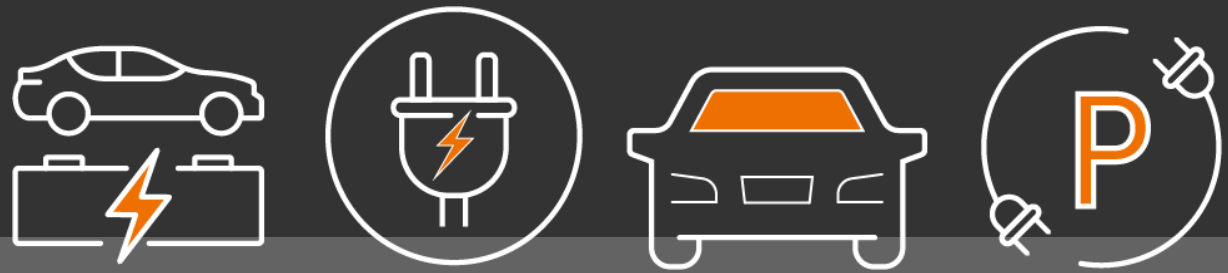
West Lothian Public Electric Vehicle Infrastructure Plan

August 2023



Executive Summary

Background

This document sets out West Lothian Council's (WLC) **plan for the expansion of public electric vehicle (EV) charging infrastructure in West Lothian up to 2026.**

The Plan has been produced using funding from the **Electric Vehicle Infrastructure Fund (EVIF).** EVIF is jointly managed by Transport Scotland and Scottish Futures Trust (SFT) and aims to at least double Scotland's public EV charging network by 2026 in a way that is aligned with the Scottish Government's Draft Vision for Public EV Charging[1]. A total of £30m of Scottish Government funding is being made available for the fund with the intention of drawing in a further £30m from the private sector.

In line with EVIF requirements, the Plan sets out an overarching Vision and Objectives for the development of EV charging infrastructure in West Lothian; estimates the future public charging need; identifies a range of possible sites for new charging infrastructure and sets out a potential charge point mix; details the investment requirement; and sets out a preferred approach to delivery.

In line with the guidance produced by SFT, the Plan is particularly focused towards providing charge points in locations where the commercial proposition for investment may be more limited and seeks to leverage private sector investment to boost the provision of public EV charge points and help meet the increasing levels of demand across West Lothian

The development of the Plan was informed by:

- a comprehensive **policy review**
- the development and analysis of a **public survey** of both EV users and non-users in West Lothian
- **engagement with a wide range of stakeholders**, including neighbouring and other Scottish local authorities, private charge point operators (CPOs), and SP Energy Networks (SPEN).

Subject to approval by WLC, the Plan will be reviewed by the **Electric Vehicle Infrastructure Fund (EVIF)** Programme Board who will make recommendations to Transport Scotland as to the level of EVIF capital funding to be allocated to WLC over the period up to 2026.

The sections below provide a summary of the document. The narrative is structured under the following headings:

- Vision, Objectives, and Commitments
- Future public charging needs
- Site identification and charge point mix
- Preferred delivery model
- Financial case
- Next steps

Vision, Objectives and Commitments

The document sets out an overarching **Vision** for EV charging in West Lothian and a set of supporting **Objectives** and **Commitments** which are framed around the outcomes and priorities identified within the Scottish Government's Draft Vision for Public EV Charging Infrastructure. These are summarised in Figure 1.

[1] https://www.transport.gov.scot/news/a-new-vision-for-electric-vehicle-charging-infrastructure-in-scotland/

Vision	*All people living in and visiting West Lothian have access to a comprehensive and reliable network of public EV chargers which are accessible and easy to use, provide convenient and affordable access for all, and support active and sustainable travel choices.*
Objectives	**Objective 1:** 10% of parking spaces in key West Lothian Council owned car parks will be EV by 2026 **Objective 2:** Over 50% of households with no off-road car parking in West Lothian will be within a reasonable walk[1] of a charging site by 2026.

West Lothian Council Commitments

A well-designed, comprehensive and people focused network:

- Seek to ensure data on EV charge point use is made available more widely.
- Work with the private sector and wider partners to enhance access to real-time information, make tariffs more transparent, streamline the payment process, and improve reliability.

An accessible, and reliable public network that works for everyone:

- Adopt the EV Accessible Charging Specification for all new EV charge points delivered via this Plan.
- Explore the potential of reviewing the accessibility of existing West Lothian Council charge points and provide upgrades where possible.

Supporting the principle of a *'Just Transition'*:

- Seek to provide an appropriate level of public EV charging infrastructure in locations where there are a high number of households without access to off-street parking.
- Explore, in partnership with the private sector, the potential of implementing innovative tariffs structures.

Attracts private sector investment:

- Seek to maximise private sector investment in the public EV charging network and work with the private sector to ensure EV charge points are distributed in a fair, equitable and just way.

Supporting active and public transport choices:

- Consider the wider active and sustainable transport network when providing EV charging infrastructure to support active and public transport.

Figure 1.0: Plan Vision, Objectives and Commitments

Future public charging needs

Based on a review of wider forecasts, it is estimated that there will be between 8,600 and 24,900 EVs in West Lothian by the end of 2026. To fulfil the demand generated by these additional vehicles, West Lothian will require an estimated 3,900 to 19,500 kW of additional charging capacity.

While some of this will be provided by the private sector independently of this Plan, there will be a continued need for West Lothian Council to be involved in order to ensure EV charging infrastructure is provided in areas where the commercial case for investment is more limited so that all communities in West Lothian can benefit from the switch to EVs.

Based on the current split between private and public sector CPOs in West Lothian and known committed expansion plans, it has been assumed that there will be an approximate 60 / 40% split between private and public CPOs over the lifetime of this strategy.

Site identification and charge point mix

To meet the above 40% provision target, the plan identifies 148 sites across West Lothian at which it is proposed an additional 294 charging devices could be provided.

The sites are located in areas of land known to be in council ownership. This includes council owned car parks, leisure centres, community centres, partnership centres, education centres, and schools.

Should all the identified sites be delivered, it is estimated that 67% of households in West Lothian who do not have access to off-street parking would be within a reasonable walk[2] of a charge point location. This compares to a current figure of 23%.

Figure 2 shows the location of the existing and proposed charge point sites and their associated walk catchments as well as the distribution of houses without access to off-street parking across West Lothian.

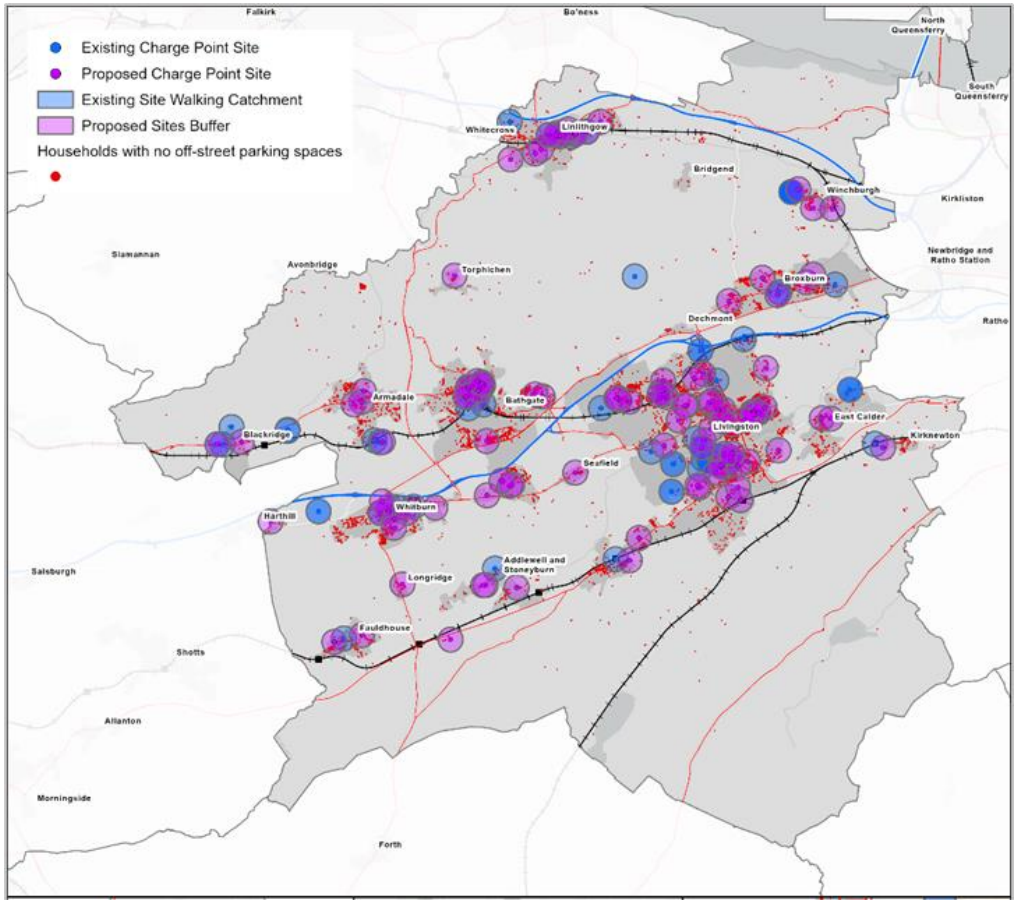


Figure 2: Location of existing and proposed charge point sites and associated walk catchments

The chargers provided will include a mix of 7kW, 22kW, and 50kW devices, with slower chargers located in residential locations where overnight charging is more common and faster chargers located in destinations, such as areas close to shops and other service centres where charging sessions are typically shorter.

[2] Assumed to be between 200-400m crow flies distance.

Preferred delivery model

Three commercial models were assessed against requirements:

- Option 1 - Leasing sites
- Option 2 - Concession contract
- Option 3 - Local authority owner operator.

Option 2 was deemed to offer the best value overall. This model allows the local authority to retain ownership of all assets with no exposure to capital risks, which are covered by a combination of private sector investment and grant subsidy. Existing assets could be incorporated as part of the delivery model and there would be greater public sector control over charge point specifications and tariffs, while allowing the private sector to handle all commercial risks in return for collecting all revenue.

Financial case

The cost of delivering the EVI network was estimated using the cost planning assumptions provided by SFT and Financial modelling was undertaken using the 'SFT EVI Feasibility Model v4.1'.

The **total upfront investment required is £3,514,736**. It has been assumed that enabling works (the acquisition and preparation of the sites, as well as forming new car parking bays and landscaping) will be funded via the EVIF grant from Transport Scotland, and the remaining costs (£2,804,634) will be funded by the market under the concession contract.

The length of operations has been assumed at 15-years starting April 2026 (Year 5) and the **total operating costs over this period is estimated to be £3,472,473.**

This proposed expansion will be affordable where the investment proposition is commercially strong and can attract private sector funding. To ensure this is the case, further work will be undertaken to develop a better understanding of the financial viability of the concession-type contract. This will include further engagement with CPOs to develop a more detailed understanding of:

- The demand profile and commercial viability of the proposed sites and the potential opportunities to increase this.
- The most appropriate tariff structure based on the level and type of demand.
- Detailed infrastructure capital, maintenance, and operational costs, including the cost of electricity.

Next Steps

Subject to WLC's approval of this Plan, the next steps involve the development of an Outline Business Case (OBC). This will be followed by procurement, and the conversion of the OBC into a Final Business Case (FBC), with delivery thereafter (anticipated for financial year 2025/26). It is proposed that the remainder of the initial allocation of EVIF funding which was provided to WLC be used to progress the OBC and subsequent procurement.

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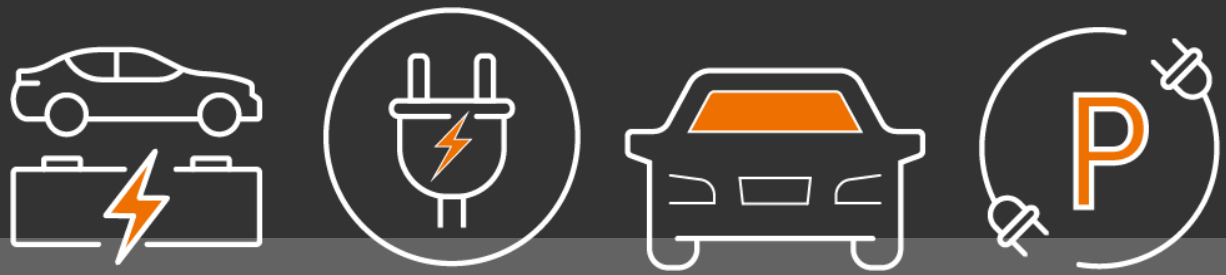
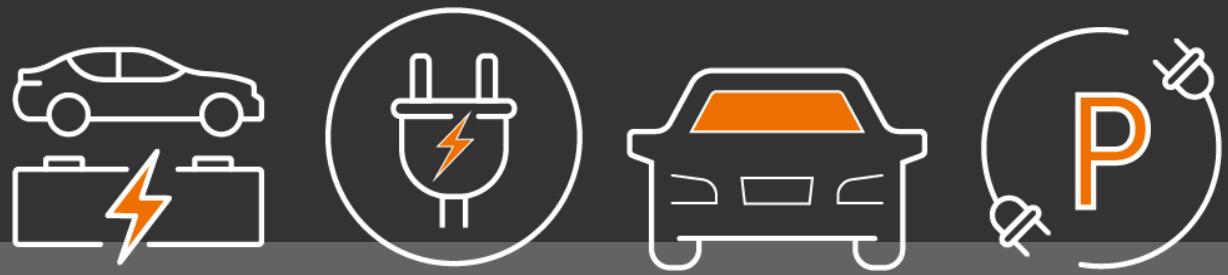


Glossary

Term	Definition
BEV	Battery Electric Vehicle - any vehicle that exclusively uses rechargeable battery packs, with no secondary source of propulsion (a hydrogen fuel cell, internal combustion engine etc).
Charge point	Another word for a charging device
Charge point site	A location where there is one or more EV charging devices
ChargePlace Scotland	The Scotland wide network of public charging infrastructure
Charger	Another word for a charging device
Charging device	A single piece of charging equipment housing two or three sockets for charging EVs
CPO	Charge point operator
Destination	Whereby charging devices are installed at both private and public sector destinations with longer duration visits (e.g., gyms, supermarkets, shopping centres, community facilities and transport hubs, such as train stations)
DNO	Distribution Network Operator – the owner and operator of power lines and infrastructure in an areas' electricity transmission network
EREV	Extended range electric vehicles – a type of PHEV. The difference is that standard PHEVs include an internal combustion engine that's connected mechanically to the drive train, like an HEV or standard ICE vehicle, while EREVs have a gasoline generator that can provide electricity to the electric motor and batteries.
EV	Electric Vehicle – a vehicle that uses one or more electric motors for propulsion. It can be powered by a collector system, with electricity from extravehicular sources, or it can be powered autonomously by a battery (sometimes charged by solar panels, or by converting fuel to electricity using fuel cells or a generator)
EV Infrastructure	Broad term used to describe EV charge points and related infrastructure
EVI	Electric vehicle infrastructure - broad term used to describe EV charge points and related infrastructure
EVIF	Electric Vehicle Infrastructure Fund
Fast Charger	A charger which has a charging speed of between 7kW and 22kW
HEV	Hybrid Electric Vehicle – a EV which cannot be plugged in to charge the battery. Instead, the battery is charged through regenerative braking and by the internal combustion engine.
Hub	A specific facility dedicated to EV charging, usually consisting of a large number of EV charging devices
ICE Vehicle	Internal Combustion Engine vehicle
LGV	Light goods vehicle
Off-street parking	Private parking which is located off the public road carriageway such as driveways or garages
On route / journey	Rapid and ultra-rapid charging to enable long-distance journeys / top-up charges
OZEV	The Office for Zero Emission Vehicles
PHEV	Plug in Hybrid Electric Vehicle - this type of hybrid electric car runs on electricity as well as petrol or diesel
PHV	Private hire vehicle
Public charging network	A network of EV charge points which can be used by members of the public
Rapid charger	A charger with a charging speed of 43kW when using alternating current (AC) or 50kW+ on a direct current (DC)

Reasonable walk of existing charge point	Assumed to be between 200-400m.
Residential hub	An area whereby multiple EV charging devices are provided in a central location for use by residents. These can be useful where parking Is very limited.
Residential on-street	Whereby charging devices are installed to serve vehicles parked on-street. These can be standalone charge points or integrated into existing furniture, such as lighting columns.
SEPT	EV Charging Strategy and Expansion Template
SFT	Scottish Futures Trust
Slow charger	A charger with a charging speed of less than 7kW
SPEN / SP Energy Networks	Scottish Power Energy Networks
TPH	Taxi and private hire vehicles
TS	Transport Scotland
Ultra-rapid Charger	A charger with a charging speed of 50kW or more
WLC	West Lothian Council

Overview



1. Overview

1.1 Purpose

The Scottish Government has made a legal **commitment to deliver net-zero[3] carbon emissions by 2045**, with interim targets for a 75% reduction in greenhouse gas emissions by 2030 and a 90% reduction by 2040[4]. In addition, the Climate Change Plan Update commits to **phasing out new petrol and diesel cars and vans by 2030**[5]. While reducing car use in favour of active travel (walking, wheeling, and cycling) and public transport will be key to reaching these goals, it will also be necessary for there to be a transformative shift to zero emission vehicles, such as electric vehicles (EV).

The EV market has grown substantially in recent years and, supported by the above policy goals, EV uptake is forecast to increase rapidly over the next five-to-ten-year period as we move towards mass market adoption. As the number of EVs grow, it will be vital to ensure appropriate public charging infrastructure is provided to support this growth.

Increasingly, EV charging infrastructure will be provided by the private sector. However, West Lothian Council (WLC) and the public sector more broadly will continue to play an important role, helping to identify poorly served locations and ensure that charging infrastructure is delivered equitably so that all those in West Lothian can benefit from the transition to EVs.

With this in mind, this document sets out WLC's **plan for the development and expansion of public EV charging infrastructure in West Lothian up to 2026.**

The document has been prepared in line with the Scottish Futures Trust (SFT) EV Charging Strategy and Expansion Plan Template (SEPT). It includes a background to West Lothian and an overview of the current EV charging provision in the local authority area. The subsequent sections are then split into two parts as follows:

- **Part 1 (Chapter 4):** focuses on the strategy setting out the Council's approach to expanding public EV charging provision.
- **Part 2 (Chapters 5-8):** sets out the scope of additional EV infrastructure (EVI) to be publicly procured and how it will be funded and delivered.

It is intended that this Plan will be used to support applications for capital funding from Transport Scotland (TS) for further EVI expansion. The document will be reviewed by the **Electric Vehicle Infrastructure Fund (EVIF)** Programme Board who will make recommendations to TS as to the level of capital funding to be allocated over the period up to 2026.

The development of this Plan has been informed by:

- a comprehensive **policy review –** details of this are set out in Appendix A.
- the development and analysis of a **public survey** aimed at understanding current use of the EV charging network in West Lothian, satisfaction with provision, and opportunities and priorities for improvement.
- **engagement with a range of stakeholders**, including neighbouring and other Scottish local authorities, private charge point operators (CPOs), and SP Energy Networks (SPEN).

Further information on public and stakeholder engagement undertaken, including the approach to the delivery and the outputs gathered is included in Appendix B.

This Plan also draws upon information and data contained within the EV toolkit produced by Field Dynamics[6] to assist local authorities in developing their plans for EV charging infrastructure.

1.2 Document Structure

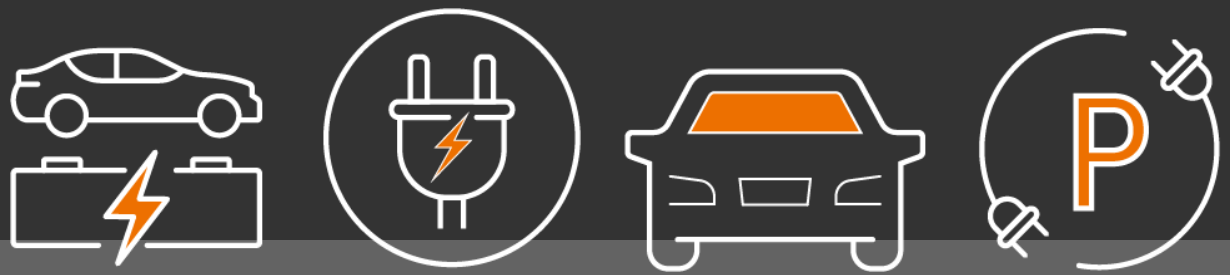
In line with the SEPT, the remainder of this Plan is structured as follows:

- **Chapter 2 –** provides a background to West Lothian, including key statistics and mapping showing population, employment centres and transport connections.
- **Chapter 3 –** sets out a baseline position with respect to EV charging infrastructure in West Lothian, including current levels of provision and the local authority tariff regime.

[3] Net zero refers to a state in which the greenhouse gases going into the atmosphere are balanced by removal out of the atmosphere.
[4] Climate Change (Emissions Reduction Targets) (Scotland) Act 2019
[5] Climate Change Plan Update (2020)
[6] West Lothian Collaboration Zone 2023, Field Dynamics / Scottish Futures Trust,

- **Chapter 4 –** sets out the Vision, Outcomes and Priorities for the development of the public EV charging network in West Lothian.
- **Chapter 5 –** outlines the Economic Case, identifying the investment need, the preferred option(s) and their estimated costs.
- **Chapter 6 –** sets out the Commercial Case, outlining the preferred contract structure and approach to procurement to deliver the required additional investment.
- **Chapter 7 –** provides the Financial Case for the capital and operating costs, identifying all sources of funding, capital funding sought from TS, and the financial viability of the proposed delivery model(s).
- **Chapter 8 –** sets out the Management Case, including the key activities planned prior to commencing procurement, the approach to managing procurement, delivery timetable, and commencement of service provision.

2: Background and Scope



2. Background and Scope

2.1 Context

Overview

West Lothian is strategically located in the Central Belt of Scotland. The local authority area is well served by a number of motorways and trunk roads, including the **M8 and M9**. The area is also served by **twelve rail stations**, and three rail lines (Glasgow to Edinburgh via Falkirk line; the North Clyde Line, and the Shotts Line) (see

Figure 2:2).

The population and employment centres are concentrated around the road and rail transport corridors. Livingston is the largest settlement, accounting for 36% of the total population (see Figure 2:1). This is followed by Bathgate (accounting for 16%) and Broxburn (accounting for 9% of the population). In total, the six largest settlements (Livingston, Bathgate, Broxburn, Linlithgow, Whitburn, and Armadale) account for more than 80% of the overall population.

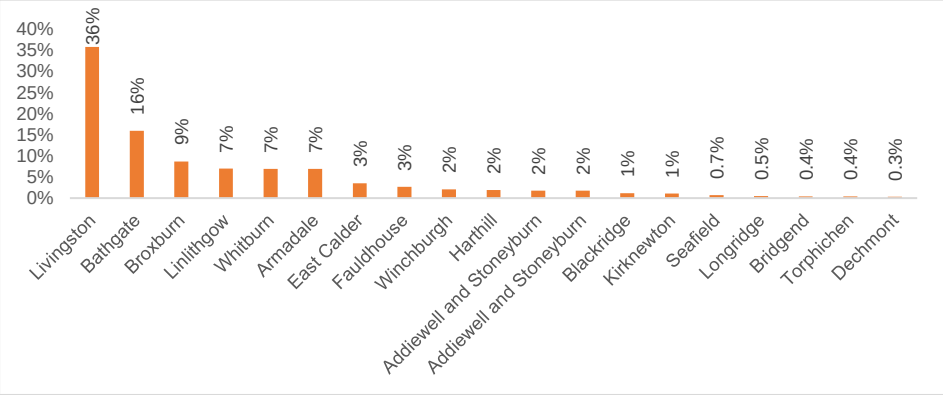


Figure 2:1: Distribution of West Lothian population by settlement (Source: 2020 Mid-year population, NRS)

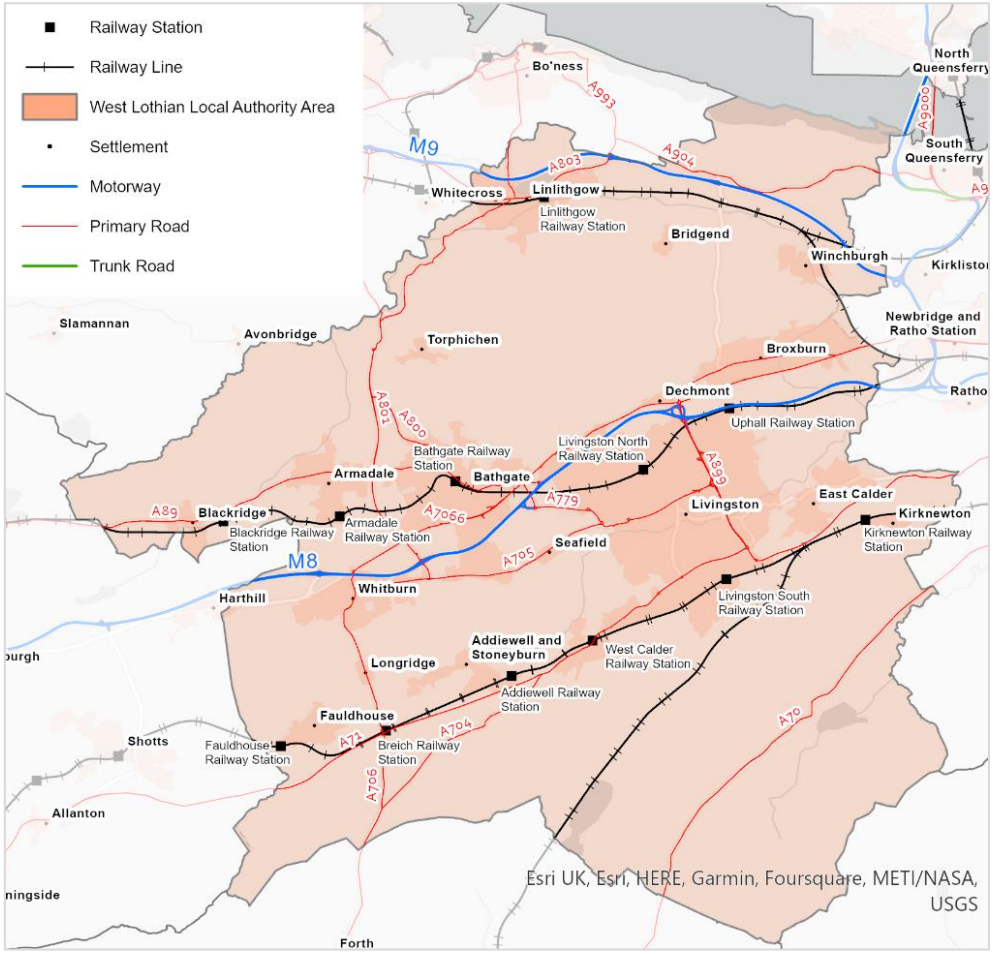
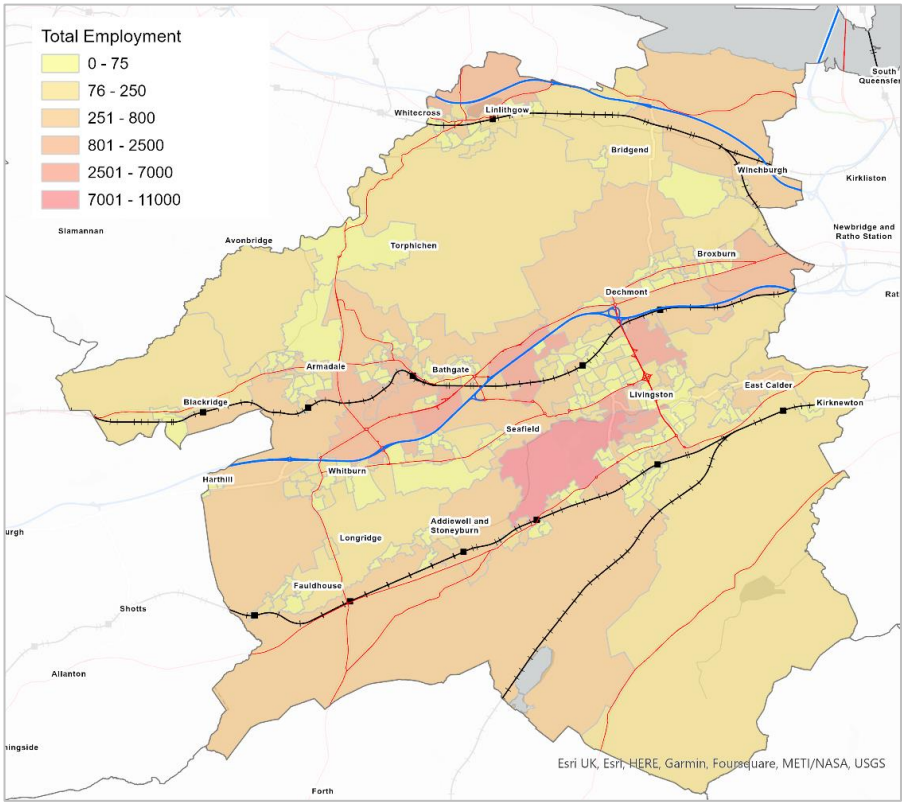


Figure 2:2: West Lothian overview

Figure 2: shows the distribution of employment across West Lothian. Employment is similarly concentrated in the key centres, particularly Livingston



and Bathgate as well as pockets along the M8 corridor where there are a number of commercial and industrial estates.

Figure 2:3: Total Employment across West Lothian (BRES, 2021)

Beyond the major centres, much of the wider area is rural in nature. In terms of EVI, there will likely be more of a commercial case for investment where there are concentrations of activity whereas the provision of EV charging in more residential and rural areas may be more challenging due to lower levels of demand.

Population change

West Lothian has **one of the fastest growing populations** in Scotland, increasing by 16.7% between 2001 and 2021 (compared to an 8.2% increase at the Scottish level). Data suggests that this trend will continue, with population projections indicating that there will be a growth of 5% on 2018 levels by 2026 and 7% on 2018 levels by 2030[7] (see 4).

