversee the running of EV infrastructure. Specialist procurement, legal and financial advice will be provided by the in-house Corporate Services directorate. Procurement colleagues have already been engaged on this project and support staff identified.

At a regional level, both SFT and SESTRANs have been encouraging collaboration between local authorities and SESTRANs are facilitating discussions with Council's and stakeholders across the South-East of Scotland Region, to promote the sharing of information and experiences and to try and ensure a consistent approach to support the growth of EVs across the region. The Council will continue to play its part and contribute to these discussions and workshops.

The Council already works collaboratively with other local authorities in Scotland in relation to Decriminalised Parking Enforcement (DPE). The Council have a framework contract for DPE related services, which can be accessed by other local authorities upon payment of the appropriate joining fee. The Council also offers back-office processing services for any Scottish local authorities which are operating DPE. This approach to collaborative working has proven very successful and will be considered by Officers as they finalise the Council's EV Procurement Strategy.

Risk Management and Mitigation

Please provide a populated risk register indicating the likelihood, probability, and impact of key delivery risks. For each of the key risks please identify suggested mitigations.

Risk (1-6)	Strategy	Pre Mitigation Risk Rank			Mitigations	Post Mitigation Risk Rank		
		Probability	Impact	Risk Rank		Probability	Impact	Risk Rank
Delay in business case completion	Treat	Low	med	2	Agree detailed scope of outstanding tasks and objectives, then resource appropriately. Engage with external stakeholder group to ensure business case is aligned with their expectations	low	med	2
Delay in business case or procurement approval	Treat	med	med	4	Early engagement with senior decision makers at CEC to cover technology required, level of public consultation required, and other critical elements senior leaders wish to see answered	low	med	2
Input assumptions to financial model (eg. energy costs or EV uptake) change greatly.	Treat	med	med	4	Model a broad range of possible scenarios	med	low	2
Suppliers are not attracted to the contract on offer and do not bid	Treat	Low	high	3	Early market engagement undertaken, conservative assumptions used in the financial modelling, and structure of contract to be modelled on how successful examples from elsewhere.	low	high	3
Reduced funding requested and received from Transport Scotland based on SFT assumption that Edinburgh will be a desirable investment proposition for charge point operators.	Treat	med	high	4	Mitigation to be informed by SFT based on similar advice to other local authorities	med	med	3
Supplier capacity/delivery issues	Treat	med	med	4	Suppliers to demonstrate capacity and previous experience as part of tender assessment.	low	Med	4
EV uptake rates are lower than anticipated	Treat	med	med	4	Modelling is based on observed trends with a reasonable lower and upper range. Structure the contract to allow flexible delivery, based on observed EV uptake.	med	low	2

Table 20: Risk Register

Timetable and Next Steps

An indicative timetable of next steps is shown in the table below. Further engagement with colleagues in the procurement team is needed to understand more precise timings for the commencement of the procurement activity. This is the priority for January – March, ahead of the committee decision to proceed with the procurement.

Activity	Commentary	Milestone (Approx date)
CEC officer approval of business case	Business case signed off October 2023.	Autumn 2023
Develop Procurement Strategy and supporting procurement documents	August – November will see the procurement team developing the supporting documents based on the business case.	Autumn 2023
CEC Executive approval of Procurement Strategy	The Committee decision will seek delegation of subsequent decision making to ensure smooth deliver of the project	Winter 2023/24
Commencement of procurement	Following approval of the Procurement Strategy procurement activity can start in earnest.	Spring 2024
Contract award		Autumn 2024
Works commencement of capital works	First year locations identified as part of the Strategy and Expansion Plan helps to inform the appointed partner's programme of works.	To be determined alongside appointed partner

Table 21: Indicative timetable of next steps

9. Conclusion

In developing this Strategy and Expansion plan, the study of various aspects including current policies, the EVI baseline starting point, market trends & EV forecast, stakeholder consultation, households without off-street parking, and demographics within the City of Edinburgh, have resulted in a thorough and bespoke business case, enabling CEC to plan the delivery of EVI effectively through to 2026. A summary of key findings and recommendations are detailed within this section.

