Appendix A

Reading Transport Strategy 2040 Sub-Strategy:

Electric Vehicle Charging Infrastructure Strategy

Draft for Consultation - March 2024

Reading Borough Council
Working better with you

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This document is available in accessible formats on request by email to transport@reading.gov.uk

Foreword, by Councillor John Ennis

FOREWORD

Our new draft Electric Vehicle (EV) Charging Infrastructure Strategy has been developed as a sub-strategy to the emerging Reading Transport Strategy 2040, which aims to deliver a sustainable transport system in Reading to create an attractive, green and vibrant town. This EV Strategy is also an important element in achieving the aims and objectives of Reading's Climate Emergency Strategy, including our ambitions to create a net zero carbon town.

Central Government plans to ban the sale of new petrol and diesel cars in the UK by 2035 (80% EVs by 2030), and over the past few years there has been a significant growth in the proportion of new EV sales across the country, including in Reading. This growth is set to increase as we experience volatility with fluctuating petrol and diesel prices, EVs becoming a more affordable option as technology advances, and as residents look to make more environmentally conscious choices.

As a major hub for employment, leisure, retail and key services, Reading attracts many visitors. One impact of this success is high levels of traffic congestion as people travel to and through Reading by private car. This is despite us having an extensive bus network in the borough and a major rail hub at Reading Station. As a result of congestion, Reading also suffers with air pollution and a large part of the town centre and key corridors in the borough are covered by an Air Quality Management Area (AQMA).

This poses considerable health risks to residents and visitors, particularly younger or older members of the community and those with underlying health conditions. The further uptake of electric vehicles to replace petrol or diesel vehicles will have a positive impact on air quality, and therefore on the health and wellbeing of everyone in Reading.

We are aware that EVs still emit fine particulate pollution and do not address congestion. Therefore, increasing the uptake of EVs is only part of the answer, and a reduction in private vehicle usage is still needed. However, as we note in the Reading Transport Strategy 2040 and Climate Emergency Strategy, even after reducing demand and encouraging modal shift to other modes, there will still be a significant need for motorised transport for necessary journeys. As electricity supply is decarbonised, replacing fossil fuel-based vehicles with EVs will be a key element and one of the most important contributors to a net zero carbon Reading.

One of the significant barriers to adopting EVs is the ability for people to charge their vehicle, particularly if they do not have a driveway to install charging facilities at home. The Council has a key role in facilitating the roll-out of charging infrastructure, and this strategy has been developed to bring forward measures to tackle this issue, particularly to address any gaps in provision which are not adequately catered for by the private sector. In addition, we are aware of the issue of a lack of capacity in the overall power network. Whilst this is not within the Council's control, we are working with suppliers including Southern Electric Power Distribution as a matter of urgency to ensure sufficient supply is available to facilitate the transition to EVs and encourage wider adoption of EVs across the borough.

It is recognised that EV charging is a rapidly changing area, therefore this strategy will be regularly reviewed as technology advances and new national policies and funding streams are brought forward. This strategy is currently in draft form, and we welcome all feedback received through the public consultation to help shape the final strategy. This will ensure that we are best placed to deliver the wider benefits that the transition to EVs will bring to our town.

Councillor John Ennis
Lead Councillor for Climate Strategy and Transport
Reading Borough Council

EXECUTIVE SUMMARY

The Electric Vehicle Charging Infrastructure (EVCI) Strategy forms part of the Reading Transport Strategy 2040, which aims to address environmental, air quality, and health and wellbeing issues associated with our transport choices. This EVCI Strategy sets out the background to the delivery of electric vehicle (EV) charging infrastructure, including the policy context and the existing charging infrastructure in Reading. It then sets out the options available to the Council to deliver infrastructure to encourage EV take up, both in terms of the types of charging technology to be installed and the funding options and opportunities available to deliver it. Finally, a delivery plan sets out how we plan to deliver the necessary charging infrastructure in the short, medium and long term.

The strategy is built around five key objectives. The first is to build a Reading wide approach, working with residents and stakeholders to facilitate and encourage the increased use of EVs as an alternative to necessary petrol and diesel car trips. The second objective is to deliver a safe, reliable and equitable charging network. The third is seeking to provide renewable energy sources for EV charging and the fourth is to embrace and deliver innovation that benefits Reading's residents. The fifth objective is for the Council to lead by example with the electrification of its own fleet.

The policy context that the strategy is set within includes the Road to Zero, the Transport Decarbonisation Plan, the Government's clean air strategy and climate change policy at a national level. Whilst the Government has revised its ban on new internal combustion engine cars to 2035 (80% of cars sold to be EVs by 2030), the policy sets out a strong commitment to electrification of vehicles being key to meeting the UK's carbon targets.

At a local level, encouraging take up of electric vehicles is key to Reading's Climate Emergency declaration, and aligns with the Reading Transport Strategy 2040 and Reading Local Plan. EVs also deliver on Reading's Air Quality Action Plan where they significantly reduce NOx emissions, although not particulate emissions, and supports the Reading Corporate Plan. Reading has a range of charging infrastructure already in place with around 116 charge points, which are a mixture of Council delivered on-street residential and car park chargers, and commercially delivered charging facilities including rapid and ultra-rapid chargers. The Council has also implemented EV charging at its main offices and at its Bennet Road depot.

The strategy sets growth predictions for EVs in Reading and the likely demand for charge points. This indicates that there could be around 10,000 EVs in 2030 owned by residents who rely on parking on-street, which equates to the need for around 3,000 resident on-street charge points to provide equitable charging for all residents. The strategy also sets out a prediction of the need for around 200 to 250 destination charge points within the Council's car parks. The Council will also support the electrification of buses, taxis and car club vehicles in the borough through the provision of suitable charging infrastructure.

There are a number of different options for EV charging infrastructure that are summarised in this strategy, from slow / trickle chargers for on-street charging, through to ultra-rapid chargers for in-journey charging. The Council's main focus will be on delivering slow to standard chargers (3.5kW to ~ 7kW) on residential streets and destination charging at car parks, and may also consider rapid chargers in strategic locations. High-cost ultra-rapid chargers are expected to continue to be delivered commercially by companies such Ionity and Gridserve, and the Council will support the delivery of these facilities.

The strategy sets out the main options for funding EV infrastructure in Reading, including 'Ownership and Lease' options, and public private partnerships to include private sector match funding and concession frameworks. Overall, it is considered that a concession framework is the preferred option for delivering of the majority of charge points in Reading. This will leverage the significant private sector investment required to deliver the numbers of charge points needed over the next few years, and through combining this with public sector funds Reading will be able to deliver equitable schemes in terms of coverage and tariffs.