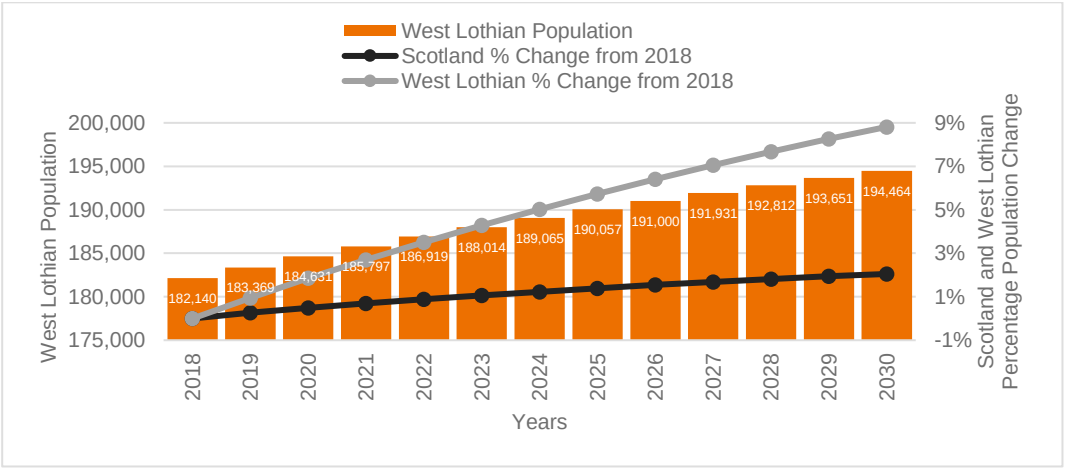


Figure 2:4: Projected population of West Lothian and percentage change for West Lothian and Scotland 2018-2030[8]

As with the rest of Scotland, the **population is aging**, with the proportion of residents aged 65 and over projected to increase by 27.6% between 2018 and 2028[9]. An aging population has implications for the provision of EVI. Older people often experience more health-related issues, including problems with mobility and it will be important to ensure that EV charge points are suitably located and accessible for all.

[7] Sub national population projections for Scottish Areas (2018-based), National Records of Scotland, Sub-National Population Projections | National Records of Scotland (nrscotland.gov.uk)

[8] Sub national population projections for Scottish Areas (2018-based), National Records of Scotland, Sub-National Population Projections | National Records of Scotland (nrscotland.gov.uk)

[9] Sub national population projections for Scottish Areas (2018-based), National Records of Scotland, Sub-National Population Projections | National Records of Scotland (nrscotland.gov.uk)

Key Destinations

There are a range of key leisure and tourist destinations across West Lothian. In Livingston, the **Livingston Designer Village**, Scotland's largest designer outlet, attracts a significant number of visitors per year. Livingston also houses a number of other key attractions, including the **Almondvale Stadium**, home to Livingston Football Club, and the **Almond Valley Heritage Centre.**

To the north of the council area, the historic town of Linlithgow is also a major attraction, housing the remains of **Linlithgow Palace and the adjoining Loch**. Outside of the town, there are also a number of other historical residences, including the **House of the Binns** and **Blackness Castle** as well as **Hopetoun House** stately home. West Lothian also benefits from a number of country parks which attract considerable tourist numbers, particularly in the summer months, including **Almondell and Calderwood, Beecraigs,** and **Polkemmet Country Park** as well as the **Five Sisters Zoo** in West Calder and **Jupiter Artland** in Kirknewton**.** There are also a number of leisure centres and swimming pools across the local authority area, including the **West Lothian Xcite centres**. Leisure destinations such as these can be popular locations for EV charge points as they both enable users to charge during their visit and can attract new customers and / or encourage EV drivers to stay longer, bringing benefits for the attraction itself. However, while some sites will have a relatively consistent throughput of demand throughout the year, others may be more seasonal in nature which can detract from the commercial case for providing EV charging.

Deprivation

Figure 2:3 shows the levels of deprivation within West Lothian based on the 2020 Scottish Index of Multiple Deprivation (SIMD). Areas in red are most deprived whilst those in blue are least deprived. As shown, there are pockets of deprivation in each of the main settlements in the central / east / west band across West Lothian. There is a clear relationship between socio-economic status and EV uptake, with lower rates of uptake amongst those in lower socio-economic groups, in part because of the high up-front costs of EVs. However, as we move towards mass market uptake of EVs, this is likely to change, with those from lower income groups likely to make up a higher proportion of EV users over time. Demand for EV charging from these communities is therefore likely to increase.

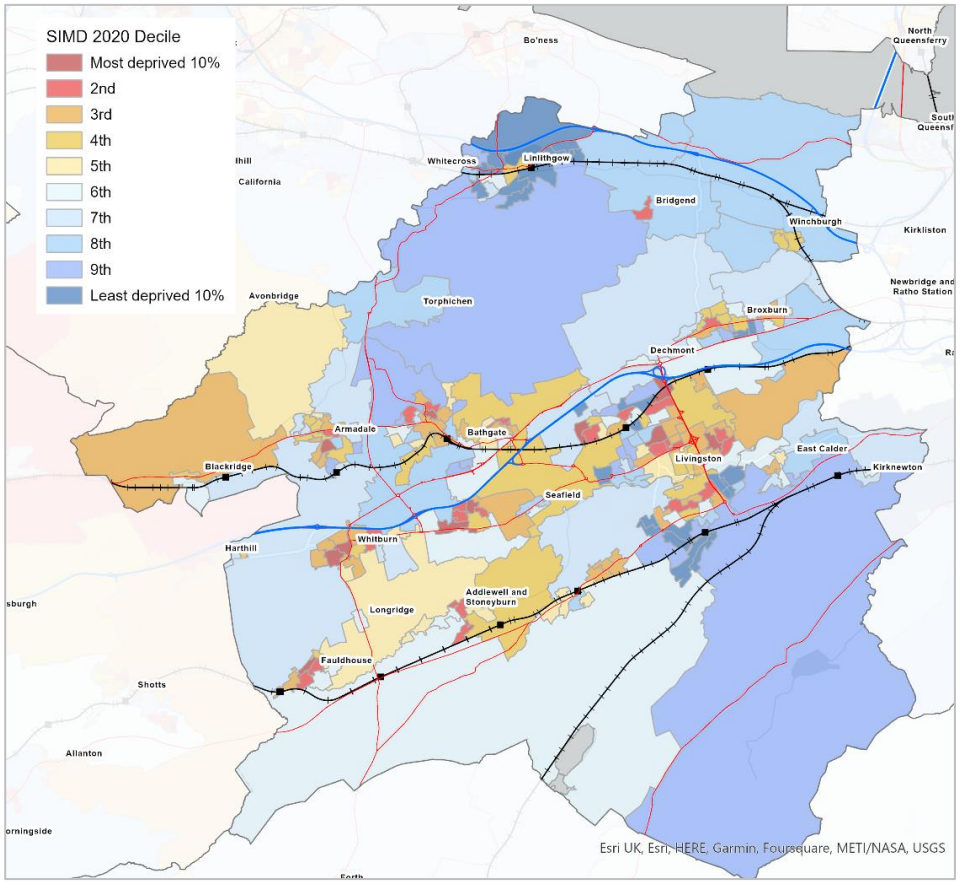


Figure 2:3 West Lothian Scottish Index of Multiple Deprivation 2020

Access to off-street parking at home

Less advantaged areas often have more homes without access to off-street parking (such as driveways or garages)[10]. This has an important impact on overall demand for the wider public EV charging network because those with off-street parking can install a charge point at home and these home chargers will generally provide sufficient charge to cover the charging needs of the majority of households[11]. In contrast, those without appropriate off-road parking are entirely dependent on the public EV charging network regardless of whether they are low or high mileage households. Currently, most EV-users have access to off-street parking. However, as more and more people in West Lothian purchase EVs, the proportion of home charging will fall and demand for the public network will increase, with particular demand coming from residential areas where off-street parking is more limited.

There are various estimates of the level of off-street parking available in West Lothian. Data from the Scottish House Condition Survey (SHCS) for 2016, 2017, and 2019 suggests that around 38% of households in West Lothian do not have dedicated parking provision, compared to 44% across Scotland as a whole[12]. As part of their commission to SFT, Field Dynamics analysed the footprint of all households in Great Britain to determine their ability to accommodate off-street parking. Overall, they estimate that 28%[13] of households in West Lothian do not have off-street parking provision and 72% have one or more off-street parking spaces. The difference in these estimates likely reflects the different methodologies[14] and definitions[15] employed. In addition, the Field Dynamics analysis is based upon more recent data[16] which includes major housing developments delivered since 2017, a high proportion of which have been lower density housing with driveways (see discussion below).

Figure 2.6 and Figure 2.7 show the estimated distribution of households of different types across West Lothian based on the Field Dynamics datasets. It is noted that this analysis was undertaken at scale and therefore there will be instances where individual households have been incorrectly allocated[17]. However, the data does provide a best estimate of provision and a broad indication of the location of different household types and therefore the different levels of need for public EVI across West Lothian.

In the recent period, there has been significant housing development in West Lothian, notably in **Winchburgh** in the northeast and the Almond Valley (particularly **Calderwood** which is located near to East Calder). Both these locations were identified as Core Development Areas (CDAs) in the 2018 West Lothian Local Development Plan (LDP)[18] and there has been considerable build out (principally housing) to date, resulting in new and expanded residential communities in both areas.

Much of the housing taken forward in these locations is low density, with access to off-street parking facilities. In April 2019, WLC adopted Supplementary Guidance which included specific requirements for the provision of charging points in new residential developments[19]. This Guidance states that[20] **one in every six residential units with off-street parking should have an active ready to use EV charge point** (7kW)[21] with **passive provision (cabling and individual fuse boxes provided) provided at all other residential units** with off-street parking. In addition, **one in every six on-street parking spaces should have a fully connected, active and ready to use EV charge point** (7kW). Furthermore, from June 2023 new provisions for EV charging will come

[10] There is also a correlation with income - surveys undertaken by the Energy Saving trust in 2019/20 41% of households with access to off-street parking had an annual income greater than £50,000, whereas only 25% of households without access to off-street parking had an annual income of this level. See Level of off-street parking provision (evinfrastructureguide.com)

[11] Home chargers would generally provide sufficient charge for the average level of vehicle mileage in the UK. In 2021, this was 102 miles per week, down from 142 miles per week in 2019, see Annual Road Traffic Estimates 2021 (publishing.service.gov.uk). The only exception to this would be where the vehicle mileage rate is significantly higher than average. This may be the case, for example, where individuals travel frequently for work purposes (business drivers, delivery, and maintenance vehicles etc). In these cases, there may be a requirement to 'top up' using the public network.

[12] Scottish House Condition Survey averaged from 2016, 2017 and 2019 data. See https://www.gov.scot/publications/scottish-building-regulations-proposed-changes-energy-standards-associated-topics/pages/7/

[13] This compares with the Field Dynamics average figure for Great Britain of 34.9%, see EVI Demand Forecasting, Scale of Challenge workbook – how to use, Field Dynamics / Scottish Futures Trust, West Lothian Collaboration Zone 2023

[14] The SSHCS data is based on a sample of survey data which is subsequently grossed up to produce local authority level proportions. The Field Dynamics data in contrast examined the space around each property using satellite data.

[15] The SHCS data relates to 'dedicated parking provision other than on-street'. This dataset therefore includes internal garages built into the footprint of the home. The Field Dynamics data in contrast focuses on off-road parking provision which uses the space around the property. The latter does not therefore include internal garages and may therefore underestimate the level of parking provision.

[16] This analysis used data which indicated that there were 81,764 dwellings in West Lothian. This is broadly equivalent to the estimated dwellings recorded in 2020 in the NRS data (81,723). Overall, Field Dynamics estimated that 28% (22,494) of households in West Lothian had no off-street parking and 72% (59,270) had one or more off-street parking spaces.

[17] For example, houses with integrated garages within the footprint of the home may be particularly likely to be allocated incorrectly.

[18] West Lothian Local Development Plan 2018 (LDP 1), https://www.westlothian.gov.uk/LDP

[19] https://www.westlothian.gov.uk/media/49587/SG-Supplementary-Guidance-Residential-Development-Guide-Adopted-April-2019/pdf/SG_-_Supplementary_Guidance__Residential_Development_Guide_-_Adopted_October_2019.pdf?m=637618588645030000

[20] At sites with ten or more residential units, or a total area of more than 0.5Ha

[21] Located either in a garage or in close proximity to a dedicated car parking place within the driveway of the property

into force under Scotland's amended Building Regulations. These state that "*every building must be designed and constructed in such a way that provision for the charging of EVs is made where car parking spaces are located within the building or the curtilage of the building*" and require enabling EV infrastructure to be provided for all new dwellings with charge point installation to the extent that this is cost-effective[22].

Given this level of provision, it is therefore expected that households in new developments in West Lothian will be relatively well equipped in terms of home EV charging infrastructure and will likely have less need to use the wider EV public charging network.

[22] See Building Scotland (Amendment) Regulations 2022 - electric vehicle charging standard: presentation - gov.scot (www.gov.scot)

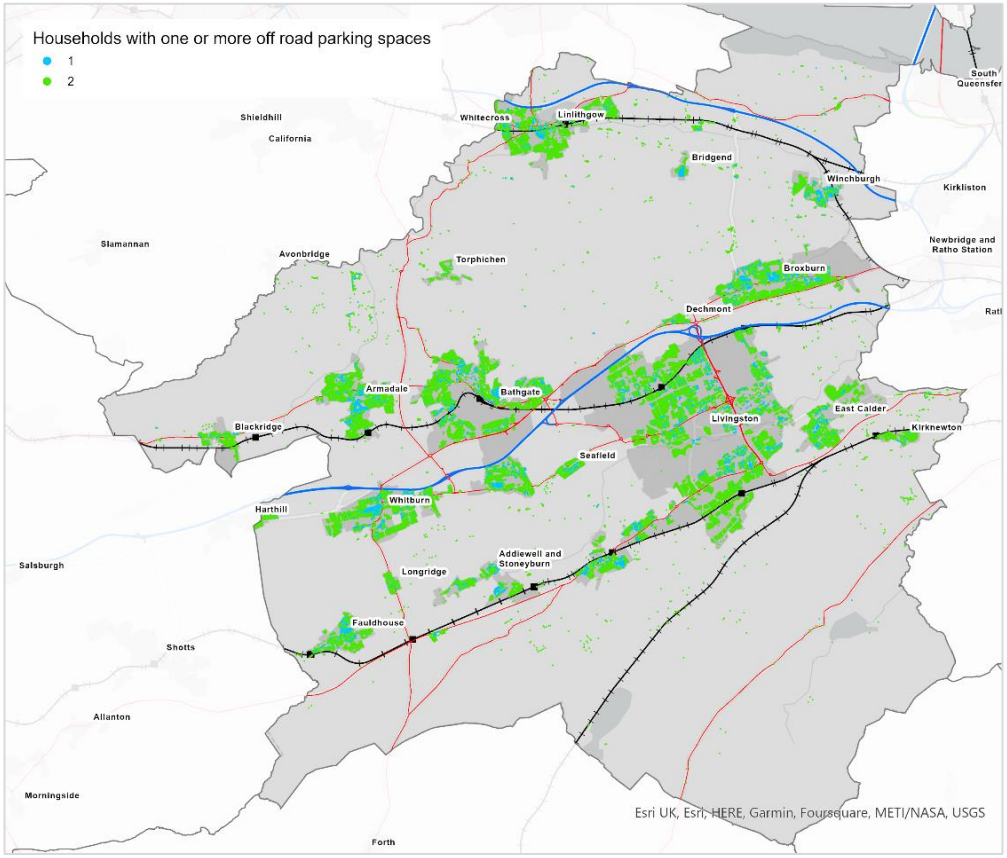


Figure 2:4: Estimated distribution of households in West Lothian with one or more off-street parking spaces

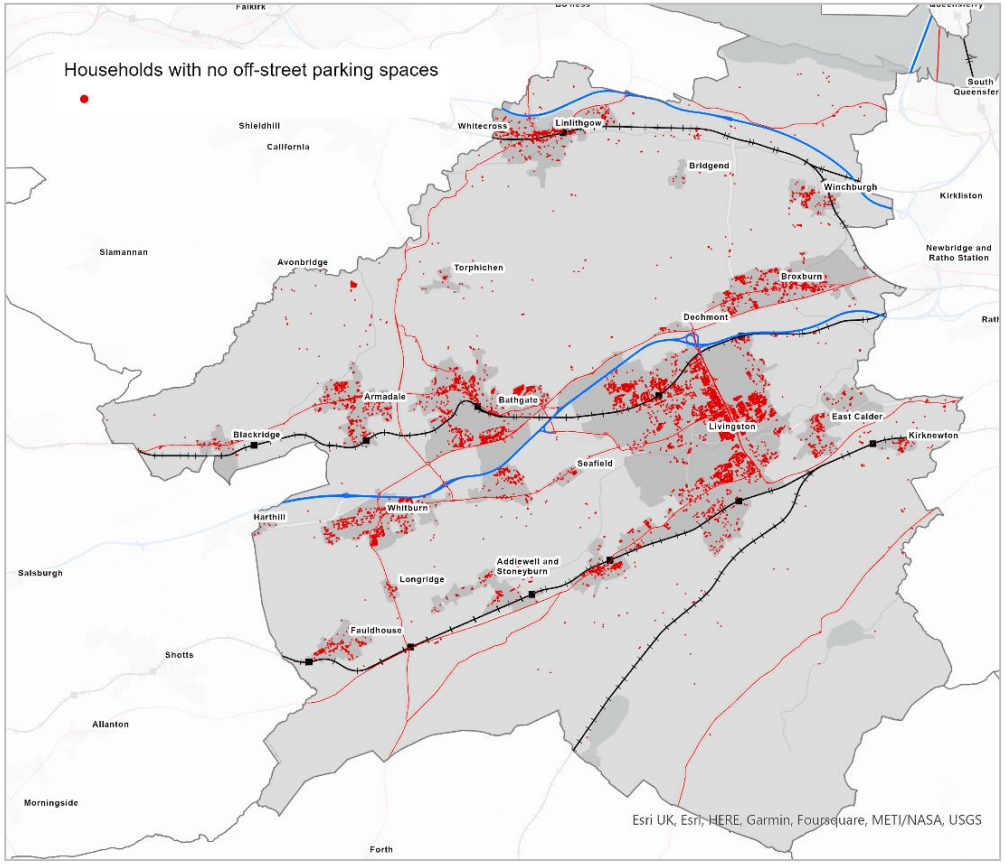


Figure 2:5: Estimated distribution of households in West Lothian spaces with no off-street parking

2.2 Vehicle groups

This Strategy covers the following vehicle groups: **cars, vans, light goods vehicles (LGVs), taxis, and private hire vehicles.**

To help determine the level of public EV charging required, it is important to establish a baseline of **the number of EVs in West Lothian**. The Department for Transport (DfT) collates information on vehicles registered by fuel type in each local authority area on a quarterly basis. The number and percentage of EVs registered in West Lothian as recorded in this dataset is set out in Appendix C.

The DfT dataset provides a comprehensive picture of the number of electric vehicles registered in West Lothian and the change over time. However, the data is based on the location of the registered keeper of each vehicle and a registered keeper may not necessarily own or drive the vehicle. For example, a company car driver may drive the car, but the lease company may be registered as the keeper. This creates a locational distortion, with, for example, high numbers of company vehicles registered in areas with large remote leasing centres, and under-representation of company cars in areas without these facilities.

To partly address this issue, DfT data showing the breakdown between company and privately registered vehicles was reviewed and the company vehicles registered in Great Britain were re-distributed across each local authority area in the same proportions as private vehicles. Further information on this adjustment is included in Appendix C.

Table 2:1 to Table 2:4 show the estimated number of vehicles by type based in West Lothian once this adjustment has been made. The data focuses on the vehicle types which are relevant for this strategy, namely cars[23] and LGVs[24].

Table 2:1: Number of licensed vehicles by type in Q3 2022 (adjusted figures)

	Petrol / Diesel	Plug-in Electric	Other Fuels[25]	Total
Cars	87,359	2,980	2,860	93,199
Light goods	10,575	89	12	10,676
Total	97,934	3,069	2,872	103,875

Table 2:2: Percentage of licenced vehicles by type in Q3 2022 (adjusted figures)

	Petrol / Diesel	Plug-in Electric	Other Fuels	Total
Cars	93.7%	3.2%	3.1%	100.0%
Light goods	99.1%	0.8%	0.1%	100.0%
Total (cars + LGVs)	94.3%	3.0%	2.7%	100.0%

Table 2:3: Number of licensed plug-in vehicles by type in Q3 2022 (adjusted figures)

	Battery electric (BEV)	Plug-in hybrid electric (PHEV)[26]	Total
Cars	1,997	983	2,980
Light goods	89	0	89
Total (cars + LGVs)	2,086	983	3,069

Table 2:4: Percentage of plug-in vehicles by type in Q3 2022 (adjusted figures)

	Battery electric (BEV)	Plug-in hybrid electric (PHEV)	Total
Cars	67.0%	33.0%	100.0%
Light goods	100.0%	0.0%	100.0%
Total (cars + LGVs)	68.0%	32.0%	100.0%

In total, it is estimated that there were approximately 103,900 cars and LGVs in West Lothian in Q3 2022, including **3,100 EVs (2,100 BEVs and 1000 PHEVs).** This suggests an **EV adoption rate of 3% for cars and LGVs combined**. However, not all of these will need to use the public EV charge point network. As previously discussed, a high proportion of EV users will have access to a home charger which will provide sufficient charge for the needs of the majority of households.

[23] Private hire vehicles (PHV) are recorded under cars

[24] It is recognised that this plan also considers taxis; however, taxis/hackney carriages fall into the 'Other' vehicle body type, which is defined by the DfT as 'all vehicles not mentioned in other body types' and covers numerous vehicle types relating to construction and agriculture. Scottish Transport Statistics 2022 indicates that there were only 69 taxis registered in West Lothian in 2021, and so taxis will make up only a small proportion of the Other category. On this basis, the Other category was excluded from the above analysis.

[25] Other Fuels includes non-plug-in hybrid electric, fuel cell electric (hydrogen), liquefied petroleum gas (LPG), other types of gas, biofuels, steam, and experimental technologies).

[26] PHEV figures include petrol and diesel PHEVs as well as range extended electric vehicles.

2.3 Charging types

Public EV charge points can be provided in a variety of locations, including:

- **Residential on-street** – whereby charging devices are installed to serve vehicles parked on-street. These can be standalone charging devices or integrated into existing furniture such as lighting columns.
- **Residential off-street** – whereby multiple charging devices are provided in a single location for use by residents such as car parks, train stations or existing community assets such as leisure centres and community centres. Residential off-street provision can be useful where parking is very limited.
- **Destination** – whereby charging devices are installed at both private and public sector destinations with longer duration visits (e.g., gyms, supermarkets, shopping centres, community facilities and transport hubs, such as train stations).
- **On route / journey** – ultra-rapid charging to enable long-distance journeys / top-up charges. In West Lothian, the M8 and M9 offer opportunities for such facilities.
- **Hub** – a specific facility dedicated to EV charging, usually consisting of a large number of EV charging devices.
- **Workplace** - some workplaces may have chargers installed for use by employees and/or customers. Depending on the employer, use of these charging devices could be free or discounted in order to encourage employees to use them. However, such facilities may not be available to all users and are therefore generally not categorised as public charge points.

Each of these locations has a different demand profile and this impacts the type of charge point device which is most suitable for each location. Charge point devices can be categorised by their power ratings (measured in kW) and the power rating of the device impacts the speed at which it is possible to charge an EV. Higher power chargers are typically more expensive and are more likely to require upgrades to the electricity grid[27]. The typical power and speed categories are set out in Table 2:5 along with the locations at which each charger is typically provided. This information has been drawn from the stakeholder engagement undertaken to inform this strategy and wider research.

Table 2:5: Typical charge point power ratings and associated charging times, range and locations[28]

Power	Speed category	Typical recharge time	Typical range	Typical locations
AC - 7kW and less	Slow	Around 6-12 hours to fully recharge depending on the vehicle	Between 10-25 miles of range per hour	Typically used where EVs are parked for a long time / overnight (e.g., **residential on-street and residential hubs**)
AC- 7kW- 22kW	Fast	Around 2-8 hours to fully recharge depending on the vehicle	Up to 75 miles of range per hour	Typically used at **destinations** where EVs are parked for a few hours (e.g., shopping centres, leisure centres, community buildings etc.)
DC- >43kW- 50kW[29]	Rapid	Around 40 minutes for 80% recharge	Approx. 100 miles of range in half an hour	
DC - Over 50kW[30]	Ultra-rapid	Around 20 minutes for 80% recharge	Approximately 200 miles of range in half an hour.	Typically used at **hubs / on route**

This Plan is primarily focused on the provision of EV charging in **residential areas and at public sector destinations.**

It is anticipated that much of the on-route provision as well as provision at many private sector destinations will be independently provided by the private sector

[27] See https://evinfrastructureguide.com/chapter/powering-your-chargepoints/selecting-chargepoint-type/
[28] Sourced from Local Government Association (Electric vehicles: What are the different types of charge point? | Local Government Association) and RAC, Electric car charger types and connectors – a visual guide | RAC Drive, August 2021
[29] Most rapid charge points are 50kW
[30] Most ultra-rapid charge points are 100kW or 150kW.

given the higher rates of commercial return associated with these locations as well as existing commercial relationships[31]. In contrast, the commercial case for investment is likely to be more challenging in residential locations as:

- charging volumes are generally lower in these locations (due to the slower speed of charge) and there are lower margins on the sale of each kWh
- there is often less opportunity to capitalise on ancillary revenues such as cafes or shops.

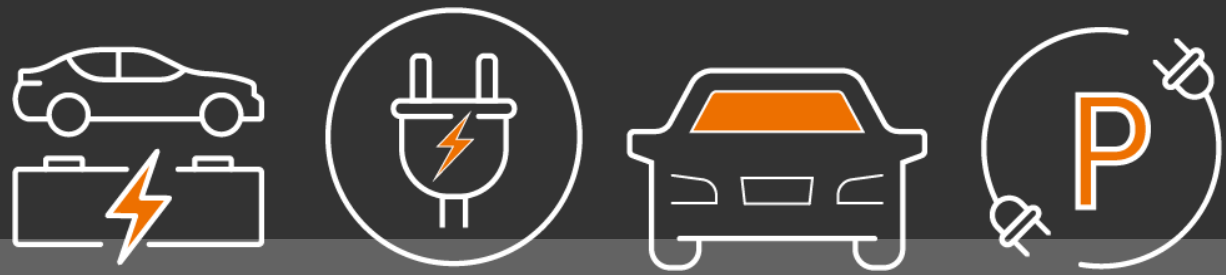
Given that households without access to off-street parking will have greater need to use the wider EV charging network and the need to support the principle of a 'Just Transition', particular focus has been placed on locations where there are a high proportion of households in this category.

In West Lothian, there is often significant pressure on parking spaces in residential areas without off-street parking. Given that EV adoption rates in these areas are currently low rather than on-street EV charging provision, emphasis has been placed on identifying potential communal areas within residential locations which could be used for residential off-street provision. However, the benefits of on-street EV charging provision are recognised and will be considered on a site-by-site basis. The focus on residential hubs will also be reviewed as the uptake of EVs and therefore demand for charging in these locations increases.

Beyond residential areas, lower levels of demand may also detract from the commercial case for provision of fast and rapid charge points in more remote locations and destination charging at seasonal tourist attractions. These locations have therefore also been considered as part of this Plan.

[31] Engagement with the private sector undertaken to inform the development of this Plan (see Appendix B) suggests that private operators will often go into partnership with commercial companies such as the supermarket chains and provide charging facilities across their property portfolio.

3: Baseline position



3. Baseline Position

3.1 Current approach to service delivery

There are currently **76 charging devices** (in 51 locations / sites) available for public use in West Lothian. The location of these is shown in Figure 3:2 along with a unique charge point ID. A table showing the number of outlets[32] and the charging speed available at each location as well as the operator in each case is provided in Appendix D.

Charge site locations

Figure 3:1 shows the distribution of the 51 charging sites across the local authority area as well as the overall number of charging devices in each location. As may be expected given its population and role as the key centre, Livingston has the largest number of charging sites and devices. This is followed by Bathgate. There are also high numbers in Linlithgow which as noted previously is a popular visitor location and there are charge points located in several car parks in the centre and in close proximity to Linlithgow Palace. The concentration in Winchburgh is a single charging hub and is discussed further below.

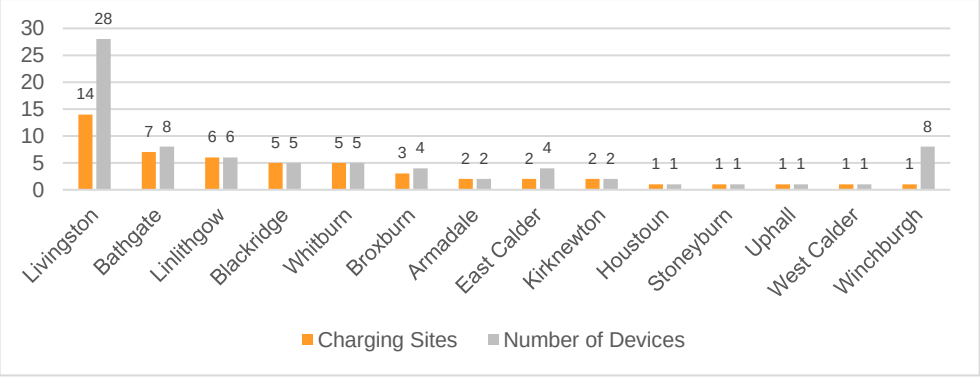


Figure 3:1: Charging sites and number of devices by settlement[33]

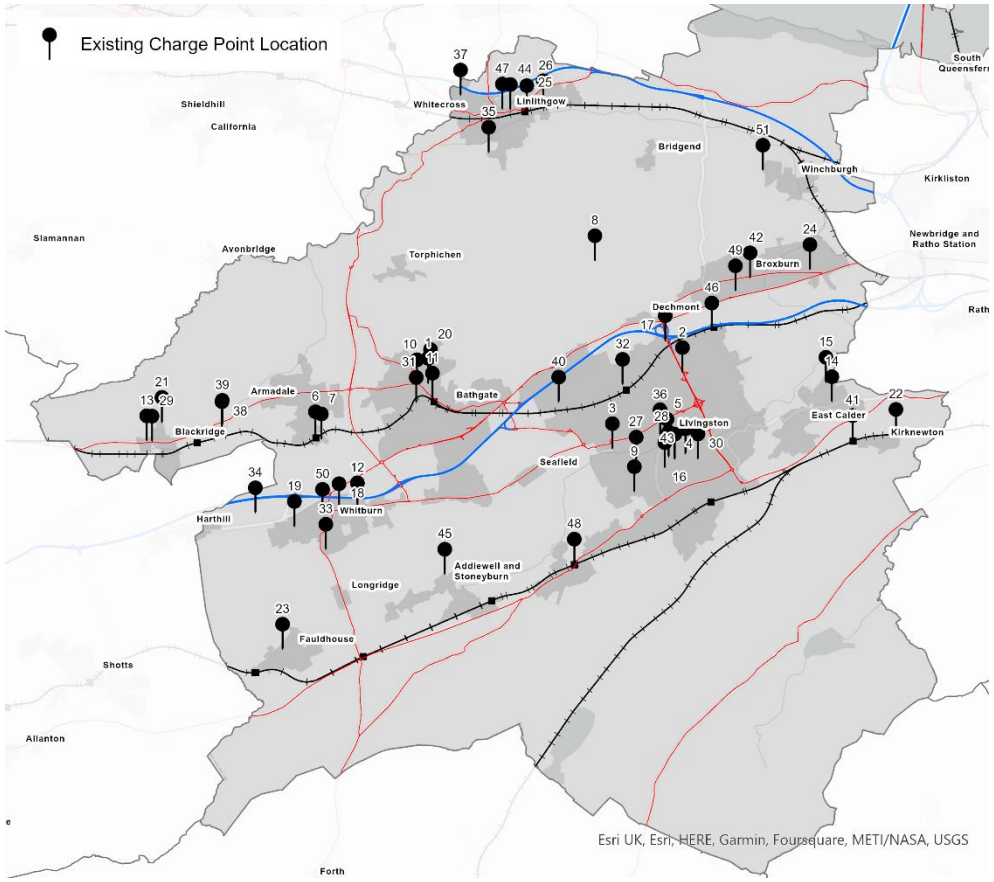


Figure 3:2: Location of existing charging devices[34]

[32] Each charging device has one or more outlet or socket, allowing it to charge a number of vehicles, sometimes at varying speeds, simultaneously (assuming there is sufficient space for parking).