Baseline

At the start of the business case, it was important to establish the baseline status for charge points and EV ownership in Edinburgh. From our studies, we were able to establish that by the end of June 2022, there were 259 charge points available to the public in Edinburgh comprising of 133 and 126 publicly owned and private sector charge points respectively. Charge Place Scotland (CPS) provides the back-office functions of the Charge Point Network Operator. Below is a summary of the power output of the 259 charge points installed.

- 3-7 kW = 165
- 11-22kW = 39
- 50kW = 41
- 100kW+ = 14

As per DfT figures, there were a total of 4,283 plug-in EVs registered in Edinburgh by October 2022. 2,743 of these were BEVs and 1,540 were PHEVs. The EVI supply meets the EU supply target as the number of EVs requires a total power output of 3,759kW from the EVI installed in the city.

From 1 May 2022, tariffs were introduced to cover the operational and maintenance costs related to the EVI network. Tariffs were again revised in May 2023 in response to the increase in wholesale electricity costs, where the projected income from EVI network utilisation was originally set to cover the annual operational costs. The projected figures included the cost incurred by CEC for electricity, CPS transaction fees per charging session, CEC staff costs, maintaining the assets, and fees to replace the charge point at the end of its life. Due to the recent rise in wholesale electricity costs, the financial model uses different cost assumptions from those set out in the CEC Enforcement and Tariff Report 2022.

Strategic Case

It is expected that in the short term, CEC will continue to deliver a significant share of public charge points and needs to provide approximately half of the required charge points up to 2026. CEC will play an important role to ensure that charge point deployment reaches all areas of the city, using sustainable commercial approaches. The zoning system developed for EVI delivery in the city has been refined further as part of the Strategy and Action Plan, and includes the following elements:

- Areas in the city identified as having a public need for charge points will be the focus of EVI delivery.
- The city centre zone 1 will still need rapid chargers to serve taxis and commercial vehicles.
- Greater focus on providing standard chargers in neighbourhood hubs across all zones where there is a public need for home charging.
- Fast charging hubs within Zones 2 and 3 in strategic locations such as Park and Ride sites.

It is widely acknowledged that households with access to off-street parking will find it much easier to transition from fossil-fuel powered vehicles to EVs, especially as EV registrations in Edinburgh are

concentrated in areas where most households have off-street parking. However, the lack of off-street parking and the need for public charge points is not limited to deprived areas only, as some affluent neighbourhoods such as Newington, Morningside and Stockbridge feature a high proportion of households without off-street parking. Noting that EVs are currently more expensive to buy than a fossil fuel equivalent, it is the affluent areas, where residents are early adopters of EVs and where EVI tends to be commercially viable. It will take longer for a concentration of EVs enabling EVI to be commercially successful in areas of deprivation, hence CEC will ensure that deprived areas are not neglected in the transition to EVs. CEC's approach includes proposing batches of charge point sites featuring both commercially attractive and less attracted areas.

In summary, CEC's EVI delivery plan will focus on the areas of the city that have been identified as a 'public need' whilst aiming to deliver a comprehensive network providing people without access to home charging, a charge point within a convenient distance. There is also potential for private sector to host EVI in location features such as petrol stations, supermarkets, and retail parks. Such installation within 5-minute walking distance of the location features will expand the charging network. Whilst remaining gaps in the EVI network can be met by kerbside provision.