The strategy concludes with a delivery plan which sets out how Reading will deliver against the five objectives of the strategy over the short, medium and long term. Delivery will focus on working with residents, businesses and other stakeholders to deliver infrastructure that meets residents and visitors needs and delivers a sustainable future for Reading.

1. INTRODUCTION

Electric Future for Reading

1.1 The Reading Electric Vehicle (EV) Charging Infrastructure Strategy forms part of the Reading Transport Strategy 2040, which aims to address environmental, air quality, and health and wellbeing issues associated with our transport choices. The transport strategy vision is to promote a sustainable transport system in Reading that creates an attractive, green and vibrant town with neighbourhoods that promote healthy choices and wellbeing. Through the Reading Transport Strategy, we are committed to providing transport options that enhance quality of life, reduce emissions and improve air quality. The EV Charging Infrastructure Strategy also supports the wider objectives contained within the Reading Climate Emergency Strategy and Air Quality Action Plan (AQAP). The Climate Emergency Strategy seeks to achieve net zero carbon dioxide emissions in Reading, whilst the AQAP aims to address areas of poor air quality (NOx and particulates) in the borough.

1.2 In order to achieve our sustainable transport vision and meet the wider environmental goals, we aim to reduce car use (both within and through the borough) by providing attractive and viable alternatives through enhanced public transport and active travel options. However, it is recognised that private vehicle use, car and van trips, will remain for many the most appropriate mode of transport. Therefore, by encouraging the adoption of electric vehicles for essential trips, they can be made to be more sustainable with a lower impact on the environment and climate change.

1.3 A key driver to the successful adoption of electric vehicles is the ability to adequately charge vehicles. For some the natural choice will be through home charging in an off-street setting, but this will not be available for many as Reading has a particularly high proportion of homes (approximately 45%), such as Victorian terraced housing, that do not have off-street parking in the borough.

1.4 A range of charging infrastructure options will therefore be required to complement home charging and provide options when this is not available, including destination and workplace charging as well as 'on-route' charging. Having comprehensive, accessible, equitable and efficient charging infrastructure is essential in enabling the rapid adoption of electric vehicles and is the key focus of this strategy.

1.5 However, the transition to electric private cars will only partially address wider objectives relating to the environment, health and wellbeing, and the economy. Around 85% of fine particulate pollution from vehicles does not come from exhausts but from wear and tear on tyres, brakes and road surfaces, with the particles being lifted back into the air through vehicle movement. In addition, reducing single/low occupancy road travel will be required to achieve improvements in air quality and levels of congestion as this will not be addressed by the transition to electric vehicles. A further core element of this strategy is therefore the provision of charging infrastructure for electric buses, car clubs, taxis, e-bikes and e-scooters* to help promote these sustainable forms of travel. *It should be noted that the use of e-scooters is currently illegal on the public highway, except through a Government approved e-scooter public hire scheme. The use of privately owned e-scooters on the public highway is therefore subject to Government bringing forward a change in legislation to allow their use.

Reading Electric Vehicle Charging Infrastructure Strategy: Aims and Objectives

1.6 The purpose of the Reading EV Charging Infrastructure Strategy is to set out the current position and to light the future pathway supporting the uptake of electric vehicles for the residents, visitors and businesses of Reading.

Electric Vehicle Charging Infrastructure Strategy Aim:

Our EV Charging Infrastructure Strategy aims to support and accelerate the transition to Electric Vehicles for necessary travel in Reading in the context of wider Local Transport Plan aspirations to reduce the need to travel, reduce carbon emissions, improve air quality and promote sustainable and active travel.

1.7 The EV Charging Infrastructure Strategy is part of a wider suite of policies to drive towards a cleaner and greener Reading. The strategy is therefore put forward to enable and encourage the uptake of more sustainable transport cross Reading in tandem with promoting and enabling modal shift, active travel opportunities and cleaner carbon reduced travel options for all communities, businesses and visitors to Reading.

1.8 Reading's EV Charging Infrastructure Strategy will also play a significant role in driving toward a carbon neutral Reading.

1.9 The objectives of Reading's EV Charging Infrastructure Strategy are set out below:

Objectives	Details
Objective 1	Reading will develop a Reading-wide approach to facilitate and encourage the growth in use of electric and zero emission vehicles by Reading's residents, businesses, and visitors. This will be developed to include buses, taxis, car-clubs e-bikes and e-scooters and will be developed through engagement with residents, businesses, and other stakeholders including companies who are commercially installing charge points in Reading.
Objective 2	Reading will deliver a reliable and well-maintained public EV charging point infrastructure in line with projections, and as amended through monitoring, to facilitate the move to electric vehicles. Deliver and implement through a policy for appropriate, safe, equitable and disability aware accessible provision across the borough.
Objective 3	Reading will seek to provide renewable energy sources for charging points on Council land or highway, working with cross Council smart energy initiatives such as linking to other infrastructure projects such as heat networks.
Objective 4	Reading will innovate and respond flexibly to fast-paced and changing technologies within the EV sector and changes in EV take up including seeking to enable residents to benefit from Vehicle to Grid technologies as they come forward.
Objective 5	Reading will lead by example by using EV technology as much as possible to further reduce the environmental impact of our day-to-day operations. This will also include working with Reading Buses and Readibus to support them in their electrification plans.

Strategy Framework and Scope

Strategy Framework

1.10 The Reading EV Charging Infrastructure Strategy has been developed to:

- Provide a framework which links across Reading's current policy areas as well as national policies and strategies.
- Be focused but not inflexible to the evolving and growing EV market and other zero emission transport opportunities in the UK market.
- Be inclusive and seek to enable opportunities for all communities (economic, social and those with disabilities) and businesses across Reading and inter-connect with other authorities and business partners across the region.

Scope of EV Charging Infrastructure Strategy

1.11 The scope of the strategy is to:

1. Provide an understanding of the current and emerging market of electric vehicles (EVs) and infrastructure.
2. Map out current and future demand for EVs and infrastructure.
3. Set out an options appraisal of the types of infrastructure options available, requirements to install and potential installation locations.
4. Identify potential investment/funding opportunities and market opportunities to support the ramping up of infrastructure.
5. Identify potential external partnership opportunities, such as park and ride with partner authorities, private sector investment.
6. Consider the Council's own fleet requirements as well as specific transport sectors such as taxi's/private hire vehicles (PHVs), buses and businesses vehicles.
7. Recommend a delivery plan to target the ramping up of EV infrastructure.

1.12 The strategy focusses on EV charging for cars, car-based vans, and taxis (hackney carriage and private hire vehicles), however it does include current EV and low carbon initiatives for buses, micro-mobility (e-scooters and e-bikes) and large/heavy goods vehicles and other service vehicles.