[33] The location of existing charging devices has been collated from various sources including West Lothian Council, ChargePlace Scotland, ZapMap, and the websites of individual operators. The mapping and data represents a best estimate of current provision at the time of writing.

[34] The location of existing charging devices has been collated from various sources including West Lothian Council, ChargePlace Scotland, ZapMap, and the websites of individual operators. The mapping and data represent a best estimate of current provision.

Existing charge point mix

The majority of the existing charge point devices in West Lothian (67%) are ChargePlace Scotland devices with WLC responsible for most of these (see Table 3:). In total, 33% (25 devices) are provided by private operators, including BP Pulse, PodPoint, and GeniePoint. This includes five devices which were available via the ZapMap Home Charging Scheme at the time of writing. This scheme allows residents to rent out their home charge point when not in use, with the location advertised on ZapMap[35].

Table 3:1: Breakdown of existing charge point devices by operator

Operator	Operator	Number of devices	Percentage of devices
ChargePlace Scotland	West Lothian Council	32	63%
	Other	19	37%
	Sub-Total	51	67%
Private Operators	BP Pulse	3	12%
	Tesla	3	12%
	GeniePoint	2	8%
	InstaVolt	2	8%
	NewMotion	1*	4%
	Osprey	1	4%
	Pod Point	1	4%
	VendElectric	1	4%
	ZapMap Home Charging Scheme	5	20%
	Other	6	24%
	Sub-Total	25	33%
Total		76	100%

Charging type

In terms of charger type, the current mix primarily comprises a range of **destination** charge points and **hub-based provision**. There are currently **no on-street charge points** in West Lothian.

ChargePlace Scotland sites include a number of destination chargers at key shopping and leisure destinations, including **Livingston Designer Village, Almondvale Stadium**, **Almond Valley Heritage Centre** in Livingston, several of the car parks around **Linlithgow centre, Palace and Loch**, **Whitburn Swimming Pool (Xcite)**, and **Linlithgow Sports Club**. There are also ChargePlace Scotland sites at **Armadale, Bathgate, Kirknewton, Linlithgow, Uphall, and West Calder Stations** as well as sites at a number of Partnership Centres and schools and at WLC's Service Centre in Kirkton.

The largest hub in West Lothian is located at the new **Winchburgh Academy** which opened in August 2022. As noted in the previous chapter, Winchburgh is identified as a CDA in the LDP and there has been a significant development in the town in recent years. Winchburgh Academy is the first of a series of infrastructure projects which are being taken forward to accommodate this growth, including two new secondary schools, a primary school and a shared sport, leisure and community facility. WLC provided eight new ChargePlace Scotland chargers at this location in October 2022. It is anticipated that these chargers will be used by both visitors to the leisure and community facilities as well as local residents.

The private network includes charging sites at a number of commercial destinations, including **supermarkets / shops** (Aldi, Asda, Lidl, Morrisons, Screwfix, and the Centre in Livingston), **private health clubs** (Bannatyne Health Club, Livingston), and **service (petrol filling) stations**. Engagement with the

[35] For further information, see: https://www.zap-map.com/charge-points/public-charging-point-networks/zap-home-network/#:~:text=The%20Zap-Home%20network%20shows%20home%20charge%20points%20of,their%20home%20charge%20point%20under%20their%20own%20conditions

private sector undertaken to inform the development of this strategy (see Appendix B) suggests that private operators will often go into partnership with commercial companies such as the supermarket chains. It is therefore often the case that specific companies will use the same EV operator across their property portfolio.

Network coverage

Figure 3 shows the location of the existing charge point sites in West Lothian along with an associated walk catchment[36] around each site. The estimated distribution of households with no off-street parking across the local authority area is also shown[37]. **Error! Reference source not found.** shows the a pproximate number of households by type within a reasonable walk[38] of each existing charge point site. It is noted that the charge points available via the ZapMap Home Charging Scheme are not included in Figure 3 or **Error! Reference source not found.** given their more temporary status.

Table 3:2: Approximate proportion of households by type within a reasonable walk[39] of existing charge point sites

	No off-street parking spaces	One or more off-street parking space	All households
Estimated number of households in West Lothian	22,494	59,270	81,764
Approx % households within a reasonable walk of existing charge point site	23%	17%	18%

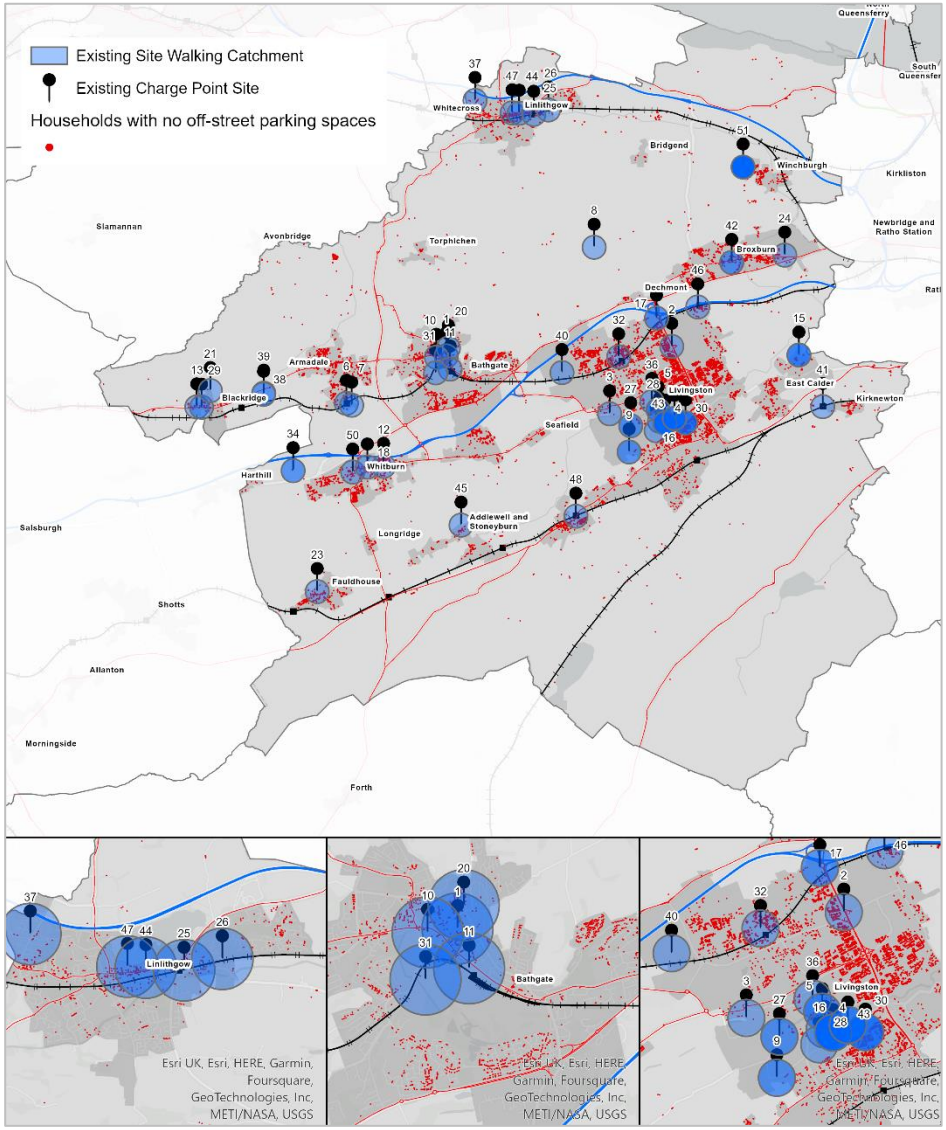


Figure 3:3: Location of existing charge point sites and associated walk catchments

[36] 400m crow flies distance.

[37] This data was produced by Field Dynamics who analysed the footprint of all households in Great Britain. The analysis was undertaken at scale and therefore there will be instances where individual households have been incorrectly allocated. See section 2.1 for further information on this.

[38] Assumed to be between 200-400m

[39] 400m crow flies distance

Based on the figures provided by Field Dynamics, it is estimated that approximately 23% of households with no off-street parking in West Lothian are within a reasonable walk of an existing charge point site. Given that those without access to off-road park**ing will have to rely solely on the public charging network, it is vital that charge points are provided within a reasonable distance of households falling into this category.** As noted above, it is also the case that these locations are likely to have lower levels of demand in the short term and therefore are likely to be less attractive to commercial CPOs. In order to ensure a 'just transition' and encourage EV uptake more generally, there may therefore be a particular need for up-front and early public sector investment in these locations.

3.2 Electric vehicle infrastructure

A summary of the EVI position and key statistics as requested in the SEPT is set out in Table 3.

Table 3:3: Key Statistics in terms of EVI position as requested in the EV Charging Strategy and Expansion Plan Template

Population	185,580[40]
Public devices (All)	76[41]
ChargePlace Scotland public devices	67% (51)
% non-ChargePlace Scotland	33% (25)
Public devices (50kW+)	20
Current estimated charging sockets	156
Current EV charging points per 100k population	41
Current opportunities[42] per 100k population	156
Dwellings	82,591[43]
Estimated % dwellings without / with off-street Parking	28% (22,494) / 72% (59,229) [44]

3.2 Revenue and operations

WLC introduced EV charging tariffs as set out in Table 3 on the 32 charging devices for which they are responsible on the 1st February 2023. The tariffs were designed to be simple to understand and consistent with other local authorities, including East Lothian and Midlothian.

In order to maximise the availability of charging facilities and encourage good driver behaviour, there is a 50-minute maximum stay restriction for rapid chargers and a 180-minute maximum stay for fast chargers. A £10 overstay charge is applied following a ten-minute grace period.

Where possible, contactless payment facilities will be fitted to existing charge points and all new chargers will have this included as standard. ChargePlace Scotland users can also set up an account that is automatically debited when the charge points are used.

Table 3:4: West Lothian electric vehicle tariffs

Charger Type	Minimum Charge	Unit Rate / kWh	Maximum Stay Limit	Overstay Charge
Rapid charger (over 43kW)	£1	£0.40	50 minutes	£10 overstay charge (following ten-minute grace period). No return within 90 minutes.
Fast charger (22Kw)	£1	£0.30	180 minutes	
Other chargers	£1	£0.30	None	None

ChargePlace Scotland publish monthly data on use of all ChargePlace Scotland chargers, including the number of charging sessions, total power drawn (kWh)

[40] 30th June 2021 (the most recent date for which data is available), National Records of Scotland, Mid-2021 Population Estimates
[41] This figure includes 51 ChargePlace Scotland charging devices and 25 charging devices operated by private operators.
[42] As directed by Scottish Futures Trust, it has been assumed that 'opportunities' refers to the number of sockets so that if a charge point has two sockets, there would be two opportunities.
[43] National Records of Scotland, 2021, West Lothian Council Area Profile (nrscotland.gov.uk),

[44] These figures are based upon data provided by Field Dynamics as part of their commission to provide local authorities with a toolkit to complement their own data sets and planning when producing the EVI Strategies. Field Dynamics analysed the footprint of all households in Great Britain to determine their ability to accommodate off-street parking. This analysis used data which indicated that there were 81,764 dwellings in West Lothian. This is broadly equivalent to the estimated dwellings recorded in 2020 in the NRS data (81,723). Of the 81,764 dwellings analysed, Field Dynamics classified 22,494 (28%) as having no off-street parking and 59,229 (72%) as having one or more off-street parking spaces.

per charger and tickets raised[45]. Data for all of the other chargers is held by the individual private operators and is not available for analysis.

Figure 3 shows the total power drawn (kWh) and number of sessions on the ChargePlace Scotland charge points for each month from October 2022 to February 2023. The charge point sites have been split between those for which the Council is responsible and those that are managed by other public providers. As shown, following the introduction of tariffs from February 1st, there was a considerable fall in use of the Council ChargePlace Scotland chargers and a slight increase in use of the non-Council owned devices, suggesting there has been some switching to the latter.

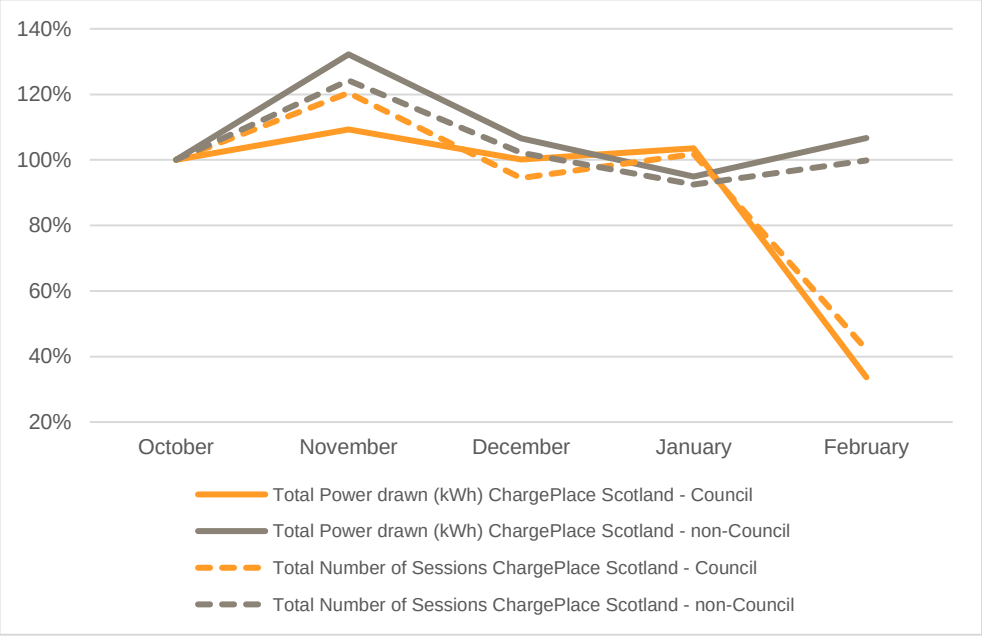


Figure 3:4: Percentage change in total power drawn (kWh) and number of sessions between October 2022 and February 2023 (ChargePlace Scotland)

Figure 3.5 and Figure 3.6 show the total power drawn and the total number of sessions at each ChargePlace Scotland charger in February 2023. It is noted that at some locations, there is more than one charger and therefore the location names can feature more than once in the graph. Overall, Morris Square in Livingston is home to the most used charger in terms of both power drawn and number of sessions. This site is located in a residential area but is also in close proximity to The Centre and Livingston Designer outlet. This is followed by a charger at Bathgate Partnership Centre. Both devices are Council owned. The most popular non-Council ChargePlace Scotland chargers are those at Linlithgow Railway Station, Bathgate Railway Station, and South Surface Car Park at the Livingston Designer Outlet.

[45] The total number of any issue, query or fault raised in the month to the specific charger. This could include – tariff query, RFID request, remote activation assistance, how-to advice, user error, machine fault.

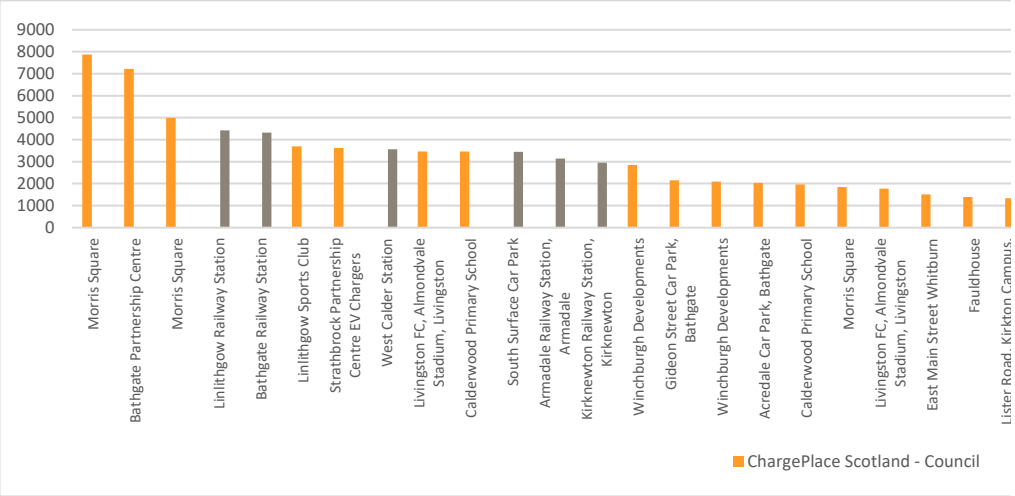


Figure 3:5: Total Power Drawn (kWh) across West Lothian chargers February 2023[46]

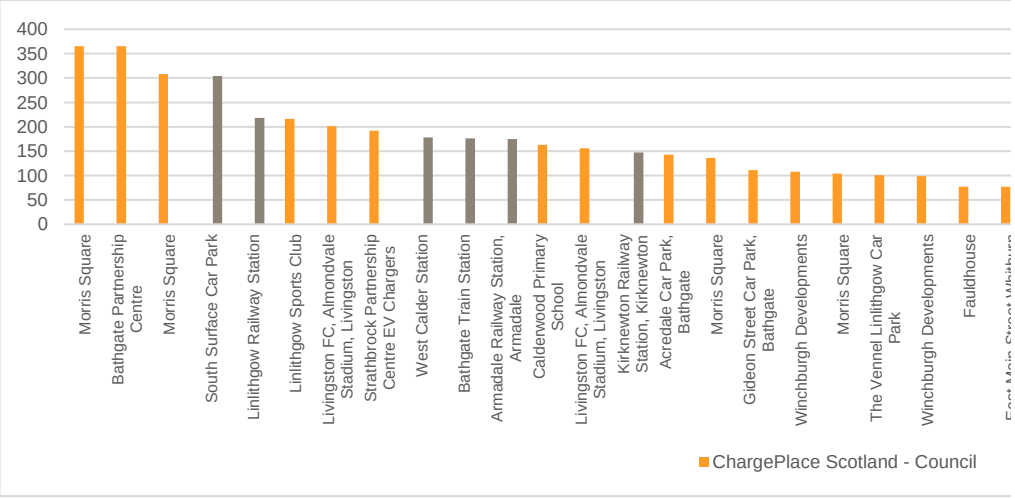
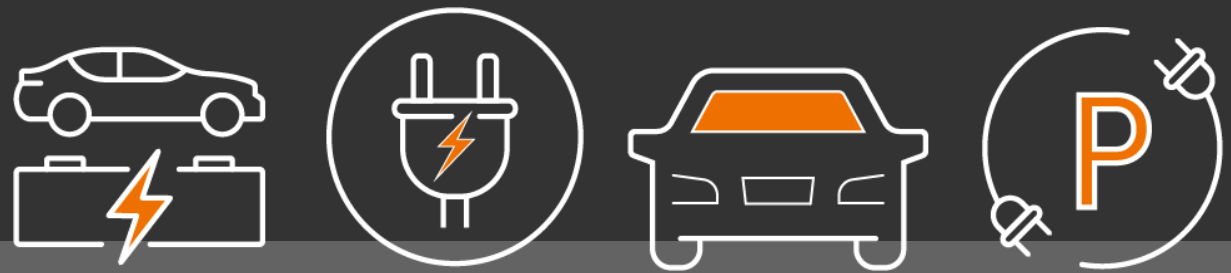


Figure 3:6: Total number of sessions across West Lothian chargers February 2023[47]

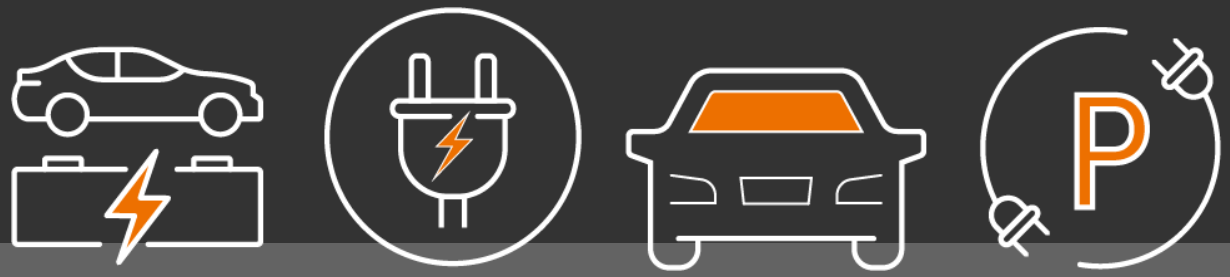
[46] February Charge point Report, Monthly Charge Point Performance - Charge Place Scotland

[47] February Charge point Report, Monthly Charge Point Performance - Charge Place Scotland

PART 1: Public EV Charge Point Strategy



4: Vision, Outcomes and Priorities



4. Vision, Objectives, and Commitments

4.1 Overview

This chapter sets out the Council's overall **Vision** for public EVI in West Lothian and an associated set of **Objectives**.

As required within the SEPT, the chapter also discusses how the Strategy aligns with and will help meet the Outcomes and Priorities identified within the Scottish Government's *Draft Vision for Scotland's Public Electric Vehicle Charging Network (DVEVI)*[48].

The chapter draws on data from the **Public Survey** undertaken to inform the development of this Plan, including information on satisfaction with current EVI provision and priorities for improvement.

4.2 Our Vision and Objectives

The **Vision** for the public EV charging network in West Lothian is:

All people living in and visiting West Lothian have access to a comprehensive and reliable network of public EV chargers which are accessible and easy to use, provide convenient and affordable access for all, and support active and sustainable travel choices.

Two Strategy Objectives have been set to help support this Vision as follows:

- **Objective 1:** 10% of parking spaces in key West Lothian Council owned car parks will be EV by 2026
- **Objective 2:** Over 50% of households with no off-road car parking in West Lothian will be within a reasonable walk[49] of a charging site by 2026.

These objectives have been set, based upon:

- the current utilisation of the existing EV charging network in West Lothian
- forecast levels of EV charging demand in the local authority area over the lifetime of this plan
- a need to deliver EV charging infrastructure to support the transition to EVs and help meet net zero emission targets and associated policy goals
- a recognition of the continued need to, in some areas, provide infrastructure in advance of demand in order to both encourage uptake (to meet the above targets) and deliver equitable access to EVs.

Objective 2 focuses on providing EV charging provision within '*a reasonable walk'* of people's homes. This is considered to be a more stringent measure than drive time and has been adopted so as to provide '*as convenient access to the EV network as possible'* (for those without access to off-road parking. Where households in this category do not fall within a reasonable walk distance, it is anticipated that delivery of this objective, would mean that they would be within a '*reasonable drive'* of a charge point location.

Progress against the objectives and uptake of EVs in West Lothian will be monitored during the delivery of this Plan and updated objectives produced as and when required. It is considered to be particularly important to build in time for regular reviews, given the uncertainty around EV demand forecasting figures.

The sections below summarise how the Vision and Objectives align with, and will help meet, the Outcomes and Priorities identified within the Scottish Government's DVEVI. In keeping with the SEPT, the narrative is structured around the following outcomes and priorities:

- A well-designed, comprehensive, and people-focused network
- An accessible and reliable public network of charge points that works for everyone
- Supporting the principle of a 'Just Transition'

[48] https://www.transport.gov.scot/media/51271/a-network-fit-for-the-future-draft-vision-for-scotland-s-public-electric-vehicle-charging-network-revised-march-2022.pdf

[49] Assumed to be between 200-400m crow flies distance.

- Attracts private sector investment
- Supports active and public transport choices

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

In order to encourage EV uptake and use, it is vital that the charging network is designed with EV-users in mind and that EV drivers can quickly and easily find and access charge points, particularly if they have no charging facility at home.

In the Public Survey undertaken to inform this Plan, a number of issues with the current public charging network were identified. These included:

- A lack of authoritative information on charge point location and use
- Difficulties using and paying for EV charge points
- Poor reliability

Each of these is discussed further below.

A lack of authoritative information on charge point location and use

While there are various resources available showing the location of existing chargers, there is no authoritative dataset covering EVI and use. Currently, ChargePlace Scotland's live map[50] provides details about the location, type, and availability of each device. However, the map only covers the ChargePlace Scotland charge points. The website ZapMap[51] includes real-time information and covers both ChargePlace Scotland devices and devices operated by other CPOs. However, the site is not exhaustive, and chargers are frequently listed as 'status unknown'.

The limited nature of real-time information was identified as an issue within the public survey undertaken to inform this Plan. In total, **57% of EV-users responding to the survey stated that they were dissatisfied with real-time information showing charge point availability and / or status, with over 40% of these stating that they were very dissatisfied.**

A high proportion of EV-users also identified 'charge points being in use when they want to charge' as a key issue, with **38% stating that charge points were always or nearly always occupied at the time they wanted to charge and a further 44% stating that this happened most of the time.** Furthermore, **67% of non-EV users who responded to the survey cited 'EV chargers being available but always in use' as a major factor in their decision not to have an EV**. This was preceded only by 'the cost of vehicle purchase' and 'range anxiety' as the most commonly cited reason for not owning an EV.

Difficulties using and paying for EV charge points

Access arrangements to the EV charge point network in West Lothian can be complex, involving various apps and multiple smartcards. While it is possible to pay by contactless debit or credit card at some charge points, all of the ChargePlace Scotland charge points and many of the older charge points do not have this functionality. While some companies have introduced RFID (Radio Frequency Identification)[52] cards to make payment easier, in many cases a

[50] https://chargeplacescotland.org/
[51] https://www.zap-map.com/live/

[52] Radio Frequency Identify Card – RFID cards allow you to initiate a charge by tapping the card against a card reader at the charge point. It may be necessary to download an app,or have a pre-registered RFID card. In many cases, you'll need a different app, website or RFID card for each different charge point network.

different RFID card and associated app or website is required for each different provider.

In the public survey, **23% of EV-users were dissatisfied with the ease of use, and 34% were dissatisfied with the consistency in design, of EV charge points.** In addition, several of the open text responses referenced issues with the ease of payments on the current network, including comments on the need to use an RFID card / set up separate accounts and the lack of ability to pay by card.

Poor reliability

For users to have confidence in the public charging network, it is important that charge points are reliable, and that EV-users can access a helpdesk or relevant support when issues arise.

In total, **61% of EV-users responding to the Public Survey indicated that they were dissatisfied with the reliability of EV charge points and over 75% stated that 'greater reliability of charging infrastructure' would result in a major improvement in their experience of owning an EV.**

Amongst non-EV users, 62% cited 'EV chargers being unreliable / often not working' as a major factor in their decision not to have an EV and 59% stated that '*greater reliability of the charging infrastructure'* would make them significantly more likely to purchase an EV.

In March 2022, the UK Department for Transport published '*Taking charge: the electric vehicle infrastructure strategy*[53]*'* which set out a vision and action plan for EV charging within the UK and included several commitments, including:

- making charging data available to all parties that need it to plan and deliver charge point infrastructure
- bringing in new legislation to improve people's experience when using public charge points, including working with industry to open data so that drivers can: access real time information about charge points; rely on the public network; and compare prices and can pay for their charging easily
- mandating reliability standards to ensure consumers have confidence wherever they travel in the UK

In March 2023, the DfT and the Office for Zero Emission Vehicles (OZEV) set out a range of policies aimed at improving the consumer experience of locating and using charge points. These include mandating the following:

- **Open data** – a data standard for all charge points with all open and some dynamic data made available to consumers as standard
- **Minimum payment** – a minimum payment method which is not brand specific at all new charge points (8kW and over) and retrofitting existing (50kW and over) which are not brand specific
- **Pricing transparency** – enabling consumers to understand and compare prices, including through the provision of a pence per kWh at all public charge points
- **Payment roaming** –industry-led roaming to provide a common method of access to public charge points
- **Reliability** – a 99% reliable charging requirement across all rapid charge points

Key commitments:

In line with the emerging standards and regulations, the Council will:

- Seek to ensure data on EV charge point use is made available more widely to help inform the future development of the public EV charging network in West Lothian and improve the overall customer experience.
- Work with the private sector and wider partners to enhance access to real-time information, make tariffs more transparent, streamline the payment process, and improve reliability standards.

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

Overall, **25% of EV-users in West Lothian who responded to the survey undertaken to inform this Plan stated that they were dissatisfied with the accessibility of existing charge points in West Lothian**. Furthermore, this

[53] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1065576/taking-charge-the-electric-vehicle-infrastructure-strategy.pdf

figure was considerably higher (rising to 67%) amongst certain older age groups who are more likely to experience disability and/or mobility issues.

As set out in Chapter 2, the population of West Lothian is aging and therefore the need for accessible infrastructure will increase over the lifetime of this Strategy and beyond. According to the British Standards Institute (BSI), disabled and older users can face a range of difficulties when using EV charge points, including charging units being at an unsuitable height, charging cables being too heavy to lift, connectors which require a high level of force to use, and more general issues with the wider streetscape such as parking bays being too small and issues with kerb height[54].