Economic Case

Forecasting the rate of adoption of EVs helps to provide a fair understanding of how many charge points will be needed in the future, and is vital for the supply chain, electricity companies, and distribution network operators (DNOs) to plan effectively. National Grid has produced models of EV adoption as part of their Future Energy Scenarios (FES) work and has made this information available to the public. FES data was used in this strategy to help CEC monitor the rate of adoption against forecasts, noting the following four scenarios considered:

- Leading the Way
- Consumer Transformation
- System Transformation
- Falling Short

When modelling how many EVs there will be in Edinburgh, we have used the Consumer Transformation scenario as the upper range, Steady Progression as the lower range and the FES 5-year forecast, which is an average of the four scenarios, as our mid-range scenario. Full year figures for vehicle registrations in 2022 have not yet been released but the figures for the second quarter of 2022 suggest that Edinburgh has a greater level of EV uptake than the national average and is somewhere between the mid and upper range.

The consumer transformation scenario (the upper range of EV adoption) is used by Field Dynamics analysis when estimating the number of EVs that will be on the road. Hence, sensitivity analysis was applied to overnight charging behaviour at 75% of that anticipated in consumer transformation scenario (base model) to rationalise the EV adoption uptake in Edinburgh and determine conservative charge point number and mix required by 2026. This approach yielded a total number of 1,042 public charge points required by 2026 based on the following numbers:

- Nearby 3.5KW to 7KW = 846
- Secondary destination 50KW = 166
- Primary destination 7KW to 22KW = 30

As the EV refueling market grows it will become increasingly attractive to private sector landlords. We have assumed that private sector delivery will greatly increase pace after 2026 however, in the short term, the public sector will continue to deliver the bulk of charge points. Of the total 1,042 charge

points required by 2026, we estimate a split of 61% and 39% will need to be provided by the CEC and the private sector respectively.

The year-on-year EVI installation and estimated total capital cost between 2024 to 2027 of £4,341,000 will be required to deliver 482 charge points. The breakdown for the capital expenditure per year is as follows:

- 2024/25, 104 charge points = £967,000
- 2025/26, 187 charge points = £1,625,000
- 2026/27, 191 charge points = £1,749,000

Commercial Case

CEC intends to play an active role in the delivery of EVI in the city so that they can influence how charge points are rolled out and ensure that the transition to EVs complements the wider transport strategy. Charge point operators will be allowed greater freedom to decide on the exact locations, type, and quantity of charge points that should be installed in commercially attractive areas, noting that as the commercial entity, they will be best placed to take on this risk. In areas of the city where there is a need for public charge points, but the level of demand is not yet sufficient for a charge point to be commercially viable, CEC shall decide where these charge points should be located. By considering opportunities in the commercially viable areas of the city together with requirements to install charge points in less commercially attractive areas, we aim to secure a just transition to EVs.

The key objectives for CEC in choosing an operating model is one that will:

- Minimise risk to public funds.
- Maximise CEC's income potential.
- Retain CEC's key influence over future investment decisions.
- Retain CEC's key influence over the EVI asset register.

As part of the study, we have assessed the following operating models in terms of meeting the key objectives mentioned above, it includes, Own and Operate, Match Funded Concession, Fully Funded Concession and Leased model.

Of the four options we assessed, the Own and Operate and Match Funded models both scored the highest. However, the Own and Operate model takes on a greater level of risk associated with installation, service delivery and asset utilisation. All the capital and ongoing costs would also have to be met by CEC while retaining all the revenue. A match-funded concession model incentivises private investment since the revenue generated is shared between the local authority and the charge point operator. The risk associated with an Own and Operate model is mitigated and allows CEC to regulate tariffs and maintain influence on the development of an equitable and accessible charging network in the city. Therefore, the Match Funded option best meets CEC's key objectives.

The options assessed are not exclusive, and a mix or combination of these options may be appropriate. It may be the case in some circumstances local authorities wish to retain the traditional owner/operator model or consider the merits of establishing a more complex joint venture with a private sector organisation. We recommend that the existing CEC EVI asset base is transferred to the chosen supplier, which will allow harmonisation of pricing, streamlined contract management and a simpler customer experience.