1.13 The strategy also looks at other developing technologies such as hydrogen and include modal shift opportunities such as enabling EV car clubs and linking to potential future policy areas such as clean air or zero emission zones.

Terms

1.14 In this document we use the terms 'Infrastructure' or 'Electric Vehicle Charge Points' (EVCPs), these are terms for the electric charging devices for vehicles to recharge through an electric cable connection. We recognise that there are trials of wireless EV charging which may become a viable alternative in the future and we will evolve our strategy as required for new technologies.

1.15 Electric vehicles (EVs), sometimes referred to as Ultra Low Emission Vehicles (ULEVs), or 'plug-in' vehicles including pure Battery Electric Vehicles (BEVs) and Plug-in Hybrids (PHEVs),all require charging from the electrical distribution network which will continue to have associated carbon emissions far into the future even though the vehicles travel with zero tailpipe emissions. ULEVs also include other zero emission (at tailpipe) vehicles such as hydrogen Fuel Cell Vehicles (FCEVs) which generate their own electricity on-board from a fuel such as hydrogen, and do not need to plug in to the electricity grid to recharge. Hybrids (HEVs) which do not plug in have a much smaller battery which is recharged while driving (regenerative). HEVs can drive in electric mode for only a few miles at the most.

Strategy Delivery

Delivery

1.16 This strategy includes an Action Plan with key objectives to direct and deliver future infrastructure needs of Reading. The action plan identifies specific actions regarding the objectives and both the immediate actions as well as the longer-term tasks.

1.17 It is acknowledged that the delivery of EVCPs requires a significant level of resourcing and funding either from public funds (local or national) or private sector funds or more likely a combination of both. It is also recognised that local authority budgets are already constrained and future spending more uncertain against the backdrop of the impact from the Covid pandemic. Local authorities will need to take careful consideration to ensure investment in EVCPs delivers good value for money whilst also not becoming obsolete within its expected timeframe.

1.18 Local authorities also need to define the role they will play in the delivery of EVCPs compared to private providers, home charging and other options available. This strategy and the commitments outlined in the action plan will take account of these issues working with stakeholders and suppliers to provide the Council with a coherent plan for the whole of the borough. It will also look to capitalise on existing budget as well as future Government grants and funding opportunities whilst developing partnerships with the private sector to deliver an EV charging network for Reading.

1.19 The EV Charging Infrastructure Strategy traverses across a wide area of Council policy areas from environment and energy, climate change, air quality to planning and transport, health and wellbeing and will be fully consulted with each as well as external stakeholders to ensure we have developed the right policy and measures for Reading.

Stakeholder Engagement and Consultation

1.20 The EV Charging Infrastructure Strategy will require further stakeholder engagement and consultation before policies and actions are put in place. Key delivery and partner stakeholders are identified in this document, however these and other stakeholders will need to be consulted further following the publication of the draft EV Charging Infrastructure Strategy.

Social Inclusion

1.21 While many areas of Reading are affluent, and likely to be among the first to see early mass adoption of EVs, there are also areas where income is low. Lower income households are often disproportionately affected by poor air quality and are also the sector of society least able to adopt EVs early.

1.22 While the Council is limited in the actions it can take to support low-income households with the direct purchase of EVs, action can be taken to be mindful of equitable access to EV charging and EVs wherever possible. Electric car clubs and the chargers needed to power them are identified as a valuable measure to help improve social inclusion within the EV Charging Infrastructure Strategy and this will be a key priority moving forward.

1.23 Access to on-street charging is underway in Reading to enable EV drivers access to local charging locations where people have no off-street parking. The Council is also supporting the introduction of low emission buses into Reading Buses fleet through the Air Quality Action Plan as well as introducing policies for cleaner taxis to improve air quality across all areas of Reading.

2. POLICY CONTEXT

National Policy

Road to Zero

2.1 In 2018, the government launched a 'Road to Zero Strategy' and has since confirmed that new petrol and diesel cars and vans will not be allowed to be sold in the UK from 2030 (subsequently revised to 2035). The strategy sets out plans and targets to enable a massive expansion of charging infrastructure across the country, reduce emissions from the vehicles already on the UK's roads, and drive the uptake of zero emission cars and vans.

2.2 The main objective of the Road to Zero strategy is to put the UK at the forefront of the design and manufacturing of zero emission vehicles. The policies identified the government's long-term ambitions as:

- Reduce emissions from the vehicles already on our roads.
- Drive the uptake of the cleanest new vehicles.
- Reduce emissions from heavy goods vehicles and road freight.
- Put the UK at the forefront of the design and manufacturing of zero emission vehicles.
- Support the development of one of the best electric vehicle infrastructures in the world.
- Support local action.

Transport Decarbonisation Plan

2.3 The UK Government (Govt.) has published the Transport Decarbonisation Plan (TDP) Decarbonising transport: a better, greener Britain[1] in July 2021. The TDP outlines the Government's current position of transport emissions, including highlighting current policies and strategies in place to decarbonise the transport sector. The TDP targets:

- Increasing cycling and walking
- Zero emission buses and coaches
- Decarbonising our railways
- A zero-emission fleet of cars, vans, motorcycles, and scooters
- Accelerating maritime decarbonisation
- Accelerating aviation decarbonisation

2.4 The TDP strategic priorities are:

- Priority 1: Accelerating modal shift to public and active transport
- Priority 2: Decarbonisation of road vehicles
- Priority 3: Decarbonising how we get our goods
- Priority 4: Place-based solutions
- Priority 5: UK as a hub for green transport, technology, and innovation
- Priority 6: Reducing carbon in a global economy

2.5 Govt. announced a commitment to end the sale of new petrol and diesel vehicles, and that all new cars and vans will be required to be fully zero emission at the tailpipe by 2035. As a result, the Govt. also published the Transitioning to zero emission cars and vans: 2035 delivery plan[2].

2.6 Additionally, Govt. have published a consultation on ending the sale of all non-zero emission heavy goods vehicles from 2040, with lighter heavy

[1] DfT (2021), Decarbonising transport: a better, greener Britain. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1002285/decarbonising-transport-a-better-greener-britain.pdf

[2] DfT, 2021- Transitioning to zero emission cars and vans: 2035 delivery plan

goods vehicles from 2035[3].

National Infrastructure Commission's National Infrastructure Assessment

2.7 The National Infrastructure Commission was set up to address the problems with long term infrastructure planning in the UK. This first National Infrastructure Assessment builds on the analysis in the Commission's interim report, Congestion, Capacity, Carbon: Priorities for national infrastructure, to set out a long-term vision for high quality, good value, sustainable economic infrastructure for the UK, and a clear plan to achieve it.