With the aim of providing an inclusive experience for people with accessibility needs, in October 2022, the BSI introduced an **EV Accessible Charging Specification (PAS 1899:2022**[55]). This sets out how to design accessible charge points and covers[56]:

- the physical aspects of the environment surrounding fixed charge points (e.g., kerb height, ground type)
- the location, placement and spacing of charge points within the streetscape / public realm
- the information, signals and indicators to be provided to users
- the factors to be taken into account in the design and specification of accessible charge points (e.g., height of charge point, cables and cable management systems, bollard spacing, colours used on screens, weight and force and ease of use of the equipment)

Key commitments:

The Council will:

- Adopt the EV Accessible Charging Specification (PAS 1899:2022) for all new EV charge points delivered via this Plan.
- Explore the potential of using PAS 1899:2022 to review the accessibility of the existing West Lothian Council charge points and provide upgrades where possible.

4.5 Supporting the principle of a 'Just Transition'

The Scottish Government define a 'Just Transition' as:

"Both the outcome - a fairer, greener future for all, and the process - how we get to a net zero and climate resilient economy, in a way that delivers fairness and tackles inequality and injustice"[57]

It is evident that the uptake of EVs has been unequal across different sections of society, with generally lower rates of uptake amongst those with lower incomes and those living in more deprived areas. This is partly a result of the high upfront cost of EVs relative to petrol or diesel vehicles. However, there are also other barriers to uptake, including a lack of off-street parking (with associated implications in terms of both the convenience and cost of EV charging) and a general lack of public chargers in areas where traffic flows (and therefore the likely rates of return for commercial CPOs) are lower.

In keeping with wider trends, the results of the public survey undertaken to inform this Plan indicate that EV uptake in West Lothian is currently lower amongst those without off-street parking. Overall, **85% of EV-users who responded to the survey had off-street parking compared to just 64% of non-EV users**. In addition, **amongst the non-EV users without off-street parking, the lack of off-street parking was a bigger barrier to uptake than either the upfront cost of EVs or battery range concerns**, highlighting the significance of this issue amongst this group.

Those who are unable to charge their EV at home are solely reliant on the public charging network. As well as making EV charging more inconvenient, this also adds to costs. Currently, VAT on public EV charging is 20% compared to just 5% on domestic electricity[58]. According to the campaign group FairCharge, this means EV drivers without access to off-street parking have to pay as much as £227 more per year to charge their vehicle based on the additional VAT amounts alone[59].

54 https://www.bsigroup.com/en-GB/about-bsi/media-centre/press-releases/2022/october/accessible-electric-vehicle-charging-standard-to-ensure-accessibility-for-all/

55 A Publicly Available Specification (PAS) is a fast-tracked standardisation document which defines good practice for a produce, service or process. PASs are often produced in response to an urgent market need and according to the BSI around 30% of PASs which BSI have published have gone forward to form the basis of an international standard. See What is a PAS? (Publicly Available Specification) | BSI (bsigroup.com)

56 https://www.bsigroup.com/en-GB/standards/pas-1899/

57 Just Transition: A Fairer, Greener Scotland, https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2021/09/transition-fairer-greener-scotland/documents/transition-fairer-greener-scotland/transition-fairer-greener-scotland/govscot%3Adocument/transition-fairer-greener-scotland.pdf

58 https://www.motoringresearch.com/car-news/government-urged-tax-ev-charging/

59 This analysis was based on average public charging pricing data supplied by ZapMap for August 2022. See https://www.thisismoney.co.uk/money/electriccars/article-11300023/A-227-pavement-tax-electric-car-drivers-without-street-parking-thanks-VAT.html

Several projects have explored implementing lower cost tariffs on the public network including 'agile' tariffs where the cost changes at different times of the day and flexible pricing which enable users to reduce the carbon intensity of their charging.

In order to encourage EV uptake and ensure all communities in West Lothian can benefit from the switch to EVs, it is important that EV charge point infrastructure and access to a fair tariff structure is provided for those without access to off-street private parking.

Key commitments:

The Council will:

- Seek to provide an appropriate level of public EVI in locations where there are a high number of households without access to off-street parking and where the commercial rate of return on investment may be lower.
- Explore, in partnership with the private sector, the potential of implementing innovative tariffs structures, including off-peak / agile and flexible tariffs as well as the potential of discounted tariffs for targeted groups such as those residents without off-street parking and / or those on low incomes.

4.6 Attracts private sector investment

As more and more people in West Lothian purchase EVs, including a higher proportion of those without private off-street parking, there will be a need to rapidly increase the number of EV charge points across West Lothian. To support this growth, the Council will seek to leverage private sector investment to boost the provision of public EV charge points and help meet the increasing levels of demand across our communities.

To help incentivise private sector investment, **we have already introduced tariffs across our WLC charging network**. We will continue to monitor use of WLC charge points, as well as wider guidance on tariff structures, and implement changes to tariffs where appropriate. To maximise investment from the private sector, we will also explore the potential of:

- Making WLC owned land available to CPOs to provide appropriate charging infrastructure
- Bundling of low and high utilisation sites in order to ensure EV charging is provided in areas where the commercial case for investment is limited
- Including our existing WLC ChargePlace Scotland charge points within the package(s) of sites - this is aimed at both incentivising investment and ensuring a level of consistency in terms of the operational and tariff regime across the WLC network
- Using grants and other funding to invest in electricity grid upgrades at preferred locations where required
- Aggregating and assessing changes in demand over time
- Consideration of partnering arrangements with private sector businesses

In developing this Plan, we have already identified a range of potential locations for EV charging infrastructure which are centred on WLC land and considered the potential levels of demand at each of these sites with a view to packaging-up options.

As we implement the Plan, we will continue to explore options which aim to increase the utilisation of EV charge points and therefore the commercial case for investment. This could include working with public sector partners (such as the NHS) and private sector organisations as well as exploring the potential for fleet vehicles and the use of existing assets.

Key commitment:

The Council will:

- Seek to maximise private sector investment in the public EV charging network and work with the private sector to ensure EV charge points are distributed in a fair, equitable and just way, so that all communities in West Lothian can benefit from the transition to EVs.

4.7 Supporting active and public transport choices

Scotland's **National Transport Strategy 2** (NTS2) seeks to achieve higher levels of active travel (walking, wheeling, and cycling) and public transport use while simultaneously reducing overall reliance on the private car.

NTS2 establishes two 'hierarchies' which define how future transport investment decision making and services should be planned. The Sustainable Travel Hierarchy defines the priority which will be given to each mode of transport in future investment planning, with walking and wheeling identified as the highest priority and single occupancy car travel the lowest priority. This is complemented

by the Sustainable Investment Hierarchy which establishes a structured set of steps to be followed when planning investment in transport infrastructure (see figure below).

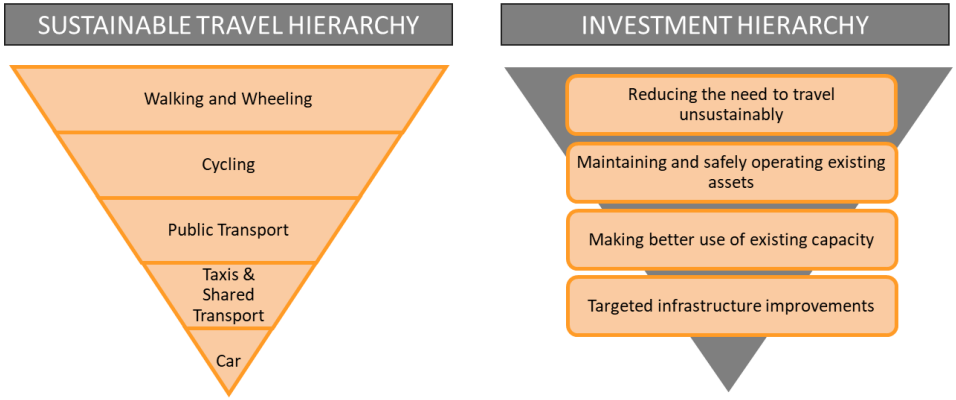


Figure 4:1: NTS2 Sustainable Travel Hierarchy and Investment Hierarchy (Source: NTS2)

Beyond NTS2, the Scottish Government has also committed to **reducing annual car kilometres by 20% by 2030**.

While active travel and public transport should be prioritised, there is also a recognition that cars will still be required for some people / journeys. In delivering EV infrastructure, there is therefore a balance to be struck between supporting those for whom private vehicles are essential and encouraging others to move up the sustainable transport hierarchy.

In developing this Plan, we have already identified a range of potential sites for EVI, including a number of travel interchanges. At these locations, there is potential for EV use to be combined with public and active travel modes as part of a longer distance journey, thereby supporting active and public transport choices. If travel between modes is made simpler, it is more likely that people will switch more readily between them, particularly if journey time savings are derived.

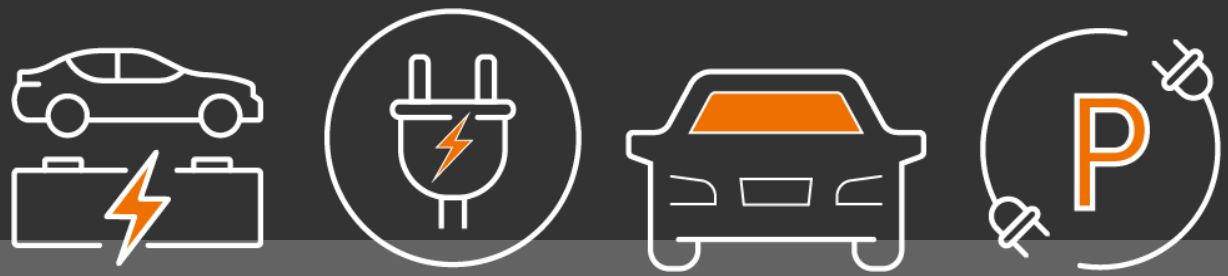
In line with the SEStran Regional Transport Strategy and the SEStran Mobility Hubs Strategic Study, there may also be potential to 'upgrade' some of these locations to form mobility hubs, defined by SEStran as *"a recognisable and easily accessible place which integrates different transport modes and supplements them with enhanced facilities, services and information aimed at encouraging more sustainable travel, creating a sense of place and improving journeys and travel choices".*

In delivering this Plan, we will continue to explore these options and other potential mechanisms to support active and sustainable travel choices, such as discounted charging tariffs at public transport interchanges and mobility hubs like the above.

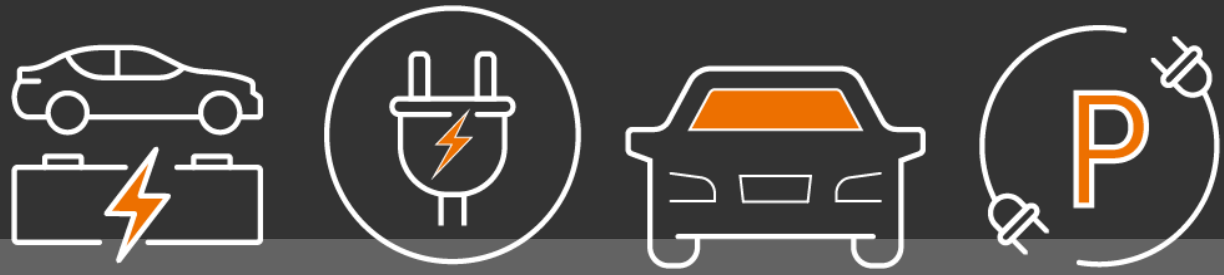
Key commitments:

In line with wider policy and our climate change commitments, the Council will consider the wider active and sustainable transport network when providing EVI to support active and public transport and promote this as people's first travel choice, wherever possible.

PART 2: Public EV Infrastructure Expansion Plan



5: The Economic Case



5. The Economic Case

5.1 Forecasting demand

In order to specify the level of EVI required to meet demand, it is necessary to estimate the number of BEV and PHEVs in West Lothian, over the period of the Plan. There are a wide range of adoption curves predicting how the EV market will develop over the coming years. For the purpose of this Plan, three sets of forecasts were considered[60]:

- **Decarbonising the Scottish Transport Sector** (DSTS), September 2021, Element Energy for Transport Scotland
- **SP Distribution Future Energy Scenarios**, December 2020, SPEN
- **Future Energy Scenarios**, July 2022, National Grid (NG) ESO

Table 5:1 summarises the extent to which each forecast covered the required fuel types, vehicle types, and geographic scale covered in this Plan.

Table 5:1: Coverage of fuel type, vehicle type, and geographic scale across the forecasts considered

Coverage		Decarbonising the Scottish Transport Sector	SP Distribution Future Energy Scenarios	National Grid Future Energy Scenarios
Fuel type	**BEV**	✓	✓	✓
	PHEV	✓		✓
Vehicle type	**Car**	✓		✓
	LGV	✓		✓
	Taxi			
	Residential[61]		✓	
	Total	✓	✓	
Scale	**West Lothian**		✓	
	Scotland wide only	✓		
	Great Britain only			✓

Battery Electric Vehicles

SPEN provided forecasts for the number of total BEVs and Residential BEVs in West Lothian from 2022 onwards. It was assumed that Residential BEVs were essentially referring to the combined number of cars and LGVs.

Similarly, NG ESO provided the estimated number of LGV, Car and Motorbike BEVs and PHEVs in West Lothian.

DSTS forecasts cover all of Scotland and so growth factors were calculated from these forecasts which were then applied to 2022 estimated BEV numbers for West Lothian (derived as set out in Section 2.2). For further information on the specific forecasts considered and what they mean, see Appendix E.

Figure 5.1 illustrates all forecasts on a single graphic. By 2030, the range in the expected number of EVs in West Lothian is as follows:

- SPEN forecasts range from approximately 14,000 to 50,000 BEVs
- NG forecasts range from approximately 19,000 to 44,000 BEVs
- DSTS PS3 anticipates approximately 52,000 BEVs.

[60] There is a lack of forecasts specifically covering taxis and the forecasts considered do not include this vehicle type. This project has therefore not produced specific forecasts for this vehicle type. It is likely that taxis may see a more rapid conversion from petrol / diesel engines to EVs, given the higher mileages involved and corresponding fuel tax savings which can be accrued. However, in 2021, only 69 taxis were registered in West Lothian (Scottish Transport Statistics 2022) and therefore they make up a relatively small part of the total vehicle population. Given the likely higher uptake rate for this vehicle type however, as well as the potential for commercial returns where a charge point is well used by taxis, provision of charging infrastructure for this group was considered during site selection.

[61] Vehicles which are predominantly charged at home (i.e. cars, LGVs and motorcycles)

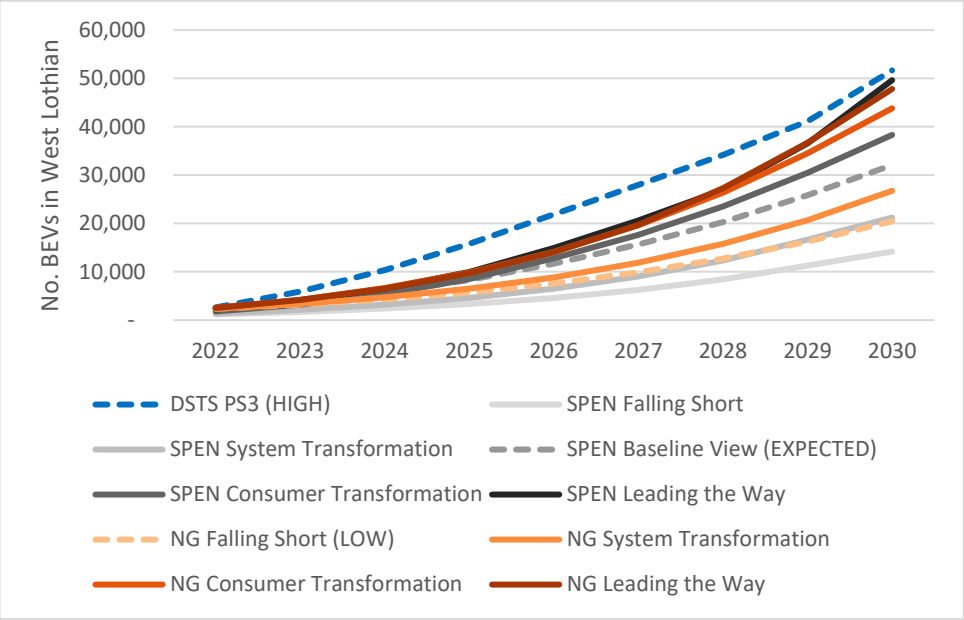


Figure 5:1: Comparison of BEV Forecasts

Three scenarios have been selected to illustrate the range of likely outcomes in terms of plug-in EV uptake in West Lothian:

- **High:** *DSTS (PS3)* has been selected as best reflecting the 'High' scenario and provides a benchmark for the scale of change to EVs needed to achieve the Scottish Government's climate change targets.
- **Expected:** the *SPEN Baseline View* scenario has been selected to reflect the most likely outcome. This scenario sits central to the range of forecasts considered while still falling within Net-Zero compliance and aligns with SPEN's single scenario for business planning purposes.
- **Low**: the *NG Falling Short* scenario has been selected to reflect the lower end of the range of likely outcomes. While the SPEN Falling Short scenario assumes the slowest transition to EVs, 2022 statistics indicate that progress to date has been more rapid than SPEN FS suggests, and so the NG Falling Short scenario has been adopted.

Table 5:2 sets out High, Expected and Low end-of-year BEV forecasts for West Lothian from 2022 through to 2030. As set out in Section 2.2, it is estimated that there were 2,086 BEVs in West Lothian in Q3 2022 (the date for which most recent data is available). The values in the table below reflect the number of BEVs expected at the end of the year, which were calculated by applying the noted High, Expected and Low forecasts to Q3 2022 estimates.

Table 5:2: High, Expected and Low end-of-year BEV forecasts for West Lothian from 2022 to 2030.

	No. BEVs		
Year	High	Expected	Low
2022	2,624	2,246	2,333
2023	5,939	3,664	3,177
2024	10,376	5,687	4,301
2025	15,811	8,329	5,745
2026	21,881	11,656	7,580
2027	27,993	15,630	9,874
2028	34,221	20,294	12,727
2029	41,159	25,826	16,221
2030	51,665	32,093	20,445

Plug-in Hybrid Electric Vehicles

The sale of new petrol and diesel cars will be banned from 2030, and the sale of new petrol and diesel PHEVs will be banned from 2035. As a result, the future demand profile for PHEVs is very different from BEVs, and PHEVs will be a diminishing part of the overall EV charging picture beyond 2035.

Of the three sets of forecasts considered, only DSTS directly provides forecasts of PHEVs. In order to generate PHEV forecasts for the other two scenarios, a PHEV to BEV ratio was derived from the DSTS data. This indicated that in 2022 there was approximately one PHEV for every two BEVs but this would reduce to one PHEV for every ten BEVs by 2030. Table 5:3 sets out the resulting forecasts.

As set out in Section 2.2., it is estimated that there were 983 PHEVs in West Lothian in Q3 2022 (the date for which most recent data is available). Again, the values in the table below reflect the number of PHEVs expected at the end of the year which were calculated by applying the noted High, Expected and Low forecasts to Q3 2022 estimates.

Table 5:3: High, Expected and Low end-of-year PHEV forecasts for West Lothian from 2022 to 2030.

Year	No. PHEVs		
	High	Expected	Low
2022	1,136	972	1,010
2023	1,602	988	857
2024	2,102	1,152	871
2025	2,614	1,377	950
2026	3,024	1,611	1,048
2027	3,435	1,918	1,212
2028	3,857	2,288	1,435
2029	4,276	2,683	1,685
2030	4,188	2,601	1,657

Plug-in Vehicles

Combining BEVs and PHEVs provides an overall estimate of plug-in vehicles (PiVs) in West Lothian, as detailed in Table 5:4.

Table 5:4: High, Expected and Low end-of-year Plug-in Vehicle (PiV) forecasts for West Lothian from 2022 to 2030.

Year	No. PiVs		
	High	Expected	Low
2022	3,759	3,218	3,342
2023	7,541	4,652	4,034
2024	12,478	6,839	5,172
2025	18,425	9,706	6,694
2026	24,905	13,267	8,628
2027	31,428	17,548	11,086
2028	38,078	22,582	14,161
2029	45,435	28,509	17,907
2030	55,853	34,694	22,103

5.2 Preferred charge point mix

As outlined above, the number of EVs in West Lothian is forecast to rise considerably over the lifetime of this Plan and there is a need for public charging infrastructure to progress in tandem to support this growth. With this in mind, this section provides a broad estimate of:

- the overall expansion of the public EV charging network required
- the expansion of the public EV charging network which will be provided by private CPOs
- the additional expansion required to meet demand and fulfil the Plan Vision and Objectives

Each of these is discussed in turn below.

Estimated expansion of the public EV charging network

This section considers how many charging points may be required in West Lothian. The Scottish Government does not have a specific target defined for EV charging infrastructure provision at present. However, the UK Government and EU have provided guidance. Each of these is discussed below.

Taking charge: the electric vehicle infrastructure strategy- United Kingdom

Taking charge: the electric vehicle infrastructure strategy (HM Government, 2022)[62] estimates that between 300,000 and 700,000 EV charging points will be required in the UK by 2030. If these charging points are apportioned to local authorities based on current population, then between 800 and 1,900 EV charging points would be needed in West Lothian by 2030.

Alternative Fuel Infrastructure Regulation – European Union

Whilst the UK has formally left the EU, Scottish Ministers have stated that it is in Scotland's national interests to align with the EU's approach to legislation and policy.

62 Taking charge: the electric vehicle infrastructure strategy (publishing.service.gov.uk)

With respect to EVI, the European Union (EU) introduced the Alternative Fuel Infrastructure Directive 2014 which required member states to provide a basic level of EV charging infrastructure by 2020, sufficient to allow electric vehicles to operate in densely populated areas. This directive indicated that '*the appropriate average number of recharging points should be equivalent to at least one recharging point per 10 cars*'[63]. For context, there were estimated to be approximately 3,200 BEVs and PHEVs (cars and LGVs) in West Lothian in January 2023 and 156 charging points, and so the level of provision at that time was approximately one charger per 20 EVs and therefore half of the number of charge points expected.

EU Guidance has evolved since this point and the European Commission proposes to repeal the Alternative Fuel Infrastructure Directive 2014, replacing and strengthening it with an Alternative Fuel Infrastructure Regulation. The 2022 draft of this legislation sets out mandatory targets for the provision of publicly available charging infrastructure for light vehicles (cars and LGVs). '*For every battery electric light duty vehicle, a total power output of at least 1 kW should be provided* through publicly accessible recharging stations (a recharging station is defined as single physical installation at a specific location, consisting of one or more recharging points) and for *every plug-in hybrid light-duty vehicle, a total power output of at least 0.66 kW should be provided* through publicly accessible recharging stations'[64]. The regulation also sets out requirements for provision of charging stations at defined intervals on busy / strategic roads like the M8 and M9.

Table 5:5 sets out the levels of light EV charging capacity which would be required under the High, Expected and Low EV forecasts set out earlier in this report if West Lothian was to provide for a similar level of charging capacity as required by this draft regulation.

Table 5:5:Total charging capacity (kW) required

Year	High	Expected	Low
2023	6,997	4,316	3,743
2024	11,764	6,447	4,876
2025	17,536	9,238	6,372
2026	23,877	12,719	8,272

The existing chargers located in West Lothian currently provide an estimated total charging capacity of **4,389kW**[65]. Table 5:6 therefore sets out the additional charging capacity which would be required once this existing provision is taken into account. As shown, by this measure West Lothian is currently on track but will have to increase light EV charging capacity by between 90% and 440% by the end of 2026.

Table 5:6: Additional charging capacity (kW) required beyond current provision

Year	High	Expected	Low
2023	2,608	0	0
2024	7,375	2,058	487
2025	13,147	4,849	1,983
2026	19,488	8,330	3,883

Estimated expansion of the public network by private operators

Given the forecast growth of the EV market and the increased potential of commercial returns, it is expected that private CPOs will command a greater share of provision over the coming years. Indeed, encouraging the growth of this sector and attracting greater private sector investment is a key aim of this Plan. However, the extent to which this will occur is difficult to predict.

To inform this strategy, engagement with a number of private CPOs was undertaken with the aim of understanding the extent to which private operators are exploring EVI expansion in West Lothian. However, while keen to work with and discuss opportunities with WLC, given the commercial realities and sensitivities, the private CPOs were hesitant about providing detailed information about their long-term aspirations in the area.

The website PlugShare[66] includes information on chargers which are 'coming soon'. A review of this highlights four new charge point sites as set out in Table 5:7. Three of the sites are on-route sites at service stations and one is based at the shopping centre in Livingston. At each site, each device will have two connecters: a 50kW and a 150kW, providing a total charging capacity across all sites of 5,800kW.

[63] DIRECTIVE 2014/94/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL - of 22 October 2014 - on the deployment of alternative fuels infrastructure - (europa.eu)
[64] https://www.europarl.europa.eu/legislative-train/theme-a-european-green-deal/file-revision-of-the-directive-on-deployment-of-alternative-fuels-infrastructure

[65] This figure does not include the ZapMap Home sites given their more temporary status

Table 5:7: Charge point sites identified as 'coming soon'[67]

Site	Location	Type	Number of devices	Speed (kW)
The Centre Livingston, Almondvale Road	Livingston	Shopping destination	7	150[68]
BP Carmondean, Carmondean Centre Road	Livingston	Service station	6	150
MFG BP Royston, Royston Service Station	Livingston	Service station	8	150
MFG Jet Glendevon, Glendevon Service Station	Winchburgh	Service station	8	150
Total			58	

Table 5:8 sets out the current split of charging capacity between public and private operators and the split once the above additional charge points are included. As shown, private operators currently account for approximately 40% of total capacity and with the additional 'coming soon' sites, this increases to 75%. However, it is unclear as to the source and veracity of the information on the PlugShare website and there is no information as to when these additional chargers are likely to come onstream.

Table 5:8: Current charging capacity split by private and public operator share

	Public operators	Private operators	Total
Existing charging capacity[69]	2,592 (59%)	1,797 (41%)	4,389 (100%)
Additional 'coming soon' capacity	0	5,800	5,800
Total	2,592 (25%)	7,679 (75%)	10,293 (100%)

Given this level of uncertainty, it has been assumed that private operators will provide 58% of overall capacity over the lifetime of this strategy (i.e., the mid-point between 41% and 75%).

Under this assumption, Table 5:9 sets out the additional charging capacity (beyond the current level of provision) which may be expected to be supplied by the private sector under the High, Expected and Low EV forecasts set out earlier in this report if West Lothian was to provide for a similar level of charging capacity as required by the EUs 2022 draft Alternative Fuel Infrastructure Regulation.

Table 5:9: Estimated additional charging capacity (kW) which may be provided by the private sector (58% of requirement)

Year	High	Expected	Low
2023	1,506	-	-
2024	4,259	1,189	281
2025	7,593	2,800	1,145
2026	11,255	4,811	2,243

Estimated additional expansion of the public network

Given the above, Table 5:10 sets out the additional expansion in EV charging capacity which would be required under the High, Expected and Low EV forecasts set out earlier in this report if West Lothian was to provide for a similar level of charging capacity as required by the EUs 2022 draft Alternative Fuel Infrastructure Regulation.

Table 5:10: Estimated additional charging capacity (kW) required (42% of requirement)

Year	High	Expected	Low
2023	1,102	0	0
2024	3,116	869	206
2025	5,554	2,049	838
2026	8,233	3,519	1,640

[69] This figure does not include the ZapMap Home sites given their more temporary status

Approach to identify charge point mix

A range of factors has been taken into account in determining the charge point mix. As discussed in Section 2.3, this Strategy is focused towards provision in **residential areas and in public sector destinations.** The typical power and speed categories provided at these types of locations is set out in Table 2:5 and can be summarised as follows:

- sites located in residential areas some distance from destinations such as shopping, leisure facilities and service centres would more likely be used for overnight charging and therefore a 7kW charger would typically be sufficient.

- sites located in close proximity to shops and other service and leisure centres may be more typically used for shorter time periods while EV drivers use these facilities and therefore 22kW or, in areas with higher demand such as town centre hubs, 50kW chargers would typically be appropriate.

Having identified a list of proposed sites and identified the potential demand and capacity at each site based on the metrics listed in Section 5.3, it was then necessary to assign an appropriate number of EV chargers and set out a proposed charge point mix at each location.

To help inform this, each location was reviewed and categorised into one of the following broad types:

- Residential – sites located in residential areas for which the primary function would likely be an overnight charge

- Destination – sites located near to facilities / amenities which people will visit to do something (e.g., shops or community buildings)

- Mix – sites which encompass a mix of the above

A maximum number of EV spaces / devices at each location was then determined based on the number of households without access to off-road parking within a reasonable walk catchment of the site, the overall car park capacity, and a broad indication of the grid capacity drawn from available SPEN sources.

Based around the above typical power and speed categories provided, the overall number of EV devices at each location were then allocated to the power categories in the approximate proportions set out in Table 5:11.

Table 5:11: Summary of key metrics as requested in the EV Charging Strategy and Expansion Plan Template

	7kW	22kW	50kW
Residential	80%	20%	0%
Destination	0%	95%	5%
Mix	40%	55%	5%

A review of the outputs for each site was then undertaken and adjustments made where necessary, based on local knowledge. The location of the proposed sites are shown in Figure 5:2 and Figure 5:3 and a full list of the sites and the potential charge point mix at each location is included in Appendix F.

While the above approach focuses on residential and destination charging in public sector locations, it is recognised that, given the motorway and trunk road connections which run through West Lothian, and the local authority's location in the heart of the Central Belt, there will likely be sufficient demand for higher powered charging points in some key locations to satisfy strategic movements. However, the analysis undertaken to inform the development of this version of the plan did not identify any sites which were in close proximity to access routes onto the strategic road network which are under council ownership and therefore specific provision for chargers above 50kW has not been included in Appendix F. However, should such sites be identified during the delivery of this Plan, the Council would be amenable to leasing such locations to the private sector. The potential of this will continue to be explored during the delivery of this Plan and as EV uptake in West Lothian increases.

It is noted that this approach provides a broad indication of the overall level of potential provision which could be provided in West Lothian. However, t he individual sites and the charge point mix at each will be subject to further analysis as this Plan is delivered, including further engagement with SPEN as set out in Section 5.3 and onsite investigations to consider e.g., ground surface, lighting and security, accessibility standards etc. For some locations, there will also be a need to engage with users.

It is likely that some sites will be capable of being delivered more quickly than other locations, with Council owned car parks more likely to be deliverable than locations that are more constrained e.g., grid capacity issues, or access / land ownership difficulties likely to slow down the delivery.

Summary

As requested in the SEPT, the table below provides a summary of each of the above metrics. Figures are provided for the period up to 2026 only.