There are several procurement options that can successfully deliver a route to market, and an options appraisal of the procurement routes is being undertaken as part of the overall Procurement Strategy. The market engagement to date has established that Edinburgh is an attractive market for private

operators. The financial modelling work indicates that a 12-15-year term is the minimum necessary to make the investment attractive to private operators.

Financial Case

The Scottish Government's Electric Vehicle Infrastructure Fund (EVIF) will be one source of funding that CEC will bid for based on the modelling and expansion plans set out in this strategy. The modelling also assumes that substantial levels of private sector match funding will be forthcoming to install the charge points and update the existing assets that CEC will transfer to their management.

A financial model developed by SFT was used to determine the financial viability of EVI delivery of forecasted charge points between 2024 and 2027, and assumes a 20-year contract term and that the utilisation growth rate will be 6%. It may well be possible to secure shorter contract lengths of between 12-15 years in practice, but this may result in higher prices for consumers or a requirement for greater public subsidy. The level of capital subsidy required is projected to be £1,129,136.

Management Case

The Transport and Environment Committee will approve this Strategy and Expansion plan and the Procurement Strategy to facilitate the delivery of charge points across the city using funding from the Electric Vehicle Infrastructure Fund (EVIF). The day-to-day governance of the EVIF programme will be handled by the Network Management & Enforcement Team, headed by Gavin Brown. This team is within the Place Directorate, headed up by Paul Lawrence.

The Network Management & Enforcement Team are experienced in installing EVI on the CEC network and has recently recruited additional staff specifically for this purpose. The Network Management & Enforcement Team will work together with the in-house Corporate Services directorate who will provide specialist procurement, legal, and financial advice. Governance of the project at a senior officer level, will be carried out by the Sustainability Board.

Appendix 1

Relevant Technical Guidance Documents

Standard or Requirement	Formal Description
The Alternative Fuels Infrastructure Regulations 2017	Regulates alternative fuels (electricity and hydrogen) to ensure the way they are supplied to vehicles is consistent across the EU. This will reduce dependence on oil and the environmental impact of transport, while contributing to a low carbon economy. Specific standards will be mandatory for electrical vehicle recharging points. In effect, this will provide electrical and hydrogen vehicle users the ability to connect and recharge throughout Europe.
Electricity Safety, Quality and Continuity Regulations (ESQCR)	Regulates quality and supply continuity as well as specifying safety standards. Compliance to ESQCR is a statutory requirement for DNO's.
PAS 1899:2022 - Electric vehicles - Accessible EV charging points – Specification	Published in October 2022, the document provides new guidance on EV charging accessibility specifications.
Traffic Signs Regulations and General Directions (2016-18)	Prescribes the designs and conditions of use for traffic signs to be lawfully placed on or near roads in England, Scotland and Wales.

Relevant Standards & Legislation

Standard or Requirement	Formal Description
Edinburgh Design Guidance	<p>Provides guidance within the following areas of local policy:</p> <ul style="list-style-type: none">• new development• design of streets• parking standards <p>The design standards help shape the visual appearance and physical implementation of new EVI, to mitigate impact on the local street scene, particularly in World Heritage Sites and where there are certain heritage considerations.</p>
Autonomous and Electric Vehicles Act 2018, updated	<p>The purpose of this legislation is both to amend the existing compulsory third party insurance framework by extending it to cover the use of automated vehicles and deal with electric and hydrogen powered vehicle charging infrastructure. The act also includes specifications of EV chargers to mandate smart charging, to increase flexibility and efficiency within the EV network. Large fuel retailers may also be required to increase EV provision under this Act.</p>