2.8 The relevant core principles include:

- Half of the UK's power provided by renewables by 2030
- £43 billion of stable long-term transport funding for regional cities
- Preparing for 100 per cent electric vehicle sales by 2030

Automated and Electric Vehicles Act 2018

2.9 This legislation is part of the Government's industrial strategy to promote the development and deployment of both automated and electric vehicles and is in line with policies on climate change. The purpose of this legislation is both to amend the existing compulsory third party insurance framework by extending it to cover the use of automated vehicles and deal with electric and hydrogen powered vehicle charging infrastructure.

2.10 Part 1 of this Act relates to motor insurance for automated vehicles (i.e., vehicles that can drive themselves without human intervention) and determines liability where an accident caused by an automated vehicle occurs.

2.11 Part 2 of this Act relates to electric vehicle charging. It is intended to address incompatibility of charge points by requiring standard connectors for vehicles.

2.12 It also improves access to charge points by requiring that they be accessible without membership, certain information is made available on charge points and there is a common method of payment.

The Government's Clean Air Strategy 2019

2.13 The Government's Clean Air strategy, which was published in January 2019, set out plans to meet ambitious legally binding international targets to reduce emissions of the five most damaging air pollutants by 2020 and 2030. This strategy outlines the government's ambitions relating to reducing air pollution, making air healthier to breathe, protecting nature and boosting the economy. The strategy sets out a clear direction for

[3] DfT (2021) Heavy goods vehicles: ending the sale of new non-zero emission models. Available at: https://www.gov.uk/government/consultations/heavy-goods-vehicles-ending-the-sale-of-new-non-zero-emission-models

future air quality policies and goals. Emissions from road transport have been in the spotlight because of their impact on local air quality, but the government is committed to cutting air pollution from all forms of transport.

Climate Change Policy

2.14 The Climate Change Act 2008 sets up a framework for the UK to achieve its long-term goals of reducing greenhouse gas emissions and to ensure steps are taken towards adapting to the impact of climate change. The Act saw the UK set a legally binding target of reducing emissions by at least 80% by 2050. The legislative framework enabled the target to be amended and a more ambitious target of achieving a 100% reduction in emissions (compared to 1990 levels), otherwise known as 'net zero', was adopted in law by the Government in 2019.

2.15 In April 2021, the UK Govt. announced that it will build on its Nationally Determined Contributions (NDC) commitments to 2030, by setting ambitious climate change targets into law to reduce emissions by 78% by 2035 compared to 1990 levels.

2.16 In line with the recommendation from the independent Climate Change Committee, this sixth Carbon Budget (Carbon Budget 6) limits the volume of greenhouse gases emitted over a 5-year period from 2033 to 2037, taking the UK more than three-quarters of the way to reaching the net zero by 2050.

2.17 The 26th UN Climate Change Conference of the Parties (COP26)[4] was held in Glasgow in late 2021. COP26 produced key goals for countries to target net zero carbon emissions by the mid-century and keep global warming under 2 degrees (centigrade). Countries will be updating their plans for reducing emissions and as part of that, a key target for countries is to 'speed up the switch to electric vehicles'[5].

2.18 The 27th UN Climate Change Conference of the Parties (COP27) held in Sharm el-Sheikh, reached agreement on an outcome that established a funding mechanism to compensate vulnerable nations for 'loss and damage' from climate-induced disasters.

Accessibility

2.19 Accessibility standards have been developed for EV charge-points across the UK by the Department for Transports Office for Zero Emission Vehicles (OZEV), in partnership with British Standards Institute (BSI) and Motability[6]. The standards have been developed to allow disabled drivers to easily identify which models are suitable for their needs.

2.20 Although not policy yet, the standards industry with:

- guidance on how to make individual charge-points more accessible; and
- guidance on aspects such as kerb height, adequate space between bollards and charge-points being of a height suitable for wheelchair users.

[4] UN Climate Change Conference of the Parties (COP26) https://ukcop26.org/
[5] COP26 (2021) https://ukcop26.org/cop26-goals/
[6] PAS 1899:2022 https://www.bsigroup.com/en-GB/standards/pas-1899/

Local Policy

Climate Emergency Declaration

2.21 Reading Borough Council declared a climate emergency in February 2019 which highlighted its commitment to playing a full role and leading by example in achieving a carbon neutral Reading.

Climate Emergency Strategy 2020-2025

2.22 The Reading Climate Emergency Strategy 2020-25 sets out the actions required during the five-year period to work towards the objective of a net zero carbon, resilient Reading, the target adopted in the climate emergency declaration. There are several actions from this document that relate to this strategy:

T13: Develop a zero-emission vehicle strategy for the Borough

T14: Decarbonise the Council Vehicle Fleet

T15: Increase Public Electric Vehicle Charging Points

T16: Increase Zero Emission Vehicles Uptake

T18: Planning Policy for EV Charging in new properties

T19: Reduce emissions from the Taxi Fleet

T20: Improve Electric Vehicle Charging Infrastructure

Air Quality Action Plan

2.23 Reading currently has a single Air Quality Management Area AQMA declared due to exceedances of the annual air quality objective for nitrogen dioxide (NO_2). The AQMA is not borough wide but does cover the central Reading area and the main arterial routes into Reading. The improvement of air quality is therefore a key driver for the EV Infrastructure Strategy.

2.24 The current Air Quality Action Plan (AQAP) sets out policies and measures to address air quality issues in the AQMA and across the borough. The AQAP also provides interventions that are required for meeting the national *Air quality plan for the achievement of EU air quality limit values for*

nitrogen dioxide (NO_2) in the UK[7]. The following actions relate to this strategy:

- Work towards the electrification of the vehicle fleet;
- Introduction of charging points into car parks and as part of new developments;
- Replacement of Council fleet vehicles with electric vehicles where feasible.

2.25 The forthcoming update of the AQAP will also look to encourage and develop policy areas and schemes that can support the strategy.

Carbon Plan 2020-25

2.26 The Carbon Plan sets out policy and targets on the Council's corporate energy and water management and identifies actions to achieve these within the time period 2020-2025. The plan includes actions to ensure the authority is compliant with relevant legislation (such as Energy Performance in Buildings legislation) and national reporting requirements (such as Greenhouse Gas Protocols). The Plan will assist the Council in making energy and water management an integral part of its decision-making processes, to ensure efficient use of these resources today and in the future.

2.27 Crucially, the implementation of the Plan will:

- Contribute to the Corporate Plan aim to 'Build a Council fit for the future' by improving the efficiency of our operations and minimising costs
- Deliver many of the Council's commitments as set out in the Reading Climate Emergency Strategy 2020-25
- Enable the Council to lead by example as we encourage Reading businesses, organisations, and residents to reduce their own environmental impacts.