Table 5:12: Summary of key metrics as requested in the EV Charging Strategy and Expansion Plan Template

	High	Expected	Low
1. Estimated current installed public EV charging network - all networks (kW)		4,389[70]	
2. Estimated expansion of the public EV charging network - all networks (kW)	19,488	8,330	3,883
3. Estimated expansion of the public network by private operators outwith the programme (kW)	11,255	4,811	2,243
4. Estimated additional expansion of the public network considered necessary to meet forecast demand and Plan Vision (kW)	8,233	3,519	1,640

5.3 Site identification and grid connection

Approach to site identification

A range of potential charge point sites have been identified, providing West Lothian with a flexible range of opportunities to meet the forecast levels of demand.

The initial identification of potential sites focused on assets / areas of land known to be in council ownership. This included existing council owned car parks and existing community assets under council ownership, such as leisure centres, community centres, partnership centres, education centres, and schools. Consideration was also given to sites under ownership of other public bodies given the potential for West Lothian Council to partner with other public agencies and deploy charging infrastructure over a wider range of locations. Private land was avoided given the likely difficulties in securing agreements from all / any relevant parties.

Once a long-list of potential sites was identified, a project team workshop was held during which the long-list was refined into a shorter list of potential options and a high-level appraisal of the shorter list was undertaken. This was informed by desk-based analysis of secondary data; GIS mapping; and the outcomes of the engagement undertaken to inform this Plan. Key metrics considered included:

- Potential demand:
    - Proximity to residential areas identified as having limited off-road parking

[70] This figure does not include the ZapMap Home sites given their more temporary status

- Proximity to public amenities such as shopping centres, GP surgeries, and health centres
- Proximity to tourist attractions, particularly those with a particularly seasonal demand profile (which may therefore not attract private sector investment independently)
- Proximity to existing charge point locations – this included a review of charge point mix and utilisation at these locations
- Potential footfall – based around a combination of the above

- Potential capacity
  - Proximity of electricity grid supply points and substations and the extent to which it may be possible to connect additional Distributed Generation to the network
  - Parking capacity – this drew on available council data on car park spaces at each site (where available) and desk-based research

- Feasibility
  - Ease of access, including whether the site is gated or has restricted access during certain hours

Several of the proposed locations are in areas where there is potential for fleet use / staff use, as well as use by the general public. This is considered to be beneficial as it has the potential to increase utilisation and therefore the commercial case for investment.

WLC is progressing with plans to decarbonise its own vehicle fleet. While the WLC fleet is small relative to the number of vehicles in the local authority area, there will be a need for them to use the public charging network which will lead to an increase in utilisation and add to the viability of the delivery model in some locations. WLC will explore this further during the delivery of this Plan.

It is envisaged that fleet users would be subject to the same rules around access as the general public. However, the approach to shared access will be considered on a site-by-site basis and appropriate management interventions put in place, as required.

To help understand the extent to which a proposed site would be accessible to those living in homes without access to off-road parking, a spatial analysis of the data produced by Field Dynamics was undertaken in GIS. For each proposed charge point site, the number of houses without access to off-street parking within a reasonable walk catchment[71] of the site was calculated and sites which captured a higher proportion of homes in this category were identified and awarded higher scores.

[71] 400m crow flies distance.

provides a summary of the overall proportion of homes without access to off-street parking who would be within a reasonable walk catchment of an EV charge point if all of the proposed sites were delivered and Figure 5:2 and Figure 5:3 show the distribution of houses without access to off-street parking and the location of the existing and proposed charge point sites and their associated walk catchments. It is noted that while this analysis does not take into account the charge point mix or capacity at each site, it does provide a broad indication of overall network coverage at the strategic level. As set out in Section 4.2, progress of this Plan will be monitored during its delivery and it is anticipated that the above analysis could be repeated and refined as part of this process and during any subsequent updates to the objectives and / or Plan more generally.

In addition to considering the new charge point site locations, the site identification process also considered the potential of providing additional chargers at existing WLC EV charge point sites. To help inform this, an analysis of ChargePlace Scotland charge point utilisation data was undertaken (see Section 3.2) as well as a review of car park space capacity and engagement with WLC officers. Through this process several existing sites were identified as having the potential to accommodate further EV charge points. These sites are labelled as 'existing' as opposed to proposed sites within Appendix F.

Table 5:13: Approximate proportion of households by type within a reasonable walk[72] of existing and proposed charge point sites

	No off-street parking spaces	One or more off-street parking space	All households
Estimated number of households in West Lothian	22,494	59,270	81,764
Approx % households within a reasonable walk of existing charge point site	23%	17%	18%
Approx % households within a reasonable walk of proposed charge point site who are not within a reasonable walk of existing charge point sites	44%	36%	38%
Approx % of households within a reasonable walk of existing and proposed charge point sites	67%	52%	56%

[72] 400m crow flies distance

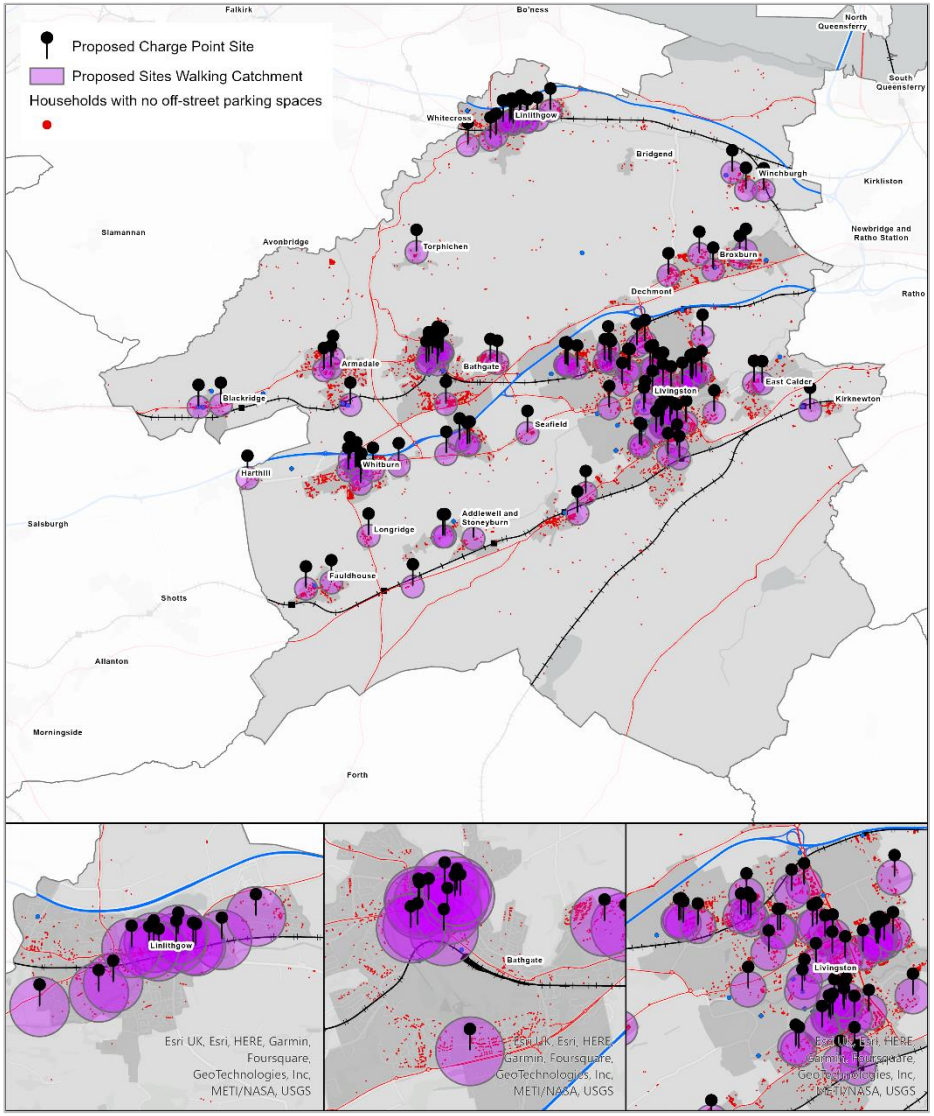


Figure 5:2: Location of proposed charge point sites and associated walk catchments

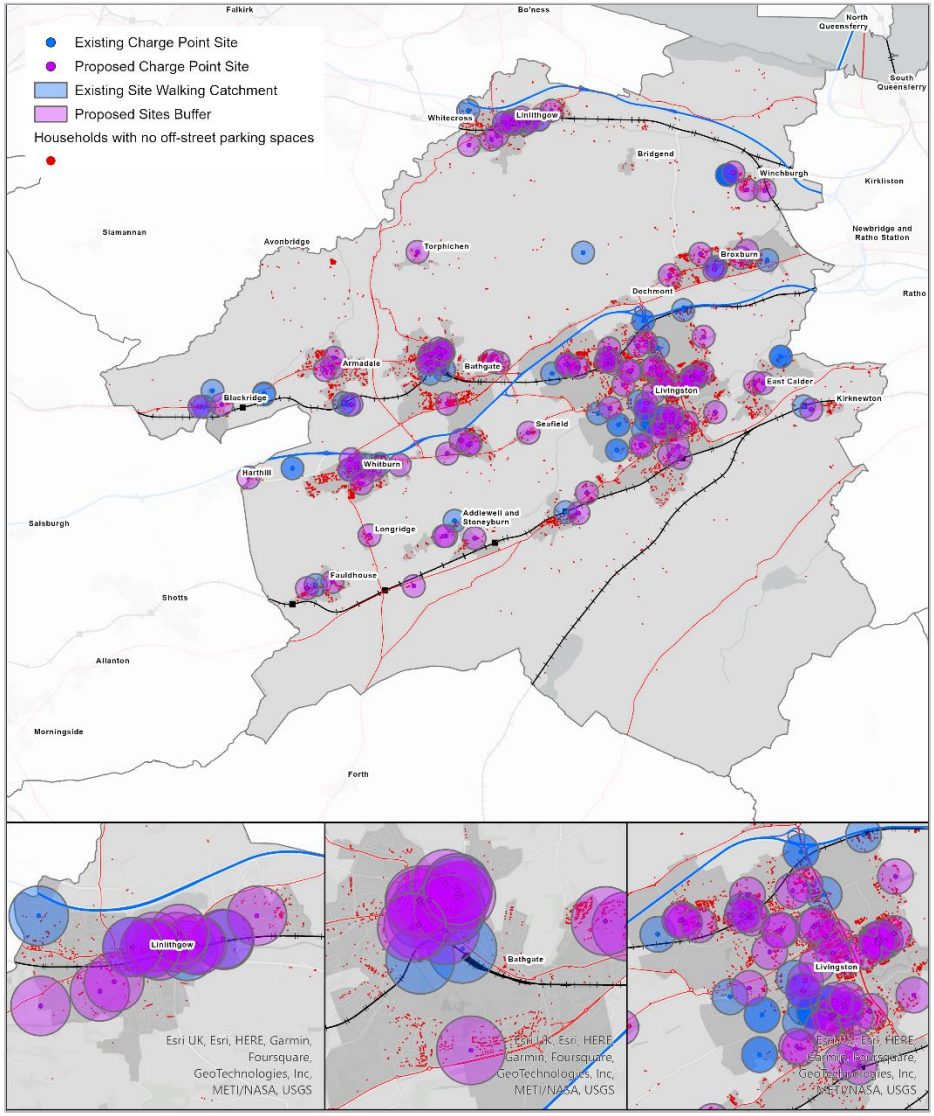


Figure 5:3: Location of existing and proposed charge point sites and associated walk catchments

Approach taken to understand impact on the grid / how grid capacity has been assessed in determining preferred charge point mix

Given the potential impact on the electricity grid and the need for sufficient capacity to provide EVI, consideration of the engagement with SPEN formed an important part of the site identification process and subsequent decisions regarding charge point mix. The discussion below provides a summary of the approach taken in this respect.

At the outset of the site identification process, an initial review of the proposed sites against SPEN's heat maps[73] was undertaken. The heat maps show the location of substations and grid supply points and provide a high-level indication of the extent to which it may be possible to connect additional Distributed Generation to the network. Following this initial review, an individual meeting with SPEN was held to discuss the site identification process, preferred charge mix, and the network implications of the proposed approach. Initial feedback from SPEN suggested that:

- there are no primary substation issues in West Lothian
- as such, if there was an issue in terms of capacity, it would more likely be an issue at grid level
- for smaller projects (≤ 50kW) there is normally sufficient capacity.

It was also noted that SPEN is developing several additional public facing tools which could be used to inform the EV charge point site identification and development process, but that these are not currently available. Further information on these is provided in Appendix B. Following this meeting, an initial-long list of site options was provided to SPEN for initial feedback.

In determining the potential charge point mix at each site, SPEN's available resources were again reviewed to provide a high-level indication of available capacity and the total kW proposed provision was reduced in areas where maps suggested lower levels of capacity. In addition, sites for which the overall proposed kW provision is above 50kW (and therefore above SPEN's figure for which there is normally sufficient capacity) have been identified and noted for further review and engagement.

WLC will continue the ongoing dialogue with SPEN and will undertake a further review of the proposed charge point sites (including those for which the proposed provision is above 50kW) using the tools which SPEN is currently developing once they are made available.

Without the feedback from SPEN (even high-level) it would not be appropriate to comment on likely costs at this stage. Given that SPEN is committed to develop a process for evaluating impacts it would not be practical to estimate future costs until any limitations are known.

Electricity costs will be further investigated during the development of the Outline Business Case (OBC) and will be informed by engagement with SPEN. Any suggested changes to cost estimates will then be incorporated prior to procurement. It is envisaged that the eventual CPO would progress with a more formal Optioneering Exercise in partnership with SPEN prior to any capital works.

In future contracts, where sites are constrained due to grid capacity issues, WLC will also seek to explore alternative renewable energy generation sources as a means to enable the site for EV provision.

5.4 Capital investment pipeline and estimated costs

At present, WLC is responsible for 32 existing EV charging devices across West Lothian as detailed in Table 3.1 and Appendix D, and this Plan identifies further locations for an additional 294 charging devices (see Appendix F) which could potentially be delivered over the lifetime of this plan (by 31st March 2026 - Year 4)"

The anticipated costs to deliver this EV Infrastructure Plan and the spend profile are set out in Table 5:14.

[73] https://www.spenergynetworks.co.uk/pages/sp_distribution_heat_maps.aspx

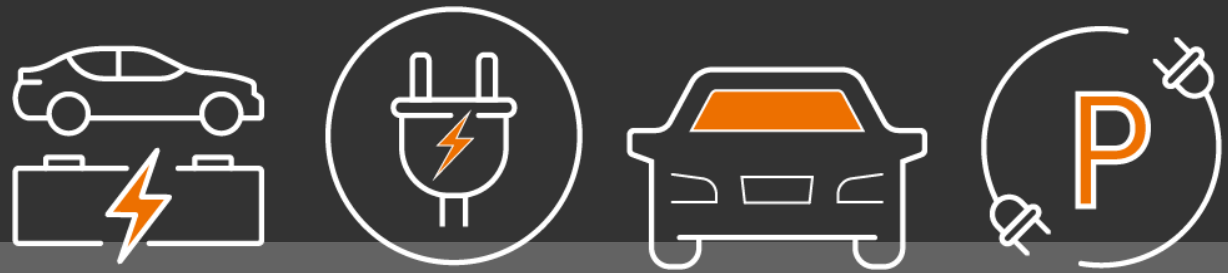
Table 5:14: Anticipated costs to deliver this EV Infrastructure Plan

Cost Item	2023/24 **(Year 2)**	2024/25 **(Year 3)**	2025/26 **(Year 4)**	**Total**
Further Development Costs	£TBC	£TBC	-	-
Capital Enabling Costs	-	-	£710,102	£710,102
EV Infrastructure & Installation	-	-	£2,044,746	£2,044,746
DNO Connections Costs	-	-	£648,288	£648,288
Replacement of Existing Assets	-	£81,000	£30,600	£111,600
Total Planned Investment	**£TBC**	**£81,000**	**£3,433,736**	**£3,514,736**

The above costs have been estimated based on SFT's planning assumptions. Further funding will be required to complete an OBC and procure the required infrastructure. These development costs are still uncertain and will be refined as part of future funding applications.

It is very likely that some of the sites will require significant enabling works including utility diversions, land acquisition or road improvements. However, these costs are based on estimates at this stage and further investigations will need to be carried out to determine the extent of these requirements.

6: The Commercial Case



6. The Commercial Case

6.1 Contract Structure and Risk Allocation

This part of the Plan sets out the Council's proposed approach to risk apportionment. The approach has been informed by targeted engagement with private-sector operators and the Council, the scope of the proposed expansion plan and the use case for the charging points.

Engagement with the market has focused on identifying the risk appetite across the different aspects of operating EV charging infrastructure. In doing this, inputs from the Council about their organisational capacity and capability have also been sought.

The following aspects of the operating model have been considered:

- Scope, in terms of site selection, number and capacity of chargers
- The role of existing assets
- Possible contract length
- Planning approvals
- Grid connections
- Capital works
- Operation, maintenance and replacement of assets
- The status of technology
- Back-office requirements and customer service
- Financing for capital works
- Tariff setting

Scope

The Council's proposed position is to retain the ability to dictate the location of chargers, ensuring there is a balance between less commercially attractive sites and those with a higher utilisation of the assets.

Taking the above into account, there are clear benefits in allowing the market to provide their inputs into the site selection process. First, it would allow the Council to assess the use case appropriately and ascertain return of investment (ROI) estimations.

In addition, involving operators in the early planning process would provide more certainty about the viability of delivering the desired outcomes (per site) for the public, the Council and the operator.

Finally, operators have indicated that there are no constraints in terms of the number, capacity and locations of chargers. However, in a partnership model with the public sector, the private partner will likely finance the capital and maintenance expenditure. In this case, the proposed bundle of sites needs to be commercially attractive to prospective operators, so as to minimise the need for public sector subsidies.

Role of Existing Assets

At present, there are 76 charging devices available for public use in West Lothian. Of these, 51 are operated by ChargePlace Scotland. Maintenance contracts for these are paid for through grant funding.

The market has indicated an appetite for taking ownership of existing assets, as long as they are compliant with the Open Charge Point Protocol (OCPP) and compatible with the operators' own software.

The inclusion of any existing assets in a bundle with new charging points will be subject to the viability of the financial model. However, it is recognised that these assets could generate a revenue stream from the outset with minimal capital expenditure depending on the maintenance requirements.

Contract Length

Operators have indicated that the length of any contract with the Council would vary depending on the initial capital investment required, maintenance costs and the need for the potential replacement of the assets during their lifecycle.

As a reference, operators have pointed to 15 to 20 years as the minimum term of contract that would attract an adequate response from the market, as part of a competitive procurement process.

Planning Approvals

Operators have indicated that if the risk of planning approvals is transferred to the private sector, compensation mechanisms would need to be in place for any delays out of their control.

It is worth noting that there has been no need to apply for planning consent for any of the existing assets.

Grid Connections

The Council's preferred position is that operators liaise with the Distribution Network Operator (DNO) for any potential power upgrades, or new connections. However, operators will need clear detail on the sites and locations to enable the market to assess the feasibility of arranging the necessary connections.

The market has also noted that there is a possibility to enable the DNO connections prior to the installation of the new charge points. This could provide a higher level of certainty on costings and a more attractive proposal to the market. However, it would likely require grant funding.

Capital Works

Operators will normally take on the risk of installing any new charge points, including time, cost and quality. On-street sites may have a higher risk in terms of below-ground utilities, potentially requiring protection and / or diversionary work although as discussed in Chapter 2, while on-street sites will be considered, this Plan has focused on identifying potential communal areas within residential locations rather than off street locations.

It is likely that the Council will have no capacity to undertake any utility works or site preparation works to minimise any associated risks ahead of the main installation works. The market has indicated that this remains a key area of risk that could affect the viability of specific sites from an investment point of view.

Further investigation work will likely be required to ensure any on-street sites remain an attractive proposition for private sector investment.

Operation and Maintenance

No particular risk elements around the operation and maintenance of the assets have been identified by the private sector. However, the Council has noted that monitoring the contract performance could require additional resource. This could be an issue given the scale of current resource pool within WLC.

Status of Technology

As EV battery capacity and charge point technology improves, there will likely be an increase in both demand for and availability of faster charging. The market has been consistent in recommending charge points of a higher power output – rapid and ultra-rapid – to future-proof the network. Faster chargers will likely mean, however, that higher power could be needed from the supplying infrastructure in the future. While potential charge point mix has been identified through this Plan, further engagement with the market will be undertaken regarding this as well as appropriate future proofing.

A key element of the use case would be the possibility of booking charging slots. However, the Council's powers to enforce any further controls above existing levels of parking regulations may be a risk to implement this.

Back-Office and Customer Service

Customer support and back-office software for the charging network will normally be provided by the operator. This approach has been confirmed by the Council, which would only intervene if a significant volume of complaints were to arise.

Capital Financing

The Council will seek to implement a delivery model that enables private sector finance for the capital and maintenance expenditure. There will, however, be elements where grant funding will be needed. These could include funding for those sites where there is not an attractive commercial proposition, or where the installation works carry a risk the market may not have appetite for.

Tariff Setting

The Council's preferred approach to tariff setting is to enable a level of flexibility / innovation around tariff setting. As noted in Section 4, this might include off-peak / agile and flexible, as well as the potential of discounted tariffs for targeted groups such as residents without off-street parking and / or those on low incomes. The Council will also seek a balance in the tariffs that enables the expansion and continuous improvement of the network.

Given these conditions, the Council could be open to higher tariffs as long as there is a commitment from operators to continuously expand and deliver improvements to the network.

Recommendations

The Council's proposed position is to retain the ability to dictate the location of new charging points. This is to ensure there is an adequate balance of less commercially attractive sites. There is, however, appetite to engage early with operators to develop a more robust understanding about the viability of specific sites or potential partnering arrangements.

The risk associated with the installation, maintenance, and service delivery across multiple sites would sit better with a private partner operator, who would finance any capital and replacement costs of new charging points.

Grant funding, however, could be used to cover the capital costs of less commercially attractive sites or those where the anticipated risks of the installation may be higher. In this case, the Council could offer a 'prepared site' to the operator. Grants could also be used by the Council to secure network upgrades.

It is expected that the Council will monitor the performance of the private partner operator through a Key Performance Indicator (KPI) framework.

This Plan has identified a range of potential sites for EV infrastructure investment, providing the Council with a flexible range of opportunities to meet forecast demand. It is recommended that the Council explores which of these potential sites could be bundled together into one or more packages and to develop a more detailed OBC for each subsequent package(s). The final package(s) will include a combination of low and high utilisation sites in order to ensure EV charging is provided in areas where the commercial case for investment is limited.

The OBC for the package(s) would need to explore the following elements in more detail:

- Develop a detailed investment timeline based on individual site bundles, including a cashflow model.
- Develop the use case scenario, which should be consistent across all sites and help future-proof the investment.
- Identify and select the preferred procurement route and contract terms based on the Council's appetite for risk and further, more targeted engagement with the market.

The summary table below compares the performance of three delivery models against each of these elements of any EV operation. These have been using a 5-point scale based on the value they deliver, ranging from **V++** to **V--**.

EV Operations	Leasing Sites	Concession Contracts	Local Authority Owner Operator
Scope	**V+** The Council retains full control for site selection. Sites could be offered in bundles, but viability may be at risk.	**V++** Offers a mechanism to allow the market to provide their inputs in the site selection process to increase certainty around viability.	**V+** The Council retains full control for site selection. There are risks, however, about the viability of the proposed sites.
Role of Existing Assets	**V--** A leasing model does not offer a mechanism to include existing assets as part of the delivery model.	**V++** The market has shown appetite to incorporate existing assets as part of the delivery model.	**V0** There is a question about the Council's capacity to take on the operation of existing assets.
Contract Length	**V0** Will require an assessment of the	**V0** Will require an assessment of the	**V++**

EV Operations	Leasing Sites	Concession Contracts	Local Authority Owner Operator
	most appropriate contract length.	most appropriate contract length.	Contract length would not be a constraint under this model.
Planning Approvals	V+ Planning approvals would be transferred to the private sector operator. However, there has been no need to apply for consents for any of the existing assets.	V+ Planning approvals would be transferred to the private sector operator. However, there has been no need to apply for consents for any of the existing assets.	V0 The Council would retain responsibility for obtaining all the required planning approvals.
Grid Connections	V++ Grid connections would be delivered by the private sector operator.	V++ Grid connections would be delivered by the private sector operator.	V- The Council's preferred position is that operators liaise with the DNO for any potential power upgrades, or new connections. This could require additional grant funding.
Capital Works	V+ Below ground utilities remain a key area of risk.	V+ Below ground utilities remain a key area of risk.	V- The Council's preferred position is to transfer the capital works to the private sector operator.
Operation and Maintenance	V0 This model typically allows freedom and flexibility for the private partner with little control by the Council.	V++ A KPI performance mechanism would be in place to monitor the performance of the service provider against the service level specification.	V-- The Council has indicated that there is no capacity to operate a network of EV charging infrastructure.
Status of Technology	V+ There will likely be a limit as to the conditions the Council may include to a leasing contract model.	V++ The Council can define their future proofing requirements to transfer to the private sector operator.	V0 The Council may be limited as per the upgrades that may be able to deliver to the network.
Back-Office and Customer Service	V0 The Council may have limited powers to define the requirements for this service.	V++ The Council will retain visibility of the private operator's performance to intervene as required.	V-- The Council has indicated that there is no capacity to offer this service.
Capital Financing	V++ This model maximises capital financing.	V++ This model maximises capital financing.	V-- This model would rely on the availability of subsidies for its successful delivery.
Tariff Setting	V- The Council would be limited as to the amount of influence they may have on tariff setting.	V0 The Council would be able to influence tariff setting, especially when it comes to deliver innovation.	V++ Tariffs would be set by the Council.

A concession contract, therefore, offers best value overall as there are no negatives against any of the elements within the operation of an EV charging network. This will be further explored and engaged on during the production of the OBC.

6.2 Local Authority Retained Works and Services

Depending on the level of grant funding available, the Council may consider retaining the preparation of sites where the installation risks may be higher due to the presence of below-ground utilities.

The Council will retain the capacity to select the sites and bundle them together. However, it is recommended to explore a mechanism that enables early inputs from prospective private partner operators.

Finally, the Council will retain the responsibility of monitoring the performance of the private partner operator though a KPI framework.

6.3 Procurement Options

Scotland Excel published a Contract Notice in November 2021 in relation to establishing an Electric Vehicle Charging Framework. The framework is aimed to provide councils and other participating bodies with a mechanism to procure a range of works, products and services. These include the supply, installation and maintenance of EV charging equipment.

The framework is now operational until May 2024, with an option to extend for up to two twelve-month periods. The framework uses NEC4 terms (Engineering and Construction Short Contract, Term Service Short Contract and Supply Short Contract). In progressing towards an OBC, further work will likely be required to

ascertain how compatible the framework may be with a model where a private partner operator takes on responsibility for the installation, maintenance and service delivery.

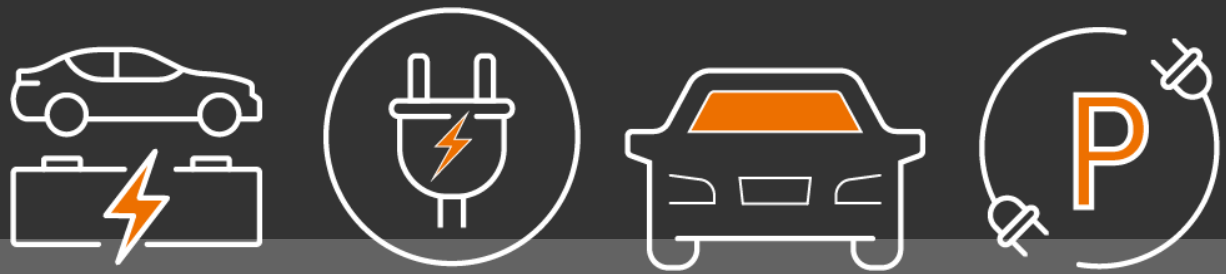
A more comprehensive procurement strategy will be developed as part of the OBC. To ensure this attracts the appropriate level of competitive interest from within the market, further engagement with potential private partner operators will be undertaken.

6.4 Specification, Standards and Contract Terms

The Council has an objective to provide a well-designed, comprehensive, and people-focused charging network that is accessible and reliable. In addition, the development of any specification will need to ensure the network is future proofed, regardless of technological advances.

The approach to finalise the necessary use case, more detailed specifications, standards and contract terms has been set out in Chapter 8: The Management Case.

7: The Financial Case



7. The Financial Case

In order to assess whether this EV Infrastructure Plan is affordable to West Lothian, costs and income have been assessed in terms of:

- The financial implications of the planned infrastructure, replacement of existing assets, maintenance and operation.
- Affordability to WLC.
- A 15-20 year operating model

7.1 Upfront Investment Costs

The cost estimates have been developed based on the outcome of the economic case and the cost planning assumptions provided by SFT. At present, WLC is responsible for 32 EV charge points across West Lothian (as detailed in Table 3.1 and Appendix D), and this Plan identifies further locations for an additional 294 charging devices (see Appendix F) which could potentially be delivered over the lifetime of this plan (by 31st March 2026 - Year 4)"

Capital Enabling Costs

The enabling costs for new chargers include the acquisition and preparation of the sites, as well as forming new car parking bays and landscaping. These have been estimated at £710,102.

The Council has limited appetite to take over the enabling works to prepare the sites. This would especially be the case where there is the potential for diversionary work. However, the market has indicated that this is a key area of risk that could have a significant impact on the viability of a potential concession-type contract.

Therefore, we have assumed that the cost of the enabling works is assumed by the Council, with funding from Transport Scotland. However, we also explore the potential of these works being delivered by the private sector at some locations. These will be further explored at OBC stage based on ongoing discussions with the private sector.

EV Infrastructure and Installation

The costs relating to the purchase, installation and commissioning of EV infrastructure are estimated to be £2,044,746.

We have assumed these costs will be funded by the market as part of a concession contract.

DNO Connection Costs

The non-material standard DNO connection costs are estimated to be £648,288.

Total Upfront Investment Requirement

The total investment costs required for the planned 294 EV chargers by Year 4 is £3,403,136. In addition, there are a number of existing chargers that will need to be replaced in Year 3 and Year 4. These have been estimated at £111,600. Therefore, the total upfront investment requirement is £3,514,736.

7.2 Funding Sources

Assuming the enabling works will be delivered by the Council, it is assumed the required £710,102 will be funded by Transport Scotland. The remaining costs of £2,804,634 would then be private investment funding.