EV Charging Equipment Technical Standards

Standard or Requirement	Formal Description
<p>IEC/EN 61851-1:2017 Electric vehicle conductive charging system - Part 1: General requirements* *EV charging equipment must be CE marked, meeting IEC/EN 61851 can be used to demonstrate this</p>	<p>Applies to EV supply equipment for charging electric road vehicles, with a rated supply voltage up to 1000V AC. The aspects covered in this standard include:</p> <ul style="list-style-type: none"> • characteristics and operating conditions of the EV supply equipment; • specification of the connection between the EV supply equipment and the EV; and • requirements for electrical safety for the EV supply equipment. <p>All requirements from IEC 61851-22 have been moved to this standard.</p>
<p>IEC/EN 62196-1:2014 Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of EVs</p>	<p>Applicable to plugs, socket-outlets, vehicle connectors, vehicle inlets and cable assemblies for EVs intended for use in conductive charging systems which incorporate control means, with a rated operating voltage not over 690V AC 50 Hz to 60 Hz, at a rated current not exceeding 250A.</p>
<p>The Electric Vehicles (Smart Charge points) Regulations 2021 – (applies to domestic and workplace charge points)</p>	<p>Came into force in June 2022, and set standards for charge points to add flexibility to the EV charging network and to mitigate demand issues for the grid by increasing charging occurring outside peak demand times.</p>
<p>BS 7671:2018 (+A1:2020) Requirements for Electrical Installations (IET Wiring Regulations)</p>	<p>The national standard to which all UK electrical installations should conform. The 18th Edition IET Wiring Regulations contains important new information for all electrical installers and engineers. The international standard, IEC 60364 forms the basis of this UK regulation.</p> <p>Section 722 relates specifically to the installation of EV supply equipment.</p>

<u>IET Code of Practice for Electric Vehicle Charging Equipment Installation 4th edition</u>	Provides an overview of EV charging equipment, considerations needed prior to installation. This includes physical installation requirements, relevant electrical installation requirements of the updated BS 7671:2020 and specific requirements when installing EV charging equipment in locations such as dwellings, on-street locations, commercial and industrial premises.
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Appendix 2

Private Charge Point Providers Expansion Plans

Supermarkets

Tesco - 26 sites in total 20 Express, 5 Superstore 1 Extra	National	Nationally Tesco had a target of 2,500 charge points in 600 stores by 2020 although it is unclear if this was reached. This represents 75%, 796, of Tesco's large stores.
	Edinburgh	5 stores in Edinburgh have EV chargers
Aldi - 10 sites in total	National	Target to deploy 140 charge point between 2020 and 2023 at their stores. Every new store will also have at least one EVCP with plans for 50 stores to open each year until 2025
	Edinburgh	TBC
Morrisons - 7 sites in total	National	50 charge points deployed in 2019, with 50 planned in 2020.
	Edinburgh	TBC

Hotels

Premier Inn - 16 sites in total	National	Target: 600 charge points across 300 hotels
	Edinburgh	TBC
IHG (Holiday Inn and Crowne Plaza) – 12 sites in total	National	Target: UK wide plan of 20-30 new charge points per month
	Edinburgh	TBC
Best Western - 4 sites in total	National	Target: All 270 hotels in UK with at least one EVCP, and increasing
	Edinburgh	The EVI coverage at the hotel sites is not comprehensive

Petrol Stations / Forecourts

Shell - 7 sites in total	National	Target: Aim to have 1-2 charge points in each of their 500 petrol stations, with target to grow EV charging network to 100,000 by 2030, to put 90% of all UK drivers within 10 mins of a ShellRecharge charge point.
	Edinburgh	Currently one Shell Recharge charge point in Edinburgh at partner Waitrose outlet.
BP - 9 sites in total <i>Currently two BP pulse charge points in Edinburgh</i>	National	Target: To double their number of public charge points in the UK and plan to deploy an increasing number of 150kW charge points at their forecourts. Also aim to "accelerate 300kW and 150kW ultra-fast charging points that are able to provide EV drivers up to 100 miles of range in around 10 minutes of

		charging, depending on the model of electric vehicle." BP website
	Edinburgh	Currently two BP pulse charge points in Edinburgh