2.28 The Carbon Plan includes actions which relate to this electric vehicle strategy:

- Rationalisation of the Council's vehicle fleet
- Electrify the Council's Light Commercial Vehicle (LCV) fleet
- Installation of charging units at the Council's Bennet Road depot
- Electrify the Council's fleet of pool cars
- Electrify the Council's Heavy goods vehicle (HGV) fleet

[7] Defra (2018) https://uk-air.defra.gov.uk/library/assets/documents/no2ten/Reading_FINAL.pdf

- Electrify the Council's Refuse Collection Vehicle fleet

Reading Transport Strategy 2040

2.29 The Reading Transport Strategy 2040 (RTS) sets out a plan for developing the town's transport network to 2040 and beyond. The RTS has several policies in place that related to this strategy which are:

- Policy RTS10 | Taxis and Private Hire
    - 10.2: We will work with taxi and private hire services, offering support and incentives to encourage a shift towards the use of cleaner vehicles.
    - 10.3: We will require all taxis operating in Reading to be electric or hybrid vehicles.
- Policy RTS24 | Freight and Sustainable Distribution
    - 24.3: We will work with operators to explore and support more sustainable delivery methods, such as cargo bikes and electric micro-vehicles, for the last mile delivery.

Reading Local Plan

2.30 The Local Plan for Reading is a document that contains the policies for how Reading will develop up to 2036 which is currently being updated to extend to 2041. The document identifies the amount of development that will take place, the areas and sites where development is expected to be accommodated, and where it will be restricted, and sets out policies for how planning applications will be decided. The Local Plan includes a policy which relates to this strategy:

- TR5: Car and Cycle Parking and Electric Vehicle Charging.

2.31 The above policy states that development should provide car parking and cycle parking that is appropriate to the accessibility of locations within the Borough to sustainable transport facilities, particularly public transport. Development should make the following provision for electric vehicle charging points:

- All new houses with dedicated off-street parking should provide charging points;
- Within communal car parks for residential or non-residential developments of at least 10 spaces, 10% of spaces should provide an active charging point.

Reading Corporate Plan 2022-25

2.32 The Council's Corporate Plan, Investing in Reading's Future, outlines the visions and priorities for Reading in the form of a three-year strategic plan for the period 2022-25 (annual update March 2023).

2.33 The plan outlines the vision of "to help Reading realise its potential – and to ensure that everyone who lives and works here can share the benefits of its success."

2.34 The Corporate Plan has a series of major change projects under three themes to set out how it will achieve the vision for Reading:

- Healthy environment
- Thriving communities
- Inclusive growth

Taxi Fleet Policy

2.35 Reading Borough Council have proposed new emissions policy for black cabs which will remove older polluting vehicles from Reading's roads and incentivise owners to replace them with newer taxis.

2.36 The schedule for the introduction of Taxi emissions policy is set out in Table 2.1.

Table 2.1: Taxi Fleet Policy

Date	Proposed Standard
23 Oct 2019	Vehicle Age policy 15 years for all vehicles, 100% electric 20-year Vehicle Age Policy
23 Oct 2019 (Currently paused)	All Replacement vehicles will be a min of Euro 5b and less than 8 years old. This rule will apply regardless of whether the vehicle is new to fleet or an existing vehicle.
1 Oct 2021 (Currently paused)	1 Oct 2021 Vehicle Age Policy 14 years for vehicles up to and including Euro 5a (vehicles registered later than 1/10/07 only)
1 Oct 2022 (Currently paused)	Vehicle Age Policy 13 years for vehicles up to and including Euro 5a (vehicles registered later than 1/10/09 only)
1 Oct 2023	Vehicle Age Policy 12 years for vehicles up to and including Euro 5a (vehicles registered later than 1/10/11 only)
1 Oct 2025	All Replacement vehicles are minimum ULEV and less than 8 years old. This rule will apply regardless of whether the vehicle is new to fleet or an existing vehicle.
1 Oct 2028	All vehicles to be minimum ULEV

2.37 The Taxi fleet policy was paused due to the impact of Covid on the trade, hence only the 1st phase policy (15-year age policy) is in place.

3. EV CHARGING INFRASTRUCTURE IN READING

Local Context

3.1 Reading is an urbanised generally affluent authority in Berkshire. Incomes in Reading are generally high, especially in the outer areas, however there are areas of income deprivation, particularly in the Whitley, Tilehurst and Lower Caversham areas.

Figure 3.1: Wards within Reading

3.2 Parts of the Reading borough have relatively high levels of health and disability deprivation, particularly in the town centre, Whitley, Coley and West Reading. There are high levels of vehicle congestion on roads around the town centre and along key corridors in Reading. This causes low environmental quality and high levels of air pollution, negatively affecting people's mental and physical health.

3.3 It is estimated that 35% of the country's drivers have no off-street parking which is mainly in urbanised areas and an evaluation of Reading has identified that this is around 45% of the town's drivers. As such this will significantly influence the uptake of EVs in Reading unless sufficient on street charging is provided.

Current Level of EV Uptake

3.4 Despite the rise in the number of licensed ULEV cars on UK roads, as a proportion of the total number of cars licensed, ULEVs still represent a tiny share. In 2021 around 58.0% of licensed cars were petrol, 36.9% diesel and 5.0% were either a plug-in-hybrid, battery electric (BEV), range-extended electric (REV), or fuel cell electric cars (FEVs).

3.5 ULEVs are however on a significant upward trajectory in numbers as the latest Department for Transport figures in Table 3.1 show the number of electric vehicles in the UK is increasingly rapidly. The number of plug-in battery electric vehicles (BEVs) in the UK has risen from roughly 10,000 in 2012, to nearly 1m in 2022. A similar trend is occurring in Reading where registered BEVs in 2012 went from 5 plug-in vehicles to over 1,300 by the third quarter of 2022 Industry figures suggest that 12.5% of all new car registrations in the UK during 2022 were pure-electric, a further 7.9% plug-in hybrids, 13% mild-hybrid petrol and 5% mild hybrid diesel.