7.3 Financial Viability of Service/Concession Type Contracts

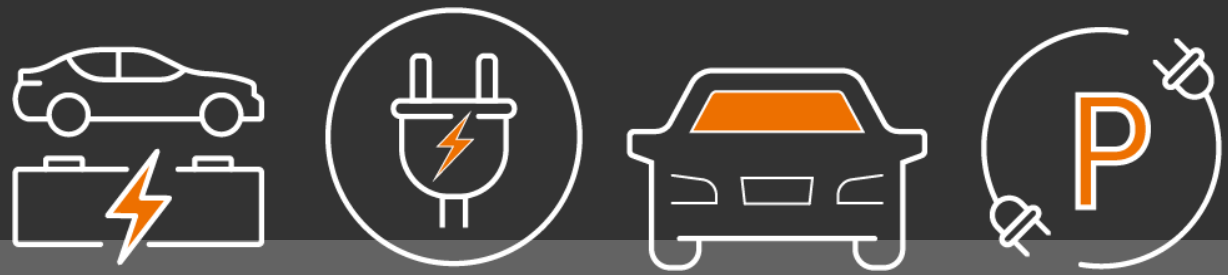
The length of operations has been assumed at 15 years starting April 2026 (Year 5). The forecast annual maintenance costs over the 15-year period are estimated

to be £2,578,265. In addition, the forecast annual connection costs are £894,208. Therefore, the total operating costs over the 15-year period is £3,472,473.

This proposed expansion will be affordable as long as the investment proposition is commercially strong and can attract private funding as outlined. To ensure the proposal will attract private funding, further work will be undertaken throughout the OBC stage to develop a better understanding of the financial viability of any concession-type contract. This will include engaging with operators to develop a more detailed understanding of:

- The commercial viability of the proposed sites and the potential to increase this through, for example, working with private and public sector partners, maximising fleet utilsation of EV charging infrastructure, and / or attracting different types of users at different times of the day.
- The most appropriate tariff structure based on the level and type of demand.
- Detailed infrastructure capital, maintenance and operational costs, including the cost of electricity.
- Operational cashflow and potential requirements for further capital funding.

8: The Management Case



8. The Management Case

8.1 Governance and Management

A core project management function has been delivered internally within the Council to date. The remit of this function to date is outlined below:

- Enable support through regular reporting on risks, issues and costs.
- Development of this EVI Plan.
- Identification and onboarding of consultancy resource.
- Change control and reporting.

It is anticipated that this function will continue in subsequent stages, including the production of an OBC as required, procurement, capital works and service delivery. The project management function reports directly into the Council's Executive Management Team and political oversight will materialise through the Council's Policy Development and Scrutiny panel.

It is very likely that progressing through the OBC stage and procuring the private partner operator will require outsourcing specialist advisors, mostly technical and legal.

Monitoring the performance of the private partner operator will require dedicated resource from within the Council organisation. There is an expectation that the cost of this resource could be covered by the operational revenue generated. However, this remains as a key resource gap and more detailed options will need to be considered as part of the OBC.

8.2 Risk Management and Mitigation

The following key risks have been identified:

- **Network capacity** - as outlined in Chapter 5, engagement with SPEN will continue throughout the OBC and Final Business Case (FBC) stages to develop an understanding of the scale of this risk.
- **Attractiveness to the market –** there is a risk with respect to how attractive proposed investment packages may be to the market. This could result in the assumptions made in the financial chapter not being valid and, therefore, this EVI Plan not being affordable. As above, more detailed engagement with operators will take place throughout the OBC stage to understand the most attractive use case and investment packages.
- **ChargePlace Scotland transition risk –** the current contract for the ChargePlace Scotland back-office operation will not be renewed beyond Spring 2025. If contracts are not awarded until the end of 2024 (as outlined below), there is a transition risk regarding the operation of the current ChargePlace Scotland assets. WLC will monitor this as delivery of the Plan progresses and should it be necessary, WLC will seek to put out a procurement exemption to extend the contract with SWARCO to cover the transition period.
- **Future of current assets** – engagement with CPOs suggests that there could be appetite to take on existing ChargePlace Scotland hardware, although CPOs indicated that they would prefer to install their own assets. There is therefore a risk that the investment made in the existing hardware will be lost. To reduce this risk, WLC will explore, with the private sector, the potential of adopting existing hardware, particularly where such hardware has very recently been introduced. In addition, the potential to recycle hardware for use in other locations, such as fleet charging will also be explored.

8.3 Timetable and Next Steps

We will continue to engage with relevant stakeholders as the Plan is developed through the OBC stage, procurement and implementation.

The Council's Environment & Sustainability Policy Development and Scrutiny Panel will review this Plan prior to seeking approval through the Council Executive. The next steps after approval of the Plan are articulated below:

Outline Business Case

The OBC will develop in further detail the following elements in preparation for the procurement stage:

- Investment packages, timeline and cashflow model.
- Use case, specifications and standards.
- Contract terms and procurement strategy.
- KPI monitoring framework.
- Delivery plan, including resource requirements, reporting structures and detailed provisions for change control.

Procurement and Final Business Case

The OBC will set out the procurement process which will be managed by the Council's own commercial team. The development of the tender documents will likely require technical and legal external advice.

It is understood that SFT will be developing some resources to support local authorities with the procurement process. This has the potential to reduce procurement costs for WLC. There is also potential for WLC to work with other local authorities to share the cost of procurement. This will be explored further during the delivery of this Plan.

Once the procurement process is complete, the OBC will be updated into a FBC to reflect the outputs of the procurement stage. This will enable the Council to secure any final approvals prior to proceeding with any capital works and the commencement of service delivery.

SFT provided funding to all local authorities in Scotland to support the development of EVI Plans and has already set out a further funding allocation for each local authority which will be provided in 2024. It is proposed that this funding be used to develop the OBC and deliver the procurement stage. While the costs of this exercise will depend on available internal council resources, at this stage, WLC anticipate an approximate breakdown as follows:

- OBC and subsequent FBC - £40,000.
- Specialist legal and technical advice to support procurement process - £25,000.
- Preparation of contract specification - £15,000.

These approximate costs will be reviewed and updated following the approval of this Plan. WLC is aware that other local authorities have developed and released a Prior Information Notice (PIN) to enable a more formal engagement process with the market. Although timeframes may not allow for a PIN to be used, WLC will continue to engage with the market and will review any outputs and resources made available from other local authorities and SFT to inform the procurement process.

Anticipated Timescales

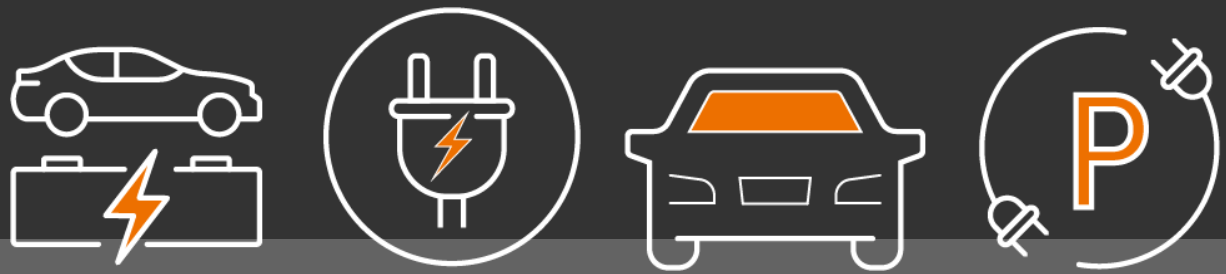
It is anticipated that final approvals of this Plan within the Council will materialise in Quarter 3 of 2023. This will then move on to the preparation of the OBC with a planned completion during Quarter 1 2024.

Preparation of the tender documents could then start following this, followed by the procurement process with completion by the end of 2024.

This will then enable transitioning the OBC into the FBC including political oversight and approvals with delivery planned to commence during financial year 2025/26 (Year 4).

We have assumed that funding discussions will be underway in parallel to the process above.

Appendix A



Appendix A: Policy Review

A.1 National Policy

Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 and the Climate Change Plan Update (2020)

Through the **Climate Change (Emissions Reduction Targets) (Scotland) Act 2019** and the subsequent **Climate Change Plan Update (2020)** the Scottish Government has made a **legally binding commitment to deliver net-zero[74] carbon emissions by 2045**. In addition, two interim targets have been developed:

- A **75% reduction in greenhouse gas (GHG) emissions by 2030** relative to 1990 levels of carbon dioxide and 1995 levels of hydrofluorocarbons, perfluorocarbons, sulphur hexafluoride and nitrogen trifluoride.
- A **90% reduction in GHGs by 2040**, again relative to the 1990/95 baseline.[75]

The **Climate Change Plan Update** also included two further commitments designed to support the delivery of the above targets:

- An aim to reduce vehicle kilometres travelled by car by 20%[76] by 2030
- A commitment to phase out the need for new petrol and diesel cars and vans and for the conditions to be created to phase out the need for all new petrol and diesel vehicles in Scotland's public sector fleet by 2030

The 2019 Climate Change Act establishes a legal commitment to reducing CO2 emissions at the national level and commits to the **phase out of new petrol and diesel cars by 2030**. These commitments will accelerate the move to EVs, with numbers forecast to increase substantially over the coming years. The 2019 Act also embeds the principles of a ***'Just Transition'*****,** which means reducing emissions in a way which tackles inequalities, or at least does not widen them. This is important in respect to this Plan as providing public EV charging provision is vital to ensure equality of access and uptake, particularly amongst those without access to private off-street charging facilities.

National Transport Strategy 2

Embodying the principles of net zero and a just transition, Transport Scotland published its National Transport Strategy 2 (NTS2) in February 2020. The NTS2 set the following 'vision' for Scotland's transport system over the 20-years to 2040

"We will have a sustainable, inclusive, safe and accessible transport system, helping deliver a healthier, fairer and more prosperous Scotland for communities, businesses and visitors".

The Vision is underpinned by four 'Priorities', as shown in Figure A1.

Figure A:1: NTS2 Priorities and

The NTS2 also established two 'hierarchies' which define how future transport investment decision making and services should be planned. The Sustainable Travel Hierarchy (see figure below) defines the priority which will be given to each mode of transport in future investment planning, with walking and wheeling identified as the highest priority and single occupancy car travel the lowest priority. The Sustainable Travel Hierarchy is complemented by the Sustainable Investment Hierarchy which establishes a structured set of steps to be followed when planning investment in transport infrastructure (see figure below).

[74] Net zero refers to a state in which the greenhouse gases going into the atmosphere are balanced by removal out of the atmosphere.

[75] https://www.gov.scot/policies/climate-change/reducing-emissions/

[76] Note the base year has not yet been confirmed by Transport Scotland.

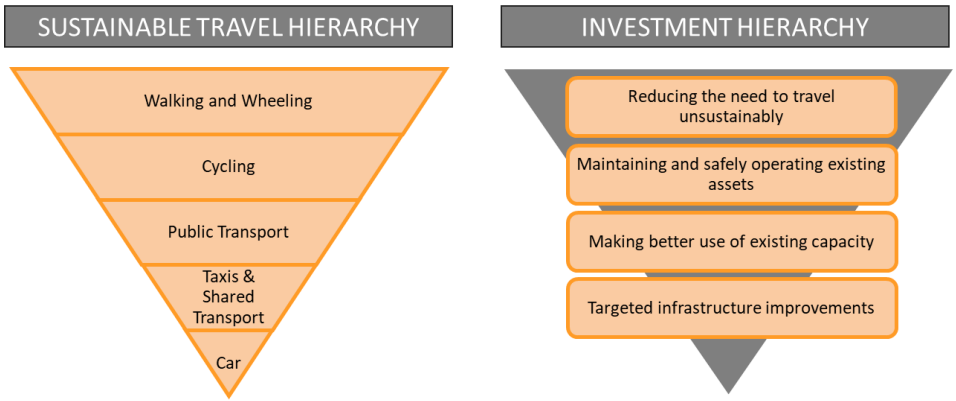


Figure A:2: NTS2 Sustainable Travel Hierarchy and Investment Hierarchy (Source: NTS2)

It will be important to place investment in EVI in the wider context established by NTS2 and ensure that both the planning of and investment in public electric vehicle charging infrastructure is undertaken in a way that considers the wider sustainable transport system.

Strategic Transport Projects Review 2 (2022)

The Strategic Transport Projects Review 2 (STPR2) sets out the Scottish Government's transport investment programme over the 20-year period 2022-2042, detailing how the government will deliver the Vision, Priorities and Outcomes of the NTS2. The document sets out a range of recommendations under six themes. The recommendations most relevant for this Plan include:

- **Zero emission vehicles and infrastructure transition** – STPR2 recommends that collaboration between the public and private sector be undertaken to develop coordinated investment in recharging infrastructure, maximising the impact of public expenditure and leveraging commercial investment

- **Framework for the delivery of mobility hubs** – STPR recommends a delivery framework is developed to facilitate the creation of mobility hubs ('facilities where various types of transport and, potentially, other services inter-connect) across Scotland.

There is strong support for the development of EVI at the national level. EV charging infrastructure could also be provided at Mobility Hubs as a way to encourage use of active, public, and shared transport as part of the journey.

Draft Vision for Scotland's Public Electric Vehicle Charging Network

This document sets out a Vision for Scotland's public EV charging network. It includes a review of the current situation with respect to charging infrastructure in Scotland and sets out a set of Outcomes and associated Priorities.

The Outcomes are as follows:

- People have access to a well-designed and comprehensive public network of charge points.

- The public electric vehicle network works for everyone regardless of age, health, income or other needs.

- Scotland has attracted private sector investment to grow the public electric charging network, ensuring it meets the needs of all people.

- The public charging network is powered by clean, renewable energy and drivers benefit from advancements in energy storage, smart tariffs and network design.

- People's first choice wherever possible is active and public transport with the location of electric vehicle charging points supporting those choices.

The Draft Vision has directly informed the development of this Plan which is closely aligned with the Outcomes and Priorities identified at the national level.

Taking charge: the electric vehicle infrastructure strategy

In March 2022, the UK Department for Transport published '*Taking charge: the electric vehicle infrastructure strategy*[77]' which sets out a vision and action plan

[77] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1065576/taking-charge-the-electric-vehicle-infrastructure-strategy.pdf

for EV charging within the UK. The document included several commitments, including:

- making charging data available to all parties that need it to plan and deliver charge point infrastructure
- bringing in new legislation to improve people's experience when using public charge points, including working with industry to open data so that drivers can: access real time information about charge points; rely on the public network; and compare prices and can pay for their charging easily
- mandating reliability standards to ensure consumers have confidence wherever they travel in the UK.

The UK EVI Strategy sets out an approach to the delivery of chargers across the UK and includes several key commitments and emerging pieces of legislation which will be highly relevant for the future delivery of EV charge points.

Consumer Experience at Public Charge Points

Following a consultation on the consumer experience at public charge points[78], in March 2023, the DfT and the Office for Zero Emission Vehicles (OZEV) set out a range of policies aimed at improving the consumer experience of locating and using charge points. These include mandating the following:

- **Open data** – a data standard for all charge points with all open and some dynamic data made available to consumers as standard
- **Minimum payment** – a minimum payment method which is not brand specific at all new charge points (8kW and over) and retrofitting existing (50kW and over) which is not brand specific
- **Pricing transparency** – enabling consumers to understand and compare prices, including through the provision of a pence per kWh at all public charge points
- **Payment roaming** –industry-led roaming to provide a common method of access to public charge points.
- **Reliability** – a 99% reliable charging requirement across all rapid charge points

In order to encourage uptake of EVs, improving the customer experience is vital. This DfT based research sets out a range of policies and emerging legislation which will be highly relevant for the future delivery of EV charge points.

A.2 Regional Policy

SEStran Regional Transport Strategy

The SEStran Regional Transport Strategy (RTS) sets out a framework for the development of transport in the SEStran area up to 2035. The document's vision is:

A South-East of Scotland integrated transport system that will be connected and safe, creating inclusive, prosperous, and sustainable places to live, work and visit, affordable and accessible to all, enabling people to be healthier and delivering the region's contribution to net zero emissions targets.

The document also includes four Strategy Objectives as follows:

- Transitioning to a sustainable, post-carbon transport system
- Facilitating healthier travel options
- Widening public transport connectivity and access across the region
- Supporting safe, sustainable and efficient movement of people and freight across the region

Section 12, 'Decarbonising transport' covers EV and EV charging. Relevant policies include:

- The RTS seeks the implementation of measures which facilitate the decarbonisation of the vehicle fleet including cars, buses, vans, trains, ships and aircraft in line with national requirements.
- The RTS recognises the risks associated with lower car running costs and supports measures (subject to equality impacts) to prevent renewed growth in

[78] https://www.gov.uk/government/consultations/the-consumer-experience-at-public-electric-vehicle-charge points

private car travel, and to encourage the use of alternative modes in line with the NTS2 Sustainable Travel Hierarchy.

- The RTS seeks the roll out of EV charging infrastructure to support decarbonisation of car-based travel.

The document also contains several actions with relevance to this strategy, including:

- **Working with the private sector and partners to develop a regional electric vehicle investment and charging strategy**, with associated technical guidance, including a spatial strategy across the area for long journey rapid charging facilities and for local area hub / community charging.

- Pursue Scottish Government for effective national strategy / guidance / specifications on fleet decarbonisation and **rollout of appropriate and future-proofed supporting infrastructure. This should include legislation to manage on-street charging provision and provision of chargers in new developments**.

- Develop and coordinate a regional information strategy including messaging around the need to ensure EVs are not regarded as a green light to increased car use and the range of issues associated with this.

- Collate data / knowledge around green hydrogen / fuel cell technology, EV charging technology (e.g., on street / at home / workplace / forecourt) and regularly monitor both emerging technology and trends.

The RTS is looking to roll-out EV charging infrastructure and includes an action to develop a regional electric vehicle investment and charging strategy which would include a spatial strategy across the area. We will work closely with SEStran as they progress this action.

SEStran Mobility Hubs Strategic Study

The SEStran Mobility Hubs Strategic Study (MHSS) was published in 2020 and provides a framework for the implementation of mobility hubs across the SEStran area.

For the purpose of the study, a Mobility Hub is defined as *"a recognisable and easily accessible place which integrates different transport modes and supplements them with enhanced facilities, services and information aimed at encouraging more sustainable travel, creating a sense of place and improving journeys and travel choices"*.

The document notes that EV charging infrastructure should be provided at Mobility Hubs, including specific charging for car club vehicles. The document also identifies potential Mobility Hub Sites across SEStran. In West Lothian, Almondvale Avenue is identified as a potential site.

The MHSS supports the implementation of Mobility Hubs with EV charging infrastructure and identifies Almondvale Avenue within West Lothian as a potential site. This site now has six ChargePlace Scotland charging devices.

A.3 Local Policy

West Lothian Climate Change Strategy

The West Lothian Climate Change Strategy was published in 2021 and provides a framework for the council's actions aimed at reducing greenhouse gas emissions over the period 2021-2028 while also considering the pathway to achieving a net-zero West Lothian by 2045.

Action T6 specifies that West Lothian will produce an EVI Plan as follows:

The council will continue to signpost individuals and organisations to relevant funding to support the move to electric vehicles and will work with Transport Scotland and others to develop an EV Infrastructure plan for West Lothian which will be published in summer 2022. As part of this plan, the council will consider the introduction of tariffs for EV charging.

In addition, Action T5 discusses decarbonising the council fleet:

A short-term working group has been established from services across the council. The working group will develop a clear and joined up asset management plan which will consider, amongst other issues, the timing and financial impact of fleet replacement, infrastructure requirements and the impacts on service delivery.

West Lothian Parking Strategy

WLC is in the process of producing a Parking Strategy to give guidance and make recommendations on parking needs and parking management in West Lothian. The Parking Strategy describes the known parking problems and issues

in the urban areas. It then identifies objectives which the strategy seeks to deliver, before setting out parking polices which could be set by the Council and interventions that could be taken, before finally setting out a delivery plan to provide timescales for implementation. The Strategy includes Parking Policy 14 which notes that the council will continue to support the provision of EV charging points across West Lothian. The document also references the production of this Strategy.

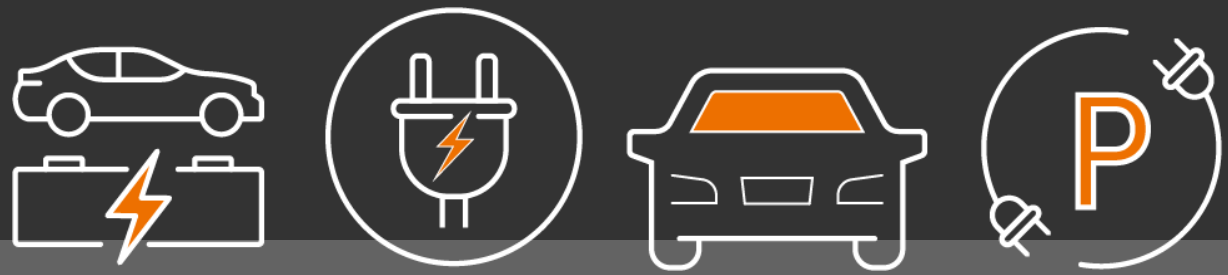
Switched on Towns and Cities (SoTC) Feasibility Programme

Energy Saving Trust (EST) completed a feasibility study in 2019/20 which provided localised forecasts of EV uptake to 2025 and recommendations on the quantity and specification of charging infrastructure and complimentary measures required to meet the projected demand. The study focused on Livingston but included an analysis of use of the ChargePlace Scotland network across West Lothian.

The study recommended the installation of a mixture of slow, fast, and rapid chargers, with residential demand mainly met by large quantities of 7kW on-street chargers. In total, 17 sites were identified for EV charging infrastructure. The maximum number of charge points which could be installed at each location, if all the available electrical capacity at each location was utilised, was set out along with the number of charge points if 20% of parking spaces at each site were dedicated exclusively to EVs. Of the 17 sites identified, two (Almondvale Stadium and Uphall Rail Station) now have EV chargers installed.

The SoTC study identified a range of locations suitable for EV chargers in Livingston. These have been reviewed and incorporated into the list of proposed EV charging sites recommended by this Plan.

Appendix B



Appendix B: Stakeholder and Public Engagement

B.1 Overview

This appendix provides a summary of the public and stakeholder engagement undertaken to inform the development of the Public EV Infrastructure Plan. Learning from these elements has been incorporated within the main document.

B.2 Public engagement

To help inform the development of the strategy, an online public survey was undertaken between 12th January and 13th February 2023.

In total, 706 responses were received.

Survey approach

The survey was administered online between Thursday 12th January and Monday 13th February 2023.

A survey link was embedded on WLC's website and was promoted via the council social media feeds.

Topic areas

The survey was split into three broad sections as follows:

- Users of EVs
- Non-users of EVs
- Demographic questions

The topic areas covered in each of these are set out below.

Users of electric vehicles

- EV type and use
- Availability and use of home charging point
- Frequency of EV charging, by location
- Satisfaction with EV charging network
- Problems experienced when using the EV charging network
- Options for improvement
- Any other comments.

Non-users of electric vehicles

- Access to and use of standard / conventional petrol or diesel vehicle
- Access to private off-street parking
- Intention to purchase an EV in the future
- Factors which prevent EV purchase
- Factors which would encourage EV purchase
- Any other comments.

Demographic

- Residential location
- Age
- Gender
- Employment status and place of employment (where relevant).

Survey response

In total, 706 responses were received to the survey. The figure below provides a breakdown of the responses by those who own, lease or have regular access to an EV and those who do not.

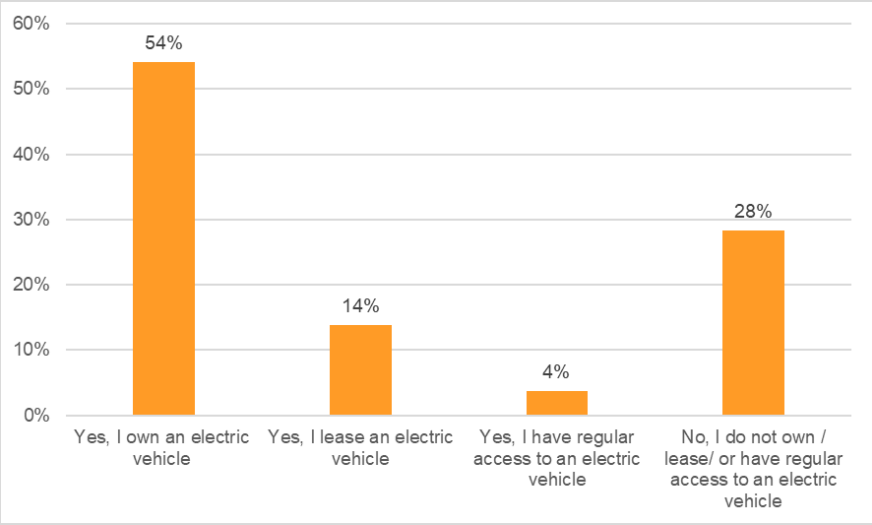


Figure B:1: Do you own / lease / or regularly drive (more than once a week) an electric vehicle? [This includes Battery Electric Vehicle (BEV), Plug-in Hybrid Vehicles (PHEV) and non-Plug-in Hybrid Vehicles (HEV)]

Overall, there was a 72% (n=506) / 28% (n=200) split between users of EVs and non-users who responded to the survey. Amongst users, the majority owned their own vehicle (54%, n=382), with 14% (n=98) leasing their EV and 4% (n=26) stating that they had regular access to an EV.

The geographical breakdown of responses broadly followed what would be expected given the population of the settlements. Overall, the highest proportion of respondents (28%, n=195) were from Livingston, followed by Bathgate (16%, n=112), Linlithgow (10%, n=74) and East Calder (9%, n=65). There were some exceptions in terms of what would be expected given the population of the settlements, with Broxburn being the third largest settlement but placing sixth in terms of responses. Additionally, East Calder (seventh largest settlement) was over-represented in the responses as (fourth largest in terms of responses). The geographical spread of EV users and non-EV users was broadly similar, albeit there were some slight variations.

A detailed breakdown of the responses from both EV users and non-EV users on a question-by-question basis is provided in the separate Public Survey Report (*West Lothian Council Public Electric Vehicle Infrastructure Plan: Public Survey, Stantec, February 2023*). The discussion below provides a summary of some of the key outputs from the Public Survey. The learning from the survey was a key input into the overall development of the Strategy and has been incorporated into the main Strategy document where relevant and appropriate.

Key survey outputs

Home chargers

- In keeping with wider trends, the survey results indicated that those with off-road private parking are more likely to be EV users. In total, 85% (n=427) of the EV-users who responded to the survey had private-off street parking. In contrast just 64% of non-users had private-off street parking. Given the association with EV use and having private off-street parking, in order to encourage use and meet wider policy aims in terms of providing equitable access to transport options, it will be important to ensure that the EVI Plan **provides charging sites which are in, or in close proximity to, residential locations without private off-street parking.**

Network use

- The survey suggests that most users with a home charger charge their vehicle at home once a week, or more frequently. Given average mileage rates, most of these users will have very limited need to use the wider charging network in the community. In contrast, **those without home chargers are entirely dependent on the wider network and therefore use of EV chargers in the community amongst this group is far higher.**

Satisfaction with the current electric vehicle charging network

- **Rates of satisfaction with the charging network were relatively low**, with around 70% of users stating that they were dissatisfied. As may be expected given their greater reliance on the wider network, **rates of satisfaction were lower amongst EV-users without home chargers** compared to those with home chargers.

- Key issues identified were there being **too few EV chargers** (particularly at key destinations such as supermarkets, shopping centres etc and on-street near where people live), **a lack of on-street chargers**, and **charge points at key destinations being too slow**.

- The highest rates of satisfaction were with **the ease of use of the charging network** (58% satisfied and 23% dissatisfied) suggesting that this issue is currently less of a problem amongst users than the other listed problems.

- Overall, around 25% of EV-users were dissatisfied with the accessibility of charge points. However, this figure was significantly higher (reaching 67%) amongst certain older age groups. Given wider policy objectives to improve access for all, **enhancing the overall accessibility of the network is a key priority of the EVI Plan**.

Problems experienced with the current electric vehicle charging network

- The problems which EV-users noted that they experience most frequently when charging their vehicle in West Lothian were **charge points being occupied at the time they want to charge their vehicle** and **faster / rapid charge points being occupied**. This suggests that there may be capacity constraints in terms of charging facilities in West Lothian, particularly with respect to faster and rapid charge points. However, it should be borne in mind that much of the survey period was prior to the introduction of tariffs in West Lothian and as discussed in Chapter 3, this has resulted in some drop in demand

- In the open text responses, a number of respondents also identified **overstaying in charging parking spaces** and **non-EVs using EV charging spaces** as issues. As the number of EVs grow over the coming years, demand on the network will increase and it will be important to ensure there is sufficient capacity to meet demand. As well as providing new infrastructure, consideration will also be given to **the benefits of introducing, and the ability to enforce, mechanisms to ensure that EV-users do not overstay, and non-EVs do not park in, charging spaces**.

- Respondents also identified **damage or maintenance issues with respect to EV charging infrastructure** as a key issue.

Options for development

- Overall, the measure which EV-users said would have the greatest impact on their user experience was **more / the availability of fast and rapid chargers at key destinations (supermarkets, shopping centres, leisure centres etc)**. It is likely that EV chargers at destinations which are under private ownership (such as shopping centres, supermarkets etc) will be provided by the private sector given that there will likely be a commercial case to do so. However, **there may be public sector destinations (such as community centres, health centres, leisure centres etc.) which are under council ownership which could be identified by the council as potential locations for EV**. There may also be opportunities for partnerships with other public sector bodies and organisations (such as the NHS) as well as the private sector to help facilitate the delivery of charging infrastructure. Given the inequality in access for those without home chargers, there would be benefit in prioritising any **sites which are in or in close proximity to residential areas without off-street private parking.**

- The majority of EV-users (77%) responding to the survey stated that they would like to see on-street chargers in residential locations. This was the case for both EV-users with a home charger and EV-users without a home charger, albeit figures were higher amongst the latter. A key benefit of on-street EV parking is that it can be provided within a very short walk of people's homes. However, it is also important to note that 20% of respondents did not want to see on-street chargers in residential streets. This figure is likely to be higher amongst people less inclined to complete a survey on EV chargers. In residential locations without off-street parking, there is often significant pressure on parking spaces, and it will be important to manage the roll out of any on-street EV chargers in such a way to not increase pressure on residential parking, particularly in the immediate / short term given that the rate of uptake of EVs in these areas may well be slower.