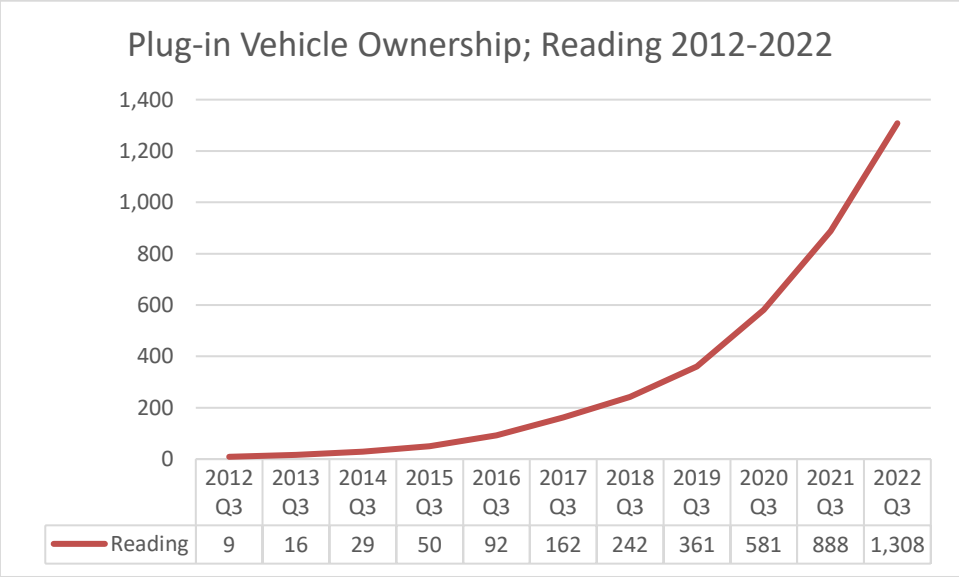
Table 3.1: Numbers of EVs in Reading and UK (2012 - 2022)

	2012 Q3	*2013 Q3*	*2014 Q3*	*2015 Q3*	*2016 Q3*	*2017 Q3*	*2018 Q3*	*2019 Q3*	*2020 Q3*	*2021 Q3*	*2022 Q3*
Reading	9	16	29	50	92	162	242	361	581	888	1,308
UK	10,026	12,741	22,468	47,260	83,875	129,006	182,289	243,992	372,136	643,543	991,419

3.6 There is a clear and evident increase in electric vehicle ownership in the borough as highlighted by the graph (Figure 3.2) below. This increase is likely to continue given the policies being implemented by central government and local government.

3.7 It is evident that advances in electric vehicle technology are also making EVs a more affordable and practical option for many. The ranges of EVs are increasing to comparable ranges of petrol and diesel vehicles with prices of vehicles and leasing options for EV also reducing.

Figure 3.2: EV Ownership in Reading (2012 - 2022)

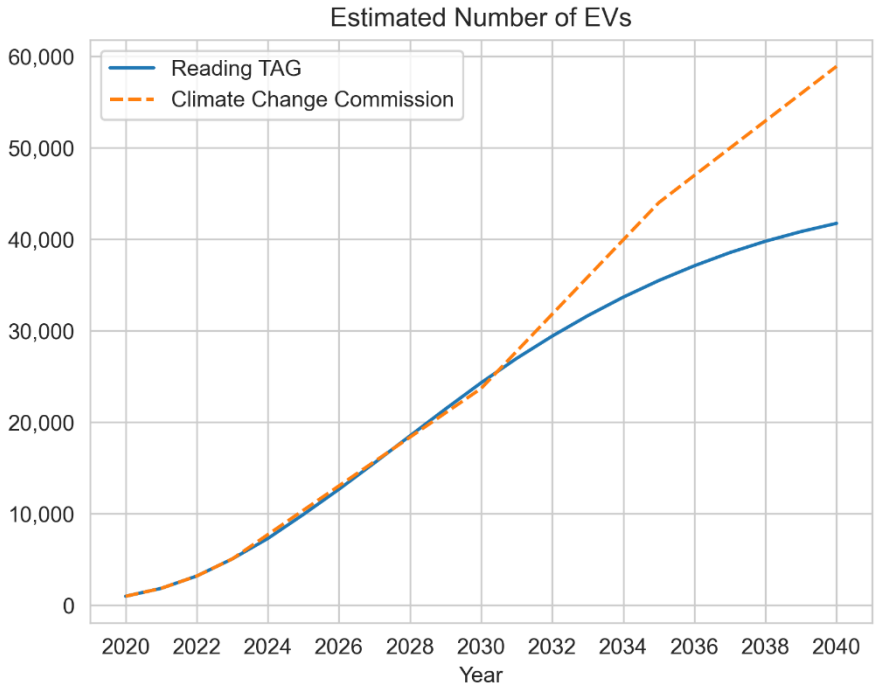


	2012 Q3	2013 Q3	2014 Q3	2015 Q3	2016 Q3	2017 Q3	2018 Q3	2019 Q3	2020 Q3	2021 Q3	2022 Q3
Reading	9	16	29	50	92	162	242	361	581	888	1,308

Projected EV Uptake

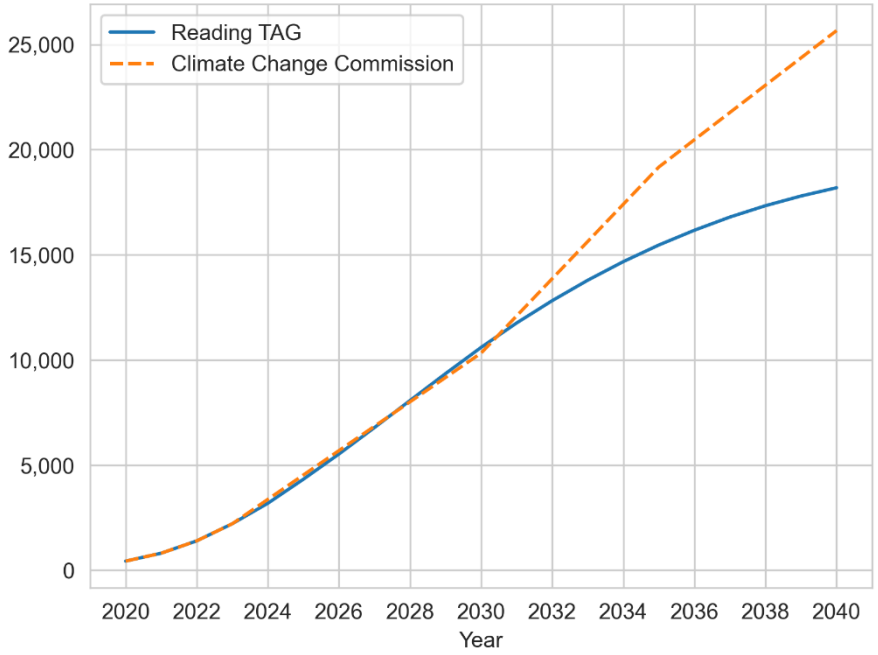
3.8 EV uptake for residents of Reading has been projected to 2040 based on the DfT's Web-based Transport Analysis Guidance (TAG) and this is shown for Reading in Figure 3.3 In addition this figure also shows the Commission for Climate Change projections of what they believe the take up of EVs should be to meet our 2050 climate goals. Reading's TAG projection tracks the Commission for Climate Change estimates up to around 2030, but then diverges indicating that a far greater take up of EVs will be required.

Figure 3.3: Projected Number of EVs for Reading



3.9 Figure 3.4 shows the estimated number of resident's EVs that we are expecting to be parked on street based on approximately 45% of dwellings not having off-street parking. This simply assumes that the EV growth is evenly distributed across the town and hence growth may be less in the early years as EVs remain expensive and are generally being purchased by the more affluent who are more likely to have off-street parking for home charging. However, EV prices are falling and more used EVs are coming onto the market and the desire of individuals to reduce their carbon footprint is not necessarily linked to affluence and hence this provides a good basis for projecting on street charging needs.

Figure 3.4: Projected Number of On-Street EVs



EV Infrastructure in Reading

3.10 There are currently 116 publicly usable electric vehicle charging points available within the borough of Reading[8] as shown in the Table 3.2 below. 21 of these charge points were installed by Reading Borough Council in their car parks.

Table 3.2: Number of EVCPs across UK and Reading

	Jan-20	Apr-20	Jul-20	Oct-20	Jan-21	Apr-21	Jul-21	Oct-21	Jan-22	Apr-22	July-22	Oct-22	Jan-23	Apr-23
Reading	34	50	50	51	57	58	59	62	64	96	101	115	111	116
United Kingdom	16,505	17,947	18,265	19,487	20,775	22,790	24,374	25,927	28,375	30,290	32,011	34,637	37,055	40,150

[8] DfT, Electric vehicle charging device statistics: April 2021 - Electric vehicle charging device statistics: April 2021 - GOV.UK (www.gov.uk)

3.11 Table 3.3 below sets out the location of public charge points available within the borough. These are a mix of slow, fast and rapid chargers[9]. Note that the table also includes 34 EV charge points associated with the Reading Rail Station car park, where 160 charge points are planned to be installed by Network Rail. Charge Point Operators (CPOs) provide the charge points and charge for their use through contact-less charging, membership fees or are part of the EV ownership fees, such as Tesla[10].

Table 3.3: Location of Public EVCPs in Reading (2023)

Location	No. of CP	Charge Connector	Power	Provider	Location Type
Rose Kiln Lane	2	3-pin	3kW	POD Point	Other
Bridge Street	3	Type 2, CCS, CHAdeMO	22kW	Equans EV Solutions	On-street
Henley Road	3	Type 2, CHAdeMO, CCS	43-50kW	Equans EV Solutions	Service station
Cavendish Road	4	CHAdeMO, CCS	50kW	InstaVolt Ltd	Retail car park
Reading Rail Station	34	Type 2	11kW	APCOA	Public car park
Rose Kiln Lane	2	Type 2	7-22kW	BP Pulse	NHS property
Unit 250 Longwater Avenue	2	Type 2	3.7kW	BP Pulse	Other
1 Station Hill	2	Type 2	7-22kW	BP Pulse	Other
500 Basingstoke Road	2	CHAdeMO	50kW	BP Pulse	Private home
387 Basingstoke Road	2	CHAdeMO	50kW	BP Pulse	Retail car park
St. Bartholomews Road	2	Type 2	3.7kW	CityEV/Joju Ltd	On-street
The Oracle Shopping Centre	12	Type 2	22kW	POD Point	Retail car park
Oldfield Retail Park	4	Type 2	7kW	POD Point	Retail car park
Tesco Extra - Reading West	4	Type 2	7kW	POD Point	Retail car park
Tesco Extra - Reading	4	Type 2	7kW	POD Point	Retail car park
24 Robert Cort Industrial Estate	2	Type 2	22kW	POD Point	Workplace car park

[9] NCR Database and Open Charge Map https://www.gov.uk/guidance/find-and-use-data-on-public-electric-vehicle-chargepoints, https://openchargemap.org/site
[10] Tesla charge points are not shown as publicly accessible charge points as these are reserved for Tesla owners only.

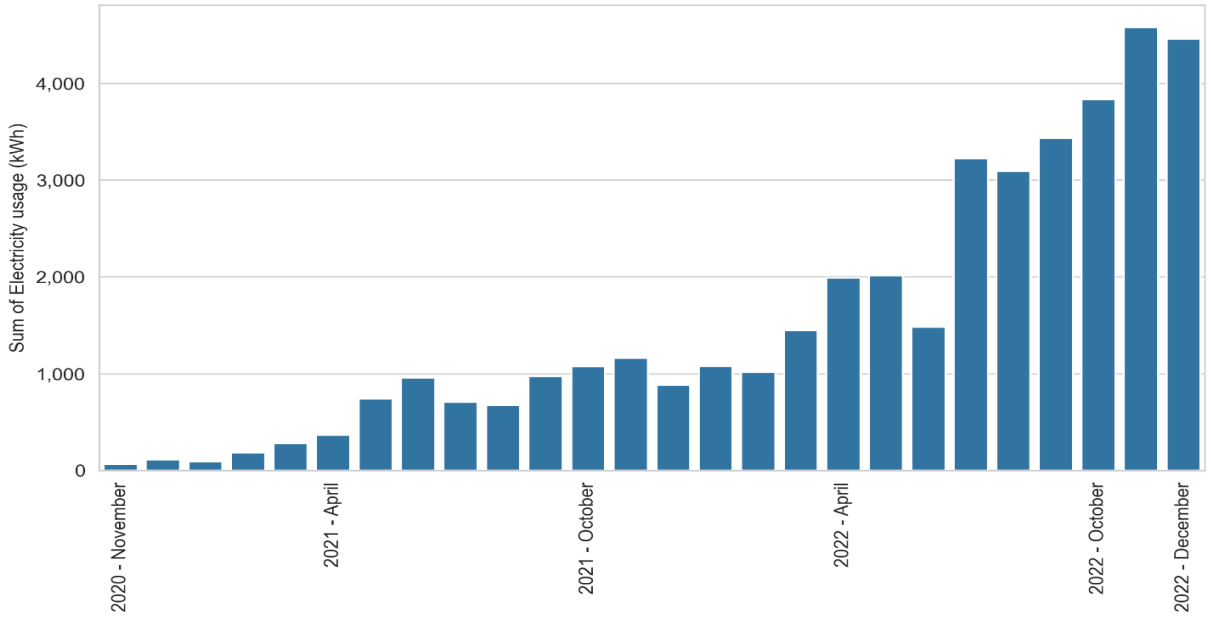
Location	No. of CP	Charge Connector	Power	Provider	Location Type
Chester Street Car Park	2	Type 2	7kW	Mer	Public car park
Thames Promenade Car Park	2	Type 2	7kW	Mer	Public car park
Kensington Road Car Park	2	Type 2	22kW	Mer	Public car park
585 Basingstoke Road	3	Type 2, CCS, CHAdeMO	43-50kW	Shell Recharge	Service station
Friar Street	4	Type 2	22kW	Drax Energy Solutions Limited	Hotel / Accommodation
Shell, Shinfield Rd	3	Type 2, CHAdeMO, CCS	43-50kW	Equans EV Solutions	Service station
Chatham Street	8	Type 2	22kW	EB Charging	Public car park
Wantage Road	3	Type 2	1.3-7kW	CityEV/Joju Ltd	On-street
Anstey Road	1	Type 2	1.3-7kW	CityEV/Joju Ltd	On-street
East Street	1	Type 2	1.3-7kW	CityEV/Joju Ltd	On-street
Caversham Road	1	Type 2	1.3-7kW	CityEV/Joju Ltd	On-street
Coventry Road	2	Type 2	1.3-7kW	CityEV/Joju Ltd	On-street
Filey Road	1	Type 2	1.3-7kW	CityEV/Joju Ltd	On-street
Manchester Road	2	Type 2	1.3-7kW	CityEV/Joju Ltd	On-street