- In line with the problems identified above, improving the reliability of charging infrastructure was also seen as important amongst EV-users. This will change as a result of tariffs being introduced that will derive income that can used to support maintenance needs.

Electric vehicle uptake

- Around 15% of non-EV users said they intend on purchasing an EV in the next year and a further 24% said they plan on purchasing an EV in the next five years. This is in line with wider data which suggests that the number of EV users will continue to increase over the coming years.

- Overall, amongst all non-users, the key barriers to EV uptake were the **upfront cost of EVs followed by battery range concerns**. While EV battery range is increasing and many of the newer EVs are more than capable of accommodating average daily mileage as well as longer distance journeys, it is clear that there remains a perception amongst some people that EV battery range is insufficient / problematic.

- **Amongst the non-users without off-street parking, the lack of off-street parking was a bigger barrier to uptake than either the upfront cost of EVs or battery range concerns**. This highlights the importance of this issue

amongst this group and the need to ensure there is adequate provision for those without off-street private parking to both ensure equitable access to EVs and encourage uptake.

B.3 Stakeholder engagement

To inform the development of this strategy stakeholder engagement was undertaken with the following stakeholder groups:

- Neighbouring and other Scottish local authorities
- Private CPOs
- SP Energy Networks (SPEN)

Further information on each of these is provided under the headings below.

Neighbouring and other Scottish Local Authorities

Individual meetings were held with the following local authorities:

- East Lothian Council
- North Lanarkshire Council

All local authorities in Scotland have been tasked with developing an EVI Strategy and Expansion Plan and various approaches have been adopted. The purpose of these meetings was to understand how others were progressing with the Strategy and identify any lessons learned and / or consistent areas of practice which could be applicable to West Lothian as well as any opportunities for collaboration. The learning from these discussions has been incorporated into the main Strategy document where relevant and appropriate.

Charge Point Operators

Individual meetings were held with the following charge point operators:

- Charge point
- Equans
- Tesla

The purpose of these meetings was to understand the extent to which private sector operators are exploring EVI expansion in West Lothian and their propensity to work in partnership with WLC in the delivery of the strategy. The meetings also explored key commercial, financial, and organisational issues which would need to be further explored to consolidate the preferred approach to risk apportionment. All meetings were held remotely via Microsoft Teams.

Prior to the meetings, a topic guide was developed covering the following key aspects:

- **General –** interest in partnership working with WLC to deliver EV charging infrastructure in West Lothian and wider expansion plans
- **Role of existing assets** – appetite for taking on the operation of existing assets / transferability of existing assets given proprietary nature of existing hardware
- **Contract term** – Length of lease or concession contract, if adopted
- **Site selection** – extent to which private sector operators want to be involved in the site selection process
- **Planning approvals (traffic orders, planning)** - typical approach to planning and consenting requirements / contract mechanisms to manage risk
- **Grid connections** – typical approach to this across the market / level of data required to help inform costings and provide confidence in the bidding process
- **Capital works** (time, cost and the quality of the installation) – appetite for taking on and financing capital works
- **Operation (service delivery, maintenance, and repairs)** – management via the council's standard contract management frameworks and specific KPI-based performance framework
- **Technology** – potential for technology obsolescence and strategies to overcome / mitigate issues
- **Customer service (availability and helpdesk)** – resource / technology / software requirements

- **Tariff setting –** preferred position in terms of tariff setting and associated risks
- **Income generation** – demand management risks and apportionment

A separate meeting was also held with WLC to understand the council's preferred position with respect to each of the above. The outcomes of these meetings helped inform the preferred charge point mix (Section 5.2) and the overall delivery model as set out in the Commercial, Financial, and Management Cases.

SPEN Energy Networks

The deployment of additional EV charging infrastructure will be constrained by and have important implications for grid capacity. In recognition of this, engagement with SPEN formed an important part of the strategy development process.

The location of grid supply points and substations and a high level indication of the extent to which it may be possible to connect additional Distributed Generation to the network is provided via SPEN's heat maps (SPD Heat Map - SP Energy Networks). Following a high-level review of this, an individual meeting with SPEN was held to discuss the site identification process, preferred charge mix, and the network implications of the proposed plan / approach. SPEN also provided information on the SP Distribution Future Energy Scenarios to inform the development of the demand forecasts (Chapter 5.1).

Initial feedback from SPEN suggested that:

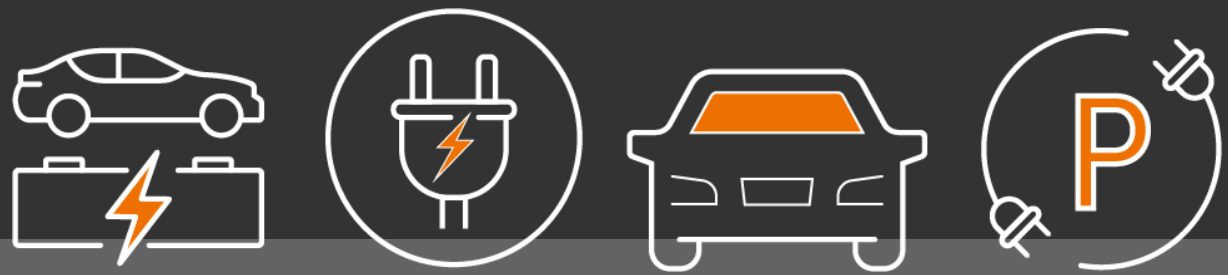
- there are no primary substation issues in West Lothian
- as such, if there was an issue in terms of capacity, it would more likely be an issue at grid level
- for smaller projects (≤ 50kW) there is normally sufficient capacity.

It was also noted that SPEN is developing a range of tools to assist in the EV charging site identification and development process. These include:

- **ConnectMore Interactive Map application** – the ConnectMore tool provides an indication of the potential EV charging demand and high voltage (HV) and low voltage (LV) electricity network capacity. The ConnectMore tool has been made available for a select number of locations prior to its official launch and is not currently available for West Lothian.
- **Enhanced customer connections portal** – a separate customer facing portal through which it will be possible to upload potential site locations to determine network implications. This tool is under development.

Having reviewed the above resources and following the meeting with SPEN, an initial-long list of site options was provided to SPEN for initial feedback. WLC will continue this dialogue with SPEN and assess the identified sites using the above resources as they are made available for the West Lothian local authority area. It is envisaged that CPOs would progress with a more formal Optioneering Exercise in partnership with SPEN prior to any capital works.

Appendix C



Appendix C: West Lothian EV Uptake

C.1 Overview

This appendix sets out how the size of the existing EV fleet in West Lothian was estimated.

C.2 Registered vehicles by type

The Department for Transport (DfT) collates information on licensed vehicles by type on a quarterly basis. The number and percentage of vehicles by type indicated as being based in West Lothian as of Q3 2022 is set out in the tables below.

Table C:1: Total number of licensed vehicles by type in West Lothian (DfT Table VEH0105)

	Diesel	Petrol	Electric	Other Fuels	Total
Cars	31,885	53,277	1,599	2,669	89,430
Buses	467	1	0	0	468
Heavy goods	1,934	5	0	0	1,939
Light goods	10,767	189	28	10	10,994
Motorcycles	2	3,459	18	0	3,479
Other	1,319	146	7	247	1,718
Total (cars & LGVs)	**42,652**	**53,466**	**1,627**	**2,679**	**100,424**
Total (all types)	**46,374**	**57,077**	**1,652**	**2,926**	**108,029**

Table C:2: Percentage of licenced vehicles by type in West Lothian (DfT Table VEH0105)

	Diesel	Petrol	Electric	Other Fuels	Total
Cars	35.7%	59.6%	1.8%	3.0%	100%
Buses	99.8%	0.2%	0.0%	0.0%	100%
Heavy goods	99.7%	0.3%	0.0%	0.0%	100%
Light goods	97.9%	1.7%	0.3%	0.1%	100%
Motorcycles	0.1%	99.4%	0.5%	0.0%	100%
Other	76.8%	8.5%	0.4%	14.4%	100%
Total (cars & LGVs)	42.5%	53.2%	1.6%	2.7%	100%
Total (all types)	**42.9%**	**52.8%**	**1.5%**	**2.7%**	**100%**

Table C:3: Number of licensed plug-in vehicles by type in West Lothian (DfT Table VEH0142)

	Battery electric (BEV)	Plug-in hybrid electric (PHEV)[79]	Total
Cars	1,029	570	1,599
Buses	0	0	0
Heavy goods	0	0	0
Light goods	28	2	30
Motorcycles	18	0	18
Other	0	7	7
Total (cars & LGVs)	1,057	572	1,629
Total (all types)	**1,075**	**579**	**1,654**

Table C:4: Percentage of plug-in vehicles by type in West Lothian (DfT Table VEH0142)

	Battery electric (BEV)	Plug-in hybrid electric (PHEV)	Total
Cars	64%	36%	96.7%
Buses	-	-	-
Heavy goods	-	-	-
Light goods	93%	7%	1.8%
Motorcycles	100%	0%	1.1%
Other	0%	100%	0.4%
Total (cars & LGVs)	**65%**	**35%**	**98.9%**
Total (all types)	**65%**	**35%**	**100%**

The above data provides a comprehensive picture of the number of electric vehicles registered in West Lothian; however, this data is based on the location of the registered keeper of each vehicle and a registered keeper may not necessarily own or drive the vehicle. For example, a company car driver may drive the car, but the lease company may still be shown as the registered keeper. This creates a locational distortion, with, for example, high numbers of company vehicles registered in areas with large remote leasing centres (e.g. elsewhere in

[79] PHEV figures include petrol and diesel PHEVs as well as range extended electric vehicles.

the UK), and under-representation of company cars in areas without these facilities.

Data from DfT Vehicle Licencing data Tables VEH0105 and VEH0142 indicate that this discrepancy may be more marked for electric and alternative fuel vehicles.

Table C:5: Balance of car+LGV keepership, by fuel type (DfT VEH0105 and DfT VEH0142)

		West Lothian	Great Britain
Diesel	Company	15.53%	18.35%
	Private	84.47%	81.65%
Petrol	Company	4.32%	6.59%
	Private	95.68%	93.41%
Electric	Company	17.65%	55.56%
	Private	82.35%	44.44%
Other	Company	14.81%	24.24%
	Private	85.19%	75.76%

To partly address this issue, DfT data showing the breakdown between company and privately registered vehicles was reviewed and the company vehicles registered in Great Britain were re-distributed across each local authority area in the same proportions as private vehicles. While there will be similar locational inaccuracies in the private vehicle data, it is considered to be more accurate than the company equivalent. The tables below show the figures prior and post the adjustment.

Table C:6: Adjusted West Lothian Car + LGV Fleet (All fuel types, Q3 2022)

		Original data	Adjusted data
Diesel	Company	6,631	7,234
	Private	36,021	36,021
	Total	42,652	43,255
Petrol	Company	2,325	3,538
	Private	51,141	51,141
	Total	53,466	54,679
Electric	Company	257	1,700
	Private	1,369	1,369
	Total	1,626	3,069
Other	Company	396	588
	Private	2,284	2,284
	Total	2,680	2,872
Total		**100,424**	**103,875**

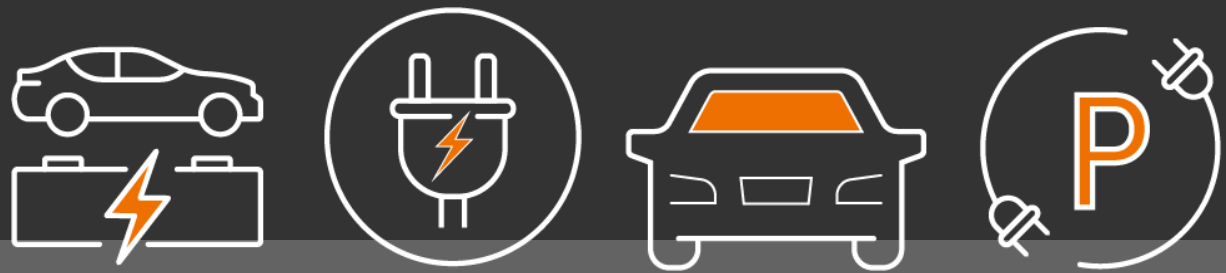
Table C:7: Adjusted West Lothian Electric Car + LGV Fleet (Q3 2022)

		Original data	Adjusted data
BEV	Company	191	1,220
	Private	866	866
	Total	1,057	2,086
PHEV	Company	66	480
	Private	503	503
	Total	569	983
Total	Company	257	1,700
	Private	1,369	1,369
	Total	**1,626**	**3,069**

The above data suggests that in Q3 2022, there was a light vehicle (car+LGV) EV adoption rate of approximately 3%.

Field Dynamics reviewed data on private and company keepership and used this to estimate the size of the total car and LGV fleet, as well as the number of BEVs in West Lothian in Summer 2022. They estimated that the total car + LGV fleet was 98,900 vehicles, including 4,000 BEVs, indicating a BEV adoption rate of 4%. The electric vehicle (BEV+PHEV) adoption rate would be approximately 6% if PHEVs were also included. However, as it has not been possible to clarify how these figures were derived, the more conservative estimates above have been used.

Appendix D



Appendix D: Baseline Position – Existing Charging Infrastructure

ID	Site	Location	Charging device	Speed (kW)	Speed type	Operator
1	Acredale Car Park	Bathgate	Dual Outlet Fast Charger	22	Fast	ChargePlace Scotland – West Lothian Council
				22	Fast	
2	Aldi Houstoun	Houstoun	Dual Outlet Fast Charger	22	Fast	NewMotion
				22	Fast	
3	Almond Valley Heritage Centre (Visitor Centre)	Livingston	Dual Outlet Fast Charger	22	Fast	ChargePlace Scotland
				22	Fast	
4	Almondvale Avenue (Livingston Designer Outlet and Retail Village)	Livingston	Single Outlet Slow Charger	7	Slow	ChargePlace Scotland
			Single Outlet Slow Charger	7	Slow	ChargePlace Scotland
			Single Outlet Slow Charger	7	Slow	ChargePlace Scotland
			Single Outlet Slow Charger	7	Slow	ChargePlace Scotland
			Single Outlet Slow Charger	7	Slow	ChargePlace Scotland
			Single Outlet Fast Charger	22	Fast	ChargePlace Scotland
5	Almondvale Stadium	Livingston	Dual Outlet Fast Charger	22	Fast	ChargePlace Scotland -West Lothian Council
				22	Fast	
			Rapid Charger	44	Rapid	ChargePlace Scotland – West Lothian Council
				44	Rapid	
				43	Rapid	
6	Armadale Railway Station	Armadale	Dual Outlet Fast Charger	22	Fast	ChargePlace Scotland
				22	Fast	
7	Asda Armadale Station	Armadale	Dual Outlet Charger	3	Slow	BP Pulse
				7	Slow	
8	Bankhead Farm Guest House	Broxburn	Dual Outlet Slow Charger	7	Slow	ChargePlace Scotland
				7	Slow	
9	Bannatyne Health Club & Spa Livingston	Livingston	Dual Outlet Rapid Charger	50	Rapid	InstaVolt
				50	Rapid	
			Dual Outlet Rapid Charger	50	Rapid	InstaVolt
				50	Rapid	
10	Bathgate Partnership Centre	Bathgate	Rapid Charger	22	Rapid	ChargePlace Scotland – West Lothian Council
				51	Rapid	
				51	Rapid	
11	Bathgate Railway Station	Bathgate	Dual Outlet Fast Charger	22	Fast	ChargePlace Scotland
				22	Fast	
12	Best Western Hotel	Whitburn	Dual Outlet Slow Charger	7	Slow	ChargePlace Scotland
				7	Slow	
13	Blackridge Primary School	Blackridge	Dual Outlet Fast Charger	22	Fast	ChargePlace Scotland – West Lothian Council
				22	Fast	

ID	Site	Location	Charging device	Speed (kW)	Speed type	Operator
14	Calderwood	East Calder	Dual Outlet Charger	3	Slow	Zap-Home
				7	Slow	
15	Calderwood Primary School	East Calder	Dual Outlet Slow Charger	7	Slow	ChargePlace Scotland – West Lothian Council
				7	Slow	
			Dual Outlet Fast Charger	22	Fast	ChargePlace Scotland – West Lothian Council
				22	Fast	
			Rapid Charger	43	Rapid	ChargePlace Scotland – West Lothian Council
				50	Rapid	
				50	Rapid	
16	Chain Runner Pub and Restaurant	Livingston	Rapid Charger	22	Fast	Osprey
				50	Rapid	
				50	Rapid	
17	Deer Park SF Connect (service station)	Livingston	Ultra-Rapid Charger	100	Ultra-Rapid	BP Pulse
				150	Ultra Rapid	
				150	Ultra Rapid	
			Ultra-Rapid Charger	100	Ultra Rapid	BP Pulse
				150	Ultra Rapid	
				150	Ultra Rapid	
18	East Main Street	Whitburn	Dual Outlet Slow Charger	7	Slow	ChargePlace Scotland
				7	Slow	
19	Gardner Crescent	Whitburn	Slow Charger	7	Slow	Zap-Home
20	Gideon Street Car Park	Bathgate	Dual Outlet Fast Charger	22	Fast	ChargePlace Scotland – West Lothian Council
				22	Fast	
21	Heights Road	Blackridge	Dual Outlet Fast Charger	22	Fast	ChargePlace Scotland
				22	Fast	
22	Hillhouse Wynd	Kirknewton	Fast Charger	22	Fast	Zap-Home
23	Fauldhouse Partnership Centre, Lanrigg Road	Bathgate	Rapid Charger	43	Rapid	ChargePlace Scotland – West Lothian Council
				50	Rapid	
				50	Rapid	
24	Lidl Broxburn	Broxburn	Rapid Charger	22	Fast	Pod Point
				50	Rapid	
				50	Rapid	
25	Linlithgow Railway Station	Linlithgow	Dual Outlet Fast Charger	22	Fast	ChargePlace Scotland
				22	Fast	
26	Linlithgow Sports Club (Xcite)	Linlithgow	Rapid Charger	22	Fast	ChargePlace Scotland -West Lothian Council
				50	Rapid	
				50	Rapid	
27	West Lothian Council Kirkton Service Centre	Livingston	Dual Outlet Fast Charger	22	Fast	ChargePlace Scotland- West Lothian Council
				22	Fast	

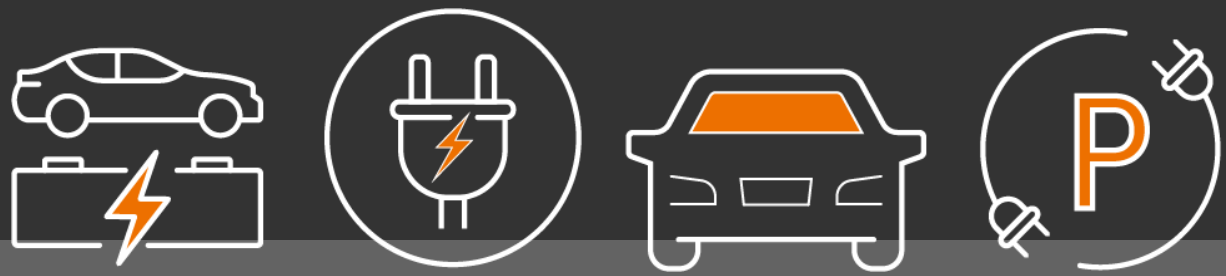
ID	Site	Location	Charging device	Speed (kW)	Speed type	Operator
	(Lister Road, Kirkton Campus)		Dual Outlet Fast Charger	22	Fast	ChargePlace Scotland – West Lothian Council
				22	Fast	
28	Livingston Designer Outlet Surface Car Park	Livingston	Dual Outlet Fast Charger	22	Fast	ChargePlace Scotland
				22	Fast	
29	Main Street	Blackridge	Dual Outlet Fast Charger	22	Fast	Other Operator[80]
				22	Fast	
30	Morris Square Car Park (close to Livingston Designer Village)	Livingston	Dual Outlet Fast Charger	22	Fast	ChargePlace Scotland – West Lothian Council
				22	Fast	
			Dual Outlet Fast Charger	22	Fast	ChargePlace Scotland – West Lothian Council
				22	Fast	
			Rapid Charger	43	Rapid	ChargePlace Scotland – West Lothian Council
				50	Rapid	
				50	Rapid	
			Rapid Charger	43	Rapid	ChargePlace Scotland – West Lothian Council
				50	Rapid	
				50	Rapid	
31	Morrisons Bathgate	Bathgate	Rapid Charger	22	Fast	GeniePoint
				50	Rapid	
				50	Rapid	
32	Morrisons Livingston	Livingston	Rapid Charger	22	Fast	GeniePoint
				50	Rapid	
				50	Rapid	
33	Netherton Grove	Whitburn	Dual Outlet Slow Charger	7	Slow	Zap-Home
				7	Slow	
34	Polkemmet Country Park	Bathgate	Dual Outlet Slow Charger	7	Slow	ChargePlace Scotland – West Lothian Council
				7	Slow	
			Dual Outlet Slow Charger	7	Slow	ChargePlace Scotland – West Lothian Council
				7	Slow	
35	Preston House Gardens	Linlithgow	Fast Charger	22	Fast	Zap-Home
36	Quarrywood Court	Livingston	Dual Outlet Fast Charger	22	Fast	Other Operator
				22	Fast	
37	Screwfix Linlithgow	Linlithgow	Dual Outlet Fast Charger	22	Fast	VendElectric
				22	Fast	VendElectric
38	Shona's Way	Blackridge	Dual Outlet Fast Charger	22	Fast	Other Operator
				22	Fast	
39	Sibbald Training	Blackridge	Dual Outlet Fast Charger	22	Fast	ChargePlace Scotland

[80] Those chargers which are operated by 'Other Operator' are the devices identified as ChargePlace Scotland on ZapMap but do no feature on the ChargePlace Scotland website.

ID	Site	Location	Charging device	Speed (kW)	Speed type	Operator
				22	Fast	
40	SMA Vehicle Remarketing Ltd	Livingston	Dual Outlet Slow Charger	7	Slow	Other Operator
				7	Slow	
41	Kirknewton Railway Station	Kirknewton	Dual Outlet Slow Charger	7	Slow	ChargePlace Scotland
				7	Slow	
42	Strathbrock Partnership Centre	Broxburn	Dual Outlet Fast Charger	22	Fast	ChargePlace Scotland -West Lothian Council
				22	Fast	
			Rapid Charger	22	Fast	ChargePlace Scotland – West Lothian Council
				50	Rapid	
				50	Rapid	
43	The Centre Livingston	Livingston	Slow Charger	7	Slow	Tesla
			Slow Charger	7	Slow	Tesla
			Slow Charger	7	Slow	Tesla
44	The Vennel Linlithgow Car Park (near Linlithgow Centre, Palace and Loch)	Linlithgow	Dual Outlet Fast Charger	22	Fast	ChargePlace Scotland – West Lothian Council
				22	Fast	
45	Unit 1 Foulshields Road	Stoneyburn	Dual Outlet Fast Charger	22	Fast	ChargePlace Scotland
				22	Fast	
46	Uphall Railway Station	Livingston	Dual Outlet Fast Charger	22	Fast	Other Operator
				22	Fast	
47	Water Yett Car Park (near Linlithgow Centre, Palace and Loch)	Linlithgow	Dual Outlet Fast Charger	22	Fast	ChargePlace Scotland – West Lothian Council
				22	Fast	
48	West Calder Station	West Calder	Dual Outlet Fast Charger	22	Fast	ChargePlace Scotland
				22	Fast	
49	West Holmes Road	Uphall	Slow Charger	7	Slow	Zap-Home
50	Whitburn Swimming Pool (Xcite)	Whitburn	Rapid Charger	22	Fast	ChargePlace Scotland – West Lothian Council
				50	Rapid	
				50	Rapid	
51	Winchburgh Academy	Winchburgh	Dual Outlet Slow Charger	7	Slow	ChargePlace Scotland – West Lothian Council
				7	Slow	
			Dual Outlet Slow Charger	7	Slow	ChargePlace Scotland – West Lothian Council
				7	Slow	
			Dual Outlet Slow Charger	7	Slow	ChargePlace Scotland – West Lothian Council
				7	Slow	
			Dual Outlet Slow Charger	7	Slow	ChargePlace Scotland – West Lothian Council
				7	Slow	

ID	Site	Location	Charging device	Speed (kW)	Speed type	Operator
			Dual Outlet Fast Charger	22	Fast	ChargePlace Scotland – West Lothian Council
				22	Fast	
			Dual Outlet Fast Charger Fast	22	Fast	ChargePlace Scotland – West Lothian Council
				22	Fast	
			Triple Outlet Fast Charger	22	Fast	ChargePlace Scotland – West Lothian Council
				22	Fast	
				22	Fast	
			Rapid Charger	22	Fast	ChargePlace Scotland – West Lothian Council
				44	Fast	
				44	Fast	
Total	**51**	**-**	**76**	**4,471kW**	**-**	**-**
Total (excluding Zap-Map Home sites)	**45**	**-**	**70**	**4,389kW**	**-**	**-**

Appendix E



Appendix E: Demand Forecasts

E.1 Overview

There are a number of different adoption curves predicting how the EV market will develop over the coming decades. This section provides of a review of the key forecasts in the public domain. Scenarios from the following are reviewed:

- Decarbonising the Scottish Transport Sector and Strategic Transport Project Review 2 (STPR2) Approach to Scenario Planning
- SP Distribution Future Energy Scenarios[81]
- National Grid Future Energy Scenarios

E.2 Decarbonising the Scottish Transport Sector and Strategic Transport Project Review 2 (STPR2) Approach to Scenario Planning

In 2019, Scotland introduced a new set of economy wide emission targets to reflect the updated advice of the UK Committee on Climate Change. This led to Scotland setting a target to reduce emissions to net-zero by 2045, with the interim target to reduce emissions by 75% between 1990 and 2030 and 90% by 2040. Having set these new emission targets, Transport Scotland commissioned Element Energy to develop the policy outcomes needed, in terms of the introduction of zero-emission vehicles and changes in transport behaviour, to meet these emission targets in the transport sector.

The report was published in September 2021 and sets out four policy scenarios (PSs) as follows:

- **Policy Scenario 0 (PS0):** Business as Usual. Transport change based on existing policy measures.
- **Policy Scenario 1 (PS1):** Rapid introduction of low and zero emission technologies. Transport demand follows existing Transport Scotland and UK department for Transport growth projections
- **Policy Scenario 2 (PS2):** Rapid introduction of low and zero emission technologies. Passenger and freight kilometres travelled remain the same as PS1, but vehicle kilometres travelled are reduced through modal shift from cars and planes to public and active travel modes.
- **Policy Scenario 3 (PS3):** Rapid introduction of low and zero-emission technologies. Passenger, freight, and vehicle kilometres travelled are reduced through modal shift from cars and planes to public and active travel modes, and reduced travel demand through trip shortening (facilitated through measures such as 20-minute neighbourhoods) and trip avoidance (facilitated through measures such as teleconferencing).

Only PS3 was able to meet Scotland's emission targets, with the other PSs falling well short, and so PS3 was subsequently used to inform the Scenario Planning for the Strategic Transport Project Review 2 (STPR2)[82].

The graph below shows the assumed change in BEV and PHEV uptake between 2022 and 2030 for cars and vans as set out under PS3. At the national level, the total number of BEVs (car and van) is forecast to increase by 1869% on their 2022 level and the total number of PHEVs is forecast to increase by 269% on their 2022 level.

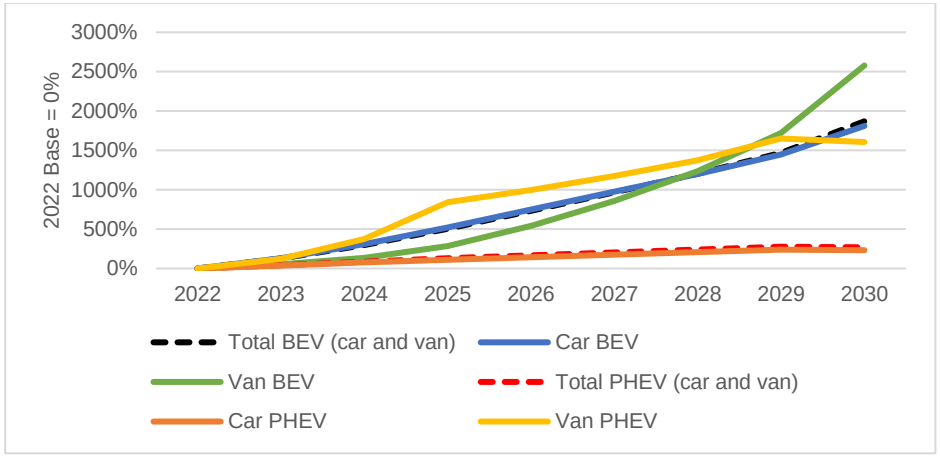


Figure E:1: Decarbonising the Scottish Transport Sector Electric Vehicle Growth Forecasts, PS3 (2022 base)

[81] SPDDFES_Main report_December20.pdf (spenergynetworks.co.uk)

[82] STPR2 Approach to Scenario Planning – May 2021, LATIS (transport.gov.scot)

The table below shows the forecast percentage increase in each category of vehicle on the 2022 level for each year between 2022 and 2030.

Table E:1: DSTS PS3 Forecast % Increase in EVs relative to 2022

Vehicle Type	Annual increase in EVs								
	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total BEV (car + van)	**92%**	**126%**	**75%**	**52%**	**38%**	**28%**	**22%**	**20%**	**26%**
Car BEV	97%	132%	76%	52%	37%	27%	21%	19%	23%
Van BEV	47%	54%	53%	63%	67%	50%	39%	36%	47%
Total PHEV (car + van)	**59%**	**41%**	**31%**	**24%**	**16%**	**14%**	**12%**	**11%**	**-2%**
Car PHEV	58%	39%	28%	19%	16%	13%	12%	10%	-2%
Van PHEV	118%	124%	111%	99%	16%	16%	16%	19%	-2%

It is assumed that these factors reflect the forecast annual increase in EVs up to the end of the year. These factors have been applied to the adjusted estimated total BEV and PHEV in West Lothian in Q3 2022 (i.e., 30th September). Growth from end of Q3 2022 to end of the year, has been assumed to be 25% of that forecast to occur in 2022.