3.12 Many of Readings charge points are on residential streets, such as the CityEV units. These units are using the existing electrical supply to lamp posts, the charge points have been installed and are operational on Coventry Road, Filey Road, Manchester Road, St Bartholemews Road, East Street, Anstey Road Caversham Road and Wantage Road. The locations were selected following the Council's 'Go Electric' public consultation where Reading residents who either owned an electric vehicle or had an interest in buying one in the future.

3.13 Many EVCP sites are at commercial, or retail locations and are used as "destination charging" locations. These sites are often Slow to Fast EVCP sites. Rapid charge sites in Reading located in Henley Road and Basingstoke Road are commercial refuelling stations which indicates a shift in the market of major fuel providers entering the electric charging market and providing "en-route charging" facilities.

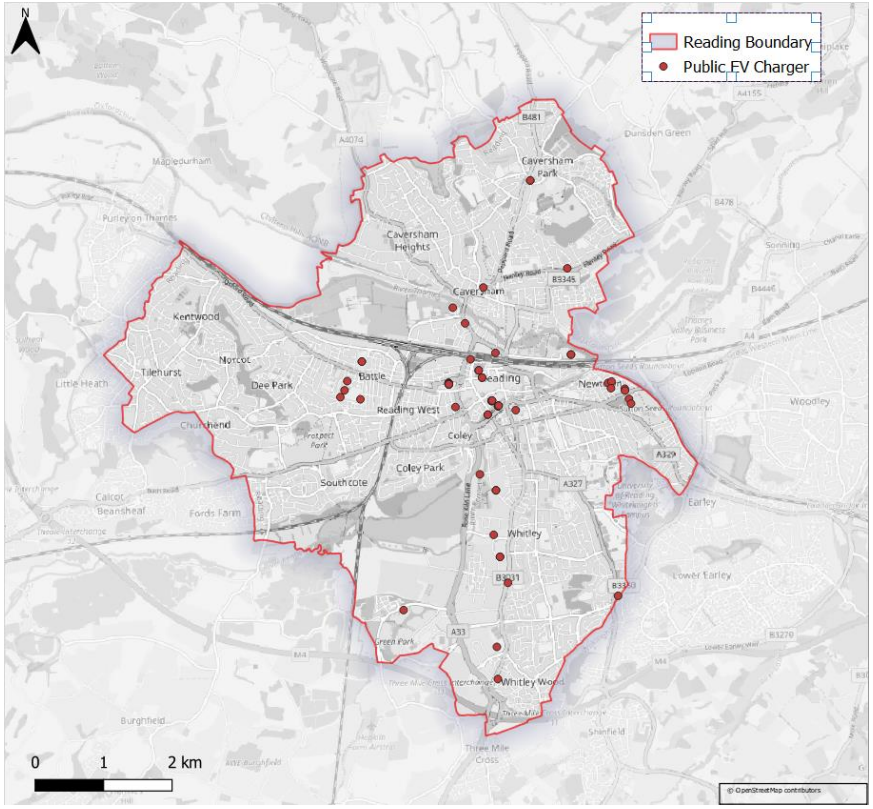
3.14 EV charge point usage is being monitored and there has been a solid growth in the use of the EV chargers in the car parks as shown in Figure 3.5, however this is not reflected in the same way for the CityEV lamp columns on street. Initial higher usage dropped after February 2021 when they switched from being free to being paid for chargers and it is likely that those originally using them were not local residents, but instead specifically parking there for a free charge. Since charging was introduced, around a third of the chargers are regularly used indicating a local resident with an EV, or hardly used at all, reflecting that there are no EVs on the street. Hence, whilst the lamp column infrastructure is under-utilised at present, this should not be seen as a reflection that significant investment in on-street chargers is not required.

Figure 3.5: EV Charge Point Usage – Reading Car Parks



3.15 These initial figures would seem to indicate that actual demand in Reading is substantially lower than that estimated as projected EV uptake for the on-street charging however, with only a limited number of on-street charging, there is not the critical mass that would give people the confidence to purchase an EV and rely on the infrastructure and this is expected to change with a substantial investment in EV charging provision set out in this strategy.

Figure 3.6: Location of Public EVCPs in Reading (2021)



GO ELECTRIC
READING
Take Charge of Your Environment

Other EVCP sites near Reading

3.16 EVCP infrastructure is also available to EV drivers in the vicinity of Reading and provide locations for “en-route charging” such as at Motorway Services or “destination charging” such as at a Park and Ride facility.

3.17 These facilities provide EV drivers with the opportunity to recharge when visiting Reading and/or for residents and businesses to recharge if en-route to other destinations. Table 3.4 provides locations of nearby EVCPs for en-route or destination charging.

Table 3.4: Location of EVCPs near Reading (2021)

Location	No. of CPs	Charge Connector	Power	Type	Provider
M4 Moto Services Burghfield (East)	2	CCS, CHAdeMO, Type 2	43kW-50kW	Rapid	Ecotricity/Gridserve
M4 Moto Services Burghfield (West)	2	CCS, CHAdeMO, Type 2	43kW-50kW	Rapid	Ecotricity/Gridserve
Mereoak Park & Ride (A33)	2	CCS, CHAdeMO, Type 2	43kW-50kW	Rapid	Charge Your Car
Winnersh Triangle Park & Ride (A2320(M))	2	CCS, CHAdeMO, Type 2	43kW-50kW	Rapid	Charge Your Car
Green Park	4	Tesla	120kW	Rapid	Tesla
Thames Valley Park	4	Type 2	7kW	Slow	POD Point
IKEA Reading Car Park	5	CCS, CHAdeMO, Type 2	43-50kW	Rapid	Ecotricity/Gridserve