Table E:2: West Lothian Forecast Car + LGV Fleet under DSTS PS3 (2022-2030)

Vehicle Type	Annual increase in EVs								
	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total BEV (car + van)	**92%**	**126%**	**75%**	**52%**	**38%**	**28%**	**22%**	**20%**	**26%**
Car BEV	97%	132%	76%	52%	37%	27%	21%	19%	23%
Van BEV	47%	54%	53%	63%	67%	50%	39%	36%	47%
Total PHEV (car + van)	**59%**	**41%**	**31%**	**24%**	**16%**	**14%**	**12%**	**11%**	**-2%**
Car PHEV	58%	39%	28%	19%	16%	13%	12%	10%	-2%
Van PHEV	118%	124%	111%	99%	16%	16%	16%	19%	-2%

Over this period, the number of BEVs in West Lothian is expected to increase by 1870% to approximately 52,000, and the number of PHEVs will increase by around 270% to 4,000. While this reflects a slowing but continually upwards trajectory for BEVs, the number of PHEVs is expected to start decreasing from 2029 onwards.

It is important to note that these forecasts were developed by Element Energy prior to Brexit, the COVID-19 pandemic, and the war in Ukraine. Disposable incomes have reduced since then as a result of higher than average inflation, mortgage rates and fuel costs, and additionally chip shortages have pushed up costs for new cars and lengthened waiting times. As a result, it is likely that the move to electric vehicles may be delayed relative to these forecasts in the short term, although forecasts are likely to bear out in the longer term.

E.3 SP Distribution Future Energy Scenarios

SP Energy Distribution's Future Energy Scenarios (DFES) were defined in December 2020 and comprise four forecast scenarios for future energy demand across the SP Distribution Area. These scenarios are as follows:

- **Falling Short (FS)** – progress is made on decarbonisation; however, it is slower than in the other scenarios. This scenario reflects the slowest rate of BEV uptake, reaching around 200,000 BEVs across the SP Distribution Area by 2030. Uptake is much slower between 2020-2030, with higher rates of adoption from 2030 onwards.

- **Consumer Transformation (CT)** - the 2045 Net Zero target is met with measures that have a greater impact on consumers and is driven by greater levels of consumer engagement in the energy transition. This scenario sees the second quickest rate of uptake of BEVs (after LW), reaching approximately 600,000 BEVs across the SP Distribution Area by 2030.

- **System Transformation (ST)** - the 2045 Net Zero target is met, following a pathway that has the least consumer impact to do so. The typical domestic consumer will experience less disruption than in Consumer Transformation as more of the significant changes in the energy system happen in the supply side, away from the consumer. This scenario is the second slowest (after SP) in terms of BEV uptake.

- **Leading the Way (LW)** - rapid decarbonisation, with high levels of investment in world-leading decarbonisation technologies. This scenario sees the quickest rate of uptake of BEVs, reaching 914,000 BEVs across the SP Distribution Area by 2030.

The SP Distribution Future Energy Scenarios also provide BEV forecasts for each local authority area. These are based on a 2021 starting point and are derived from model outputs which use off-street parking availability at an individual property level and socio-demographic information to understand the probability of specific areas transitioning to BEVs. The figure below shows the forecast uptake of residential BEVs in West Lothian under each of the SP Distribution Future Energy Scenarios. Also shown is the Baseline View (BV) scenario which is used by SP Distribution for business planning where a single value is required. It is set at the lower end of the Net Zero compliant range of DFES and Committee on Climate Change forecasts.

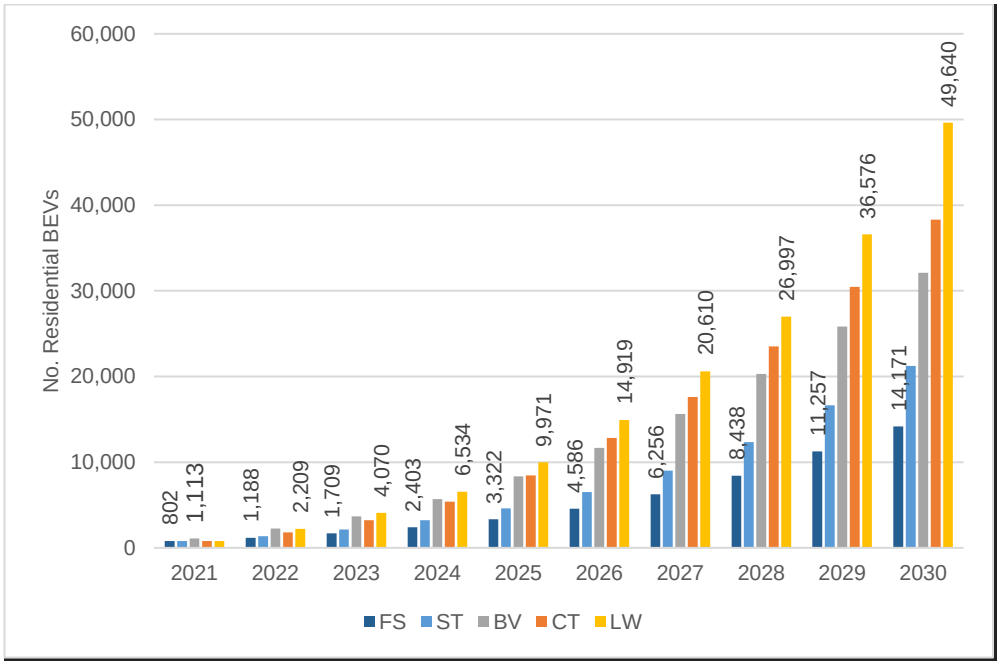


Figure E:2: SP Distribution Future Energy Scenarios – BEVs in West Lothian by Year

In Q3 2022, it is estimated that there were approximately 2,100 BEVs in West Lothian, which sits at the upper end of the SP Distribution forecast for the year.

Under these scenarios, total residential BEVs in West Lothian range between:

- 4,586 (under Scenario FS) and 14,919 (under Scenario LW) by 2026
- 14,171 (under Scenario FS) to 49,640 (under Scenario LW) by 2030

While there is significant variance between the scenarios across the 2030s and 2040s, the total number of BEVs by 2050 is broadly similar in all four scenarios.

SPEN is in the process of producing PHEV statistics, but these were under development at the time of writing and therefore it was not possible to incorporate these.

E.4 National Grid Future Energy Scenarios

National Grid ESO has been producing Future Energy Scenarios documents since 2011, with the latest version being published in July 2022. This document sets out four scenarios which illustrate the 'credible range of possibility for the future of energy'. This framework of scenarios has been in place since 2020:

- **Falling Short (FS)** – progress has been made with regard to decarbonisation compared with the present day, but it is slower than under all other scenarios. The move to from petrol and diesel to electric vehicles still occurs for residential vehicles, but there is continuing reliance on diesel for freight movements. The 2050 net-zero target is not achieved, although all new car sales are assumed to have zero-emission capability by 2035.

- **Consumer Transformation (CT)** – Net-Zero is achieved by 2050, with high levels of consumer engagement. The typical home will have an electric heat-pump, a low energy electric heating system and an electric vehicle. All new car sales are assumed to have zero-emission capability by 2030.

- **System Transformation (ST)** – again Net-Zero is achieved by 2050, but the majority of changes made to meet this target have occurred on the supply side, placing less burden on the consumer. The typical consumer will have a hydrogen boiler, an unchanged heating system and an electric or fuel cell vehicle. All new car sales are assumed to have zero-emission capability by 2032.

- **Leading the Way (LW)** – this scenario reflects the highest credible rate of decarbonisation in the UK, requiring both substantial changes on the consumer side and the supply side. All new car sales are assumed to have zero-emission capability by 2030.

The tables below set out expected annual growth in Car and LGV BEVs on UK roads under each of these scenarios.

Table E:3: Growth in Car BEV Fleet under National Grid ESO FES (2022-2030)

Area	2022	2023	2024	2025	2026	2027	2028	2029	2030
FS	81%	65%	57%	49%	43%	38%	34%	30%	26%
ST	43%	42%	40%	38%	36%	34%	32%	30%	28%
CT	73%	66%	55%	49%	44%	39%	38%	34%	29%
LW	38%	36%	36%	34%	32%	30%	29%	27%	26%

Table E:4: Growth in LGV BEV Fleet under National Grid ESO FES (2022-2030)

Area	2022	2023	2024	2025	2026	2027	2028	2029	2030
FS	81%	65%	57%	49%	43%	38%	34%	30%	26%
ST	43%	42%	40%	38%	36%	34%	32%	30%	28%
CT	73%	66%	55%	49%	44%	39%	38%	34%	29%
LW	38%	36%	36%	34%	32%	30%	29%	27%	26%

These growth forecasts were applied to Car and LGV BEV numbers for West Lothian, and it is estimated that there will be between:

- 7,580 (under Scenario FS) and 14,155 (under Scenario CT) BEVs by 2026
- 20,445 (under Scenario FS) to 47,825 (under Scenario LW) BEVs by 2030

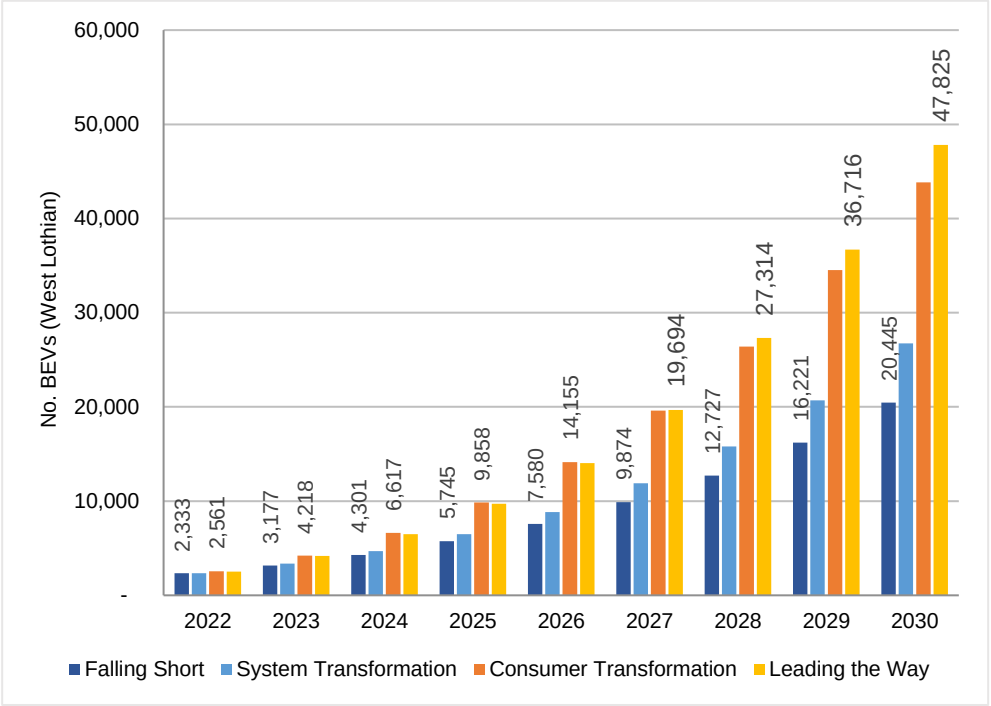


Figure E:3: National Grid ESO Future Energy Scenarios – BEVs in West Lothian by Year

E.5 Comparison of Forecasts

Three sets of forecasts have been considered with respect to how the number of EVs in West Lothian may change over time, these being:

- Decarbonising the Scottish Transport Sector, September 2021, Element Energy for Transport Scotland (Scotland level forecasts of car + LGV BEVs and PHEVs)
- SP Distribution Future Energy Scenarios, December 2020, SP Energy Networks (SP Distribution Area forecasts of Total and Residential BEVs)
- Future Energy Scenarios, July 2022, National Grid ESO (UK-wide forecasts of Car + LGV BEVs)

West Lothian specific data was provided directly by SP Energy Networks (SPEN), and growth factors were calculated for the other forecasts which were then applied to 2022 estimated BEV numbers for West Lothian, which were derived from DfT Licencing data. Figure E4 illustrates all forecasts on a single graphic.

SPEN forecasts range from approximately 15,000 to 52,000 BEVs in West Lothian by 2030, and NG forecasts range from approximately 20,000 to 48,000 BEVs by 2030. DSTS PS3 also anticipates approximately 52,000 BEVs in West Lothian by 2030.

DSTS PS3 indicates the most rapid adoption of BEVs, with approximately 50% more BEVs by 2026 than the SPEN Baseline View. By 2030 however, SPEN Leading the Way forecasts have caught up. It's useful to bear in mind that the DSTS forecasts were produced prior to the COVID pandemic and following economic slow-down.

The above indicates the range of possibilities, however if a single forecast must be selected, the SPEN Baseline View scenario appears the most sensible. It sits central to the range of forecasts considered while still falling within Net-Zero compliance and aligning with SP Distribution's single scenario for business planning purposes.

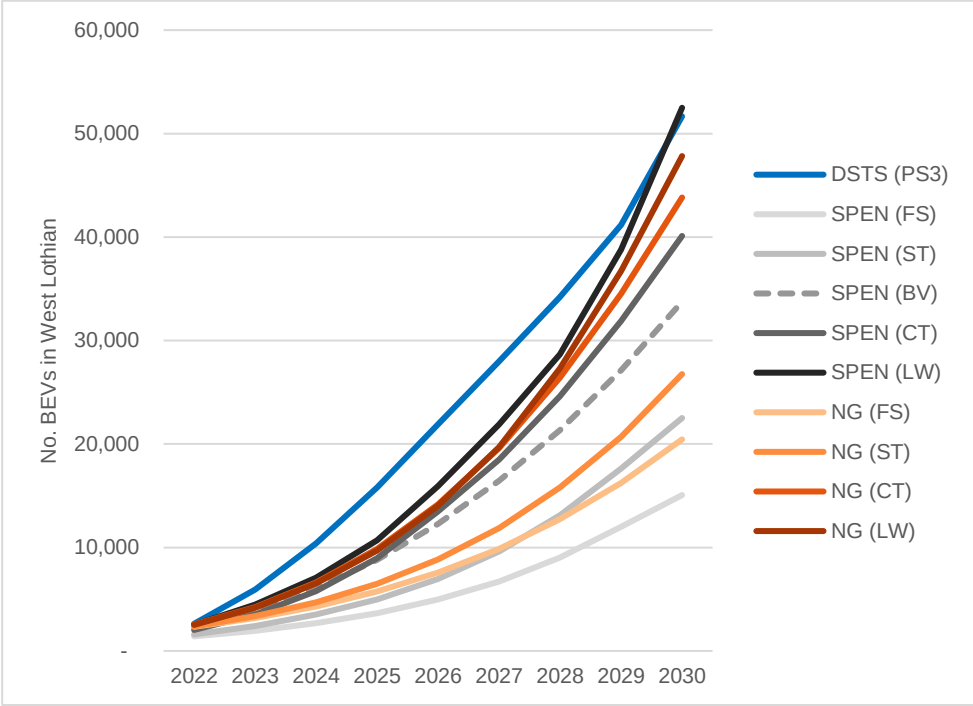
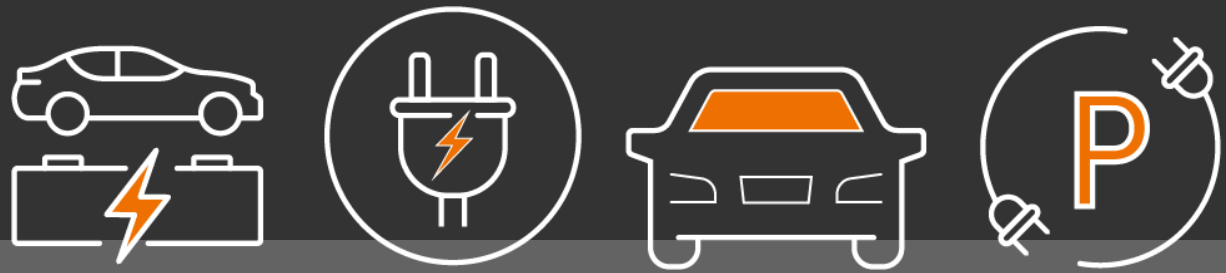


Figure E:4: Comparison of BEV Forecasts

Appendix F



Appendix F: Potential Future Sites

ID	Site	Location	Proposed / Existing	Spaces	Number of Chargers	Max kWh Output	Concurrent Output	Number of Sockets	Total kW per device type	Total kW
1	9th Scout Hall	Livingston	Proposed	2	1	7	7	2	14	14
2	Acredale Car Park	Bathgate	Existing	2	1	50	50	2	100	100
3	Addiewell Combined Primary School	Addiewell	Proposed	2	1	7	7	2	14	14
4	Adelaide Street 2	Livingston	Proposed	2	1	22	22	2	44	44
5	Adelaide Street 1	Livingston	Proposed	2	1	22	22	2	44	44
6	Almond West Road	Livingston	Proposed	4	2	22	22	2	88	102
7	Almond West Road	Livingston	Proposed	2	1	7	7	2	14	
8	Almondbank Centre	Livingston	Proposed	2	1	7	7	2	14	14
9	Almondvale Shopping Centre Taxi Rank	Livingston	Proposed	2	1	22	22	2	44	44
10	Almondvale Stadium	Livingston	Existing	2	1	50	50	2	100	144
11	Almondvale Stadium	Livingston	Existing	2	1	22	22	2	44	
12	Almondvale Street	Livingston	Proposed	18	9	22	22	2	396	396
13	Armadale Partnership Centre	Armadale	Proposed	4	2	7	7	2	28	28
14	Armadale Primary School	Armadale	Proposed	2	1	7	7	2	14	14
15	Ash Grove	Livingston	Proposed	10	5	7	7	2	70	114
16	Ash Grove	Livingston	Proposed	2	1	22	22	2	44	
17	Beveridge Square 1	Livingston	Proposed	6	3	22	22	2	132	132
18	Beveridge Square 2	Livingston	Proposed	6	3	22	22	2	132	132
19	Beveridge Square 3	Livingston	Proposed	6	3	22	22	2	132	132

ID	Site	Location	Proposed / Existing	Spaces	Number of Chargers	Max kWh Output	Concurrent Output	Number of Sockets	Total kW per device type	Total kW
20	Blackburn Partnership Centre	Blackburn	Proposed	6	3	7	7	2	42	86
21	Blackburn Partnership Centre	Blackburn	Proposed	2	1	22	22	2	44	
22	Blackridge Community Centre	Blackridge	Proposed	2	1	7	7	2	14	14
23	Blackridge Primary School	Blackridge	Existing	2	1	7	7	2	14	14
24	Boghall Primary School	Boghall	Proposed	2	1	7	7	2	14	14
25	Bridge Place	Bathgate	Proposed	4	2	22	22	2	88	102
26	Bridge Place	Bathgate	Proposed	2	1	7	7	2	14	
27	Broxburn United Sports Club	Broxburn	Proposed	4	2	7	7	2	28	72
28	Broxburn United Sports Club	Broxburn	Proposed	2	1	22	22	2	44	
29	Brucefield Drive	Whitburn	Proposed	4	2	22	22	2	88	102
30	Brucefield Drive	Whitburn	Proposed	2	1	7	7	2	14	
31	Carmondean / Nether Dechmont Community Centre	Livingston	Proposed	2	1	7	7	2	14	14
32	Coverbank	Livingston	Proposed	4	2	7	7	2	28	72
33	Coverbank	Livingston	Proposed	2	1	22	22	2	44	
34	Craigs Park Pavilion	Livingston	Proposed	2	1	7	7	2	14	14
35	Craigshill Health Centre	Livingston	Proposed	4	2	7	7	2	28	72
36	Craigshill Health Centre	Livingston	Proposed	2	1	22	22	2	44	
37	Crofthead Centre	Livingston	Proposed	4	2	7	7	2	28	28

ID	Site	Location	Proposed / Existing	Spaces	Number of Chargers	Max kWh Output	Concurrent Output	Number of Sockets	Total kW per device type	Total kW
38	Crofthead Community Centre	Livingston	Proposed	2	1	7	7	2	14	14
39	Croftmalloch Primary School	Whitburn	Proposed	2	1	7	7	2	14	14
40	Deans Primary School	Livingston	Proposed	4	2	7	7	2	28	28
41	Douglas Rise	Livingston	Proposed	8	4	7	7	2	56	100
42	Douglas Rise	Livingston	Proposed	2	1	22	22	2	44	
43	East Calder Partnership Centre	East Calder	Proposed	2	1	7	7	2	14	14
44	East Whitburn Community Centre	Whitburn	Proposed	2	1	7	7	2	14	14
45	Eastfield Development Centre	Fauldhouse	Proposed	2	1	7	7	2	14	14
46	Fallahill Primary School	Fauldhouse	Proposed	2	1	7	7	2	14	14
47	Forestbank Community Centre	Livingston	Proposed	2	1	7	7	2	14	14
48	Fulmar Brae	Livingston	Proposed	8	4	7	7	2	56	100
49	Fulmar Brae	Livingston	Proposed	2	1	22	22	2	44	
50	Gardners Lane	Bathgate	Proposed	10	5	22	22	2	220	220
51	Gideon Street Car Park	Bathgate	Existing	4	2	7	7	2	28	28
52	Greenrigg Primary School	Harthill	Proposed	2	1	7	7	2	14	14
53	Harrysmuir Primary School	Livingston	Proposed	2	1	7	7	2	14	14
54	Holy Family Primary School	Winchburgh	Proposed	4	2	7	7	2	28	72

ID	Site	Location	Proposed / Existing	Spaces	Number of Chargers	Max kWh Output	Concurrent Output	Number of Sockets	Total kW per device type	Total kW
55	Holy Family Primary School	Winchburgh	Proposed	2	1	22	22	2	44	
56	Howden Park Centre	Livingston	Proposed	4	2	7	7	2	28	72
57	Howden Park Centre	Livingston	Proposed	2	1	22	22	2	44	
58	Howden St Andrews Primary School	Livingston	Proposed	2	1	7	7	2	14	14
59	Inveralmond Community High School	Livingston	Proposed	2	1	7	7	2	14	14
60	Junilee Road	Whitburn	Proposed	2	1	7	7	2	14	14
61	Kids N Kin (Almondvale Blvd)	Livingston	Proposed	36	18	22	22	2	792	892
62	Kids N Kin (Almondvale Blvd)	Livingston	Proposed	2	1	50	50	2	100	
63	King George's V Park Pavilion Youth Group	Whitburn	Proposed	2	1	7	7	2	14	14
64	King Street	Bathgate	Proposed	6	3	22	22	2	132	160
65	King Street	Bathgate	Proposed	4	2	7	7	2	28	
66	Kirkhill Primary School	Broxburn	Proposed	2	1	7	7	2	14	14
67	Kirknewton Primary School	Kirknewton	Proposed	2	1	7	7	2	14	14
68	Knightsridge Adventure Project	Livingston	Proposed	2	1	7	7	2	14	14
69	Lanthorn Community Education Centre	Livingston	Proposed	2	1	7	7	2	14	14
70	Letham Primary School	Livingston	Proposed	2	1	7	7	2	14	14

ID	Site	Location	Proposed / Existing	Spaces	Number of Chargers	Max kWh Output	Concurrent Output	Number of Sockets	Total kW per device type	Total kW
	Community Wing									
71	Linlithgow Academy	Linlithgow	Proposed	6	3	7	7	2	42	86
72	Linlithgow Academy	Linlithgow	Proposed	2	1	22	22	2	44	
73	Linlithgow Palace	Linlithgow	Proposed	10	5	22	22	2	220	262
74	Linlithgow Palace	Linlithgow	Proposed	6	3	7	7	2	42	
75	Linlithgow Partnership Centre	Linlithgow	Proposed	2	1	7	7	2	14	14
76	Linlithgow Sports Centre	Linlithgow	Existing	2	1	50	50	2	100	144
77	Linlithgow Sports Centre	Linlithgow	Existing	2	1	22	22	2	44	
78	Livingston North P&R (North)	Livingston	Proposed	10	5	22	22	2	220	262
79	Livingston North P&R (North)	Livingston	Proposed	6	3	7	7	2	42	
80	Livingston North P&R (South)	Livingston	Proposed	16	8	22	22	2	352	352
81	Livingston North Partnership Centre	Livingston	Proposed	2	1	7	7	2	14	14
82	Livingston South P&R	Livingston	Proposed	10	5	22	22	2	220	262
83	Livingston South P&R	Livingston	Proposed	6	3	7	7	2	42	
84	Livingston Station Community Centre	Livingston	Proposed	4	2	7	7	2	28	28
85	Livingston Village Primary School	Livingston	Proposed	2	1	7	7	2	14	14
86	Longridge Primary School	Longridge	Proposed	2	1	7	7	2	14	14

ID	Site	Location	Proposed / Existing	Spaces	Number of Chargers	Max kWh Output	Concurrent Output	Number of Sockets	Total kW per device type	Total kW
87	Low Port Education Centre	Linlithgow	Proposed	2	1	7	7	2	14	14
88	Madderfield Mews	Linlithgow	Proposed	10	5	22	22	2	220	262
89	Madderfield Mews	Linlithgow	Proposed	6	3	7	7	2	42	
90	Main Street	Livingston	Proposed	12	6	7	7	2	84	172
91	Main Street	Livingston	Proposed	4	2	22	22	2	88	
92	Mansefield Street	Bathgate	Proposed	4	2	7	7	2	28	28
93	Marjoribanks	Bathgate	Proposed	4	2	7	7	2	28	72
94	Marjoribanks	Bathgate	Proposed	2	1	22	22	2	44	
95	Mid Calder Primary School	Mid Calder	Proposed	2	1	7	7	2	14	14
96	Mill Road	Bathgate	Proposed	4	2	7	7	2	28	72
97	Mill Road	Bathgate	Proposed	2	1	22	22	2	44	
98	Mill Road Spill Over	Bathgate	Proposed	6	3	22	22	2	132	132
99	Morris Square Car Park	Livingston	Existing	2	1	50	50	2	100	144
100	Morris Square Car Park	Livingston	Existing	2	1	22	22	2	44	
101	Mosswood Community Centre	Livingston	Proposed	2	1	7	7	2	14	14
102	Newyearfield Farm Community Centre	Livingston	Proposed	4	2	7	7	2	28	28
103	Our Lady of Lourdes Primary School	Addiewell	Proposed	2	1	7	7	2	14	14
104	Our Lady's RC Primary School	Bathgate	Proposed	2	1	7	7	2	14	14
105	Peel Primary Eliburn Community Wing	Livingston	Proposed	2	1	7	7	2	14	14

ID	Site	Location	Proposed / Existing	Spaces	Number of Chargers	Max kWh Output	Concurrent Output	Number of Sockets	Total kW per device type	Total kW
106	Pumpherston & Uphall Station Community Primary School	Uphall	Proposed	2	1	7	7	2	14	14
107	Regent Square	Linlithgow	Proposed	12	6	22	22	2	264	434
108	Regent Square	Linlithgow	Proposed	10	5	7	7	2	70	
109	Regent Square	Linlithgow	Proposed	2	1	50	50	2	100	
110	Residential1, Hopetoun Street	Bathgate	Proposed	2	1	7	7	2	14	14
111	Residential2, Main Street	Bathgate	Proposed	2	1	7	7	2	14	14
112	Seafield Primary School	Seafield	Proposed	2	1	7	7	2	14	14
113	Simpson Primary School	Bathgate	Proposed	4	2	7	7	2	28	28
114	South Street	Armadale	Proposed	20	10	7	7	2	140	228
115	South Street	Armadale	Proposed	4	2	22	22	2	88	
116	Southdale Primary School	Armadale	Proposed	2	1	7	7	2	14	14
117	Springfield Community Centre	Linlithgow	Proposed	2	1	7	7	2	14	14
118	St Andrew's Way	Livingston	Proposed	4	2	7	7	2	28	28
119	St Columba's Primary School	Bathgate	Proposed	2	1	7	7	2	14	14
120	St Joseph's Primary School Linlithgow	Linlithgow	Proposed	2	1	7	7	2	14	14
121	St Kentigern's Academy	Bathgate	Proposed	2	1	7	7	2	14	14
122	St Margaret's Academy	Livingston	Proposed	4	2	7	7	2	28	28

ID	Site	Location	Proposed / Existing	Spaces	Number of Chargers	Max kWh Output	Concurrent Output	Number of Sockets	Total kW per device type	Total kW
123	St Mary's Primary School Bathgate	Bathgate	Proposed	2	1	7	7	2	14	14
124	St Mary's RC Primary School Polbeth	Polbeth	Proposed	2	1	7	7	2	14	14
125	St Paul's RC Primary School	East Calder	Proposed	2	1	7	7	2	14	14
126	Stoneyburn Community Centre	Addiewell	Proposed	2	1	7	7	2	14	14
127	Strathbrock Partnership Centre	Broxburn	Existing	4	2	7	7	2	28	28
128	The James Young Highschool	Livingston	Proposed	8	4	7	7	2	56	100
129	The James Young Highschool	Livingston	Proposed	2	1	22	22	2	44	
130	The Mall	Livingston	Proposed	4	2	22	22	2	88	102
131	The Mall	Livingston	Proposed	2	1	7	7	2	14	
132	The Vennel Linlithgow Car Park	Linlithgow	Existing	2	1	7	7	2	14	14
133	Toronto Primary School	Livingston	Proposed	2	1	7	7	2	14	14
134	Torphichen Community Centre	Torphichen	Proposed	2	1	7	7	2	14	14
135	Uphall Community Centre	Uphall	Proposed	4	2	7	7	2	28	28
136	Water Yett Car Park	Linlithgow	Existing	2	1	22	22	2	44	58
137	Water Yett Car Park	Linlithgow	Existing	2	1	7	7	2	14	
138	West Calder High School	West Calder	Proposed	2	1	7	7	2	14	14

ID	Site	Location	Proposed / Existing	Spaces	Number of Chargers	Max kWh Output	Concurrent Output	Number of Sockets	Total kW per device type	Total kW
139	Whitburn Community Education Centre	Whitburn	Proposed	2	1	7	7	2	14	14
140	Whitdale Primary School	Whitburn	Proposed	2	1	7	7	2	14	14
141	Williamston Primary School	Livingston	Proposed	4	2	7	7	2	28	28
142	Winchburgh Community Centre	Winchburgh	Proposed	2	1	7	7	2	14	14
143	Winchburgh Primary School	Winchburgh	Proposed	2	1	7	7	2	14	14
144	Woodmuir Primary School	Addiewell	Proposed	2	1	7	7	2	14	14
145	Xcite Linlithgow	Linlithgow	Proposed	20	10	22	22	2	440	540
146	Xcite Linlithgow	Linlithgow	Proposed	2	1	50	50	2	100	
147	Xcite Whitburn	Whitburn	Existing	2	1	22	22	2	44	58
148	Xcite Whitburn	Whitburn	Existing	2	1	7	7	2	14	
	Total			**588**	**294**			**296**	**8,438**	**8,438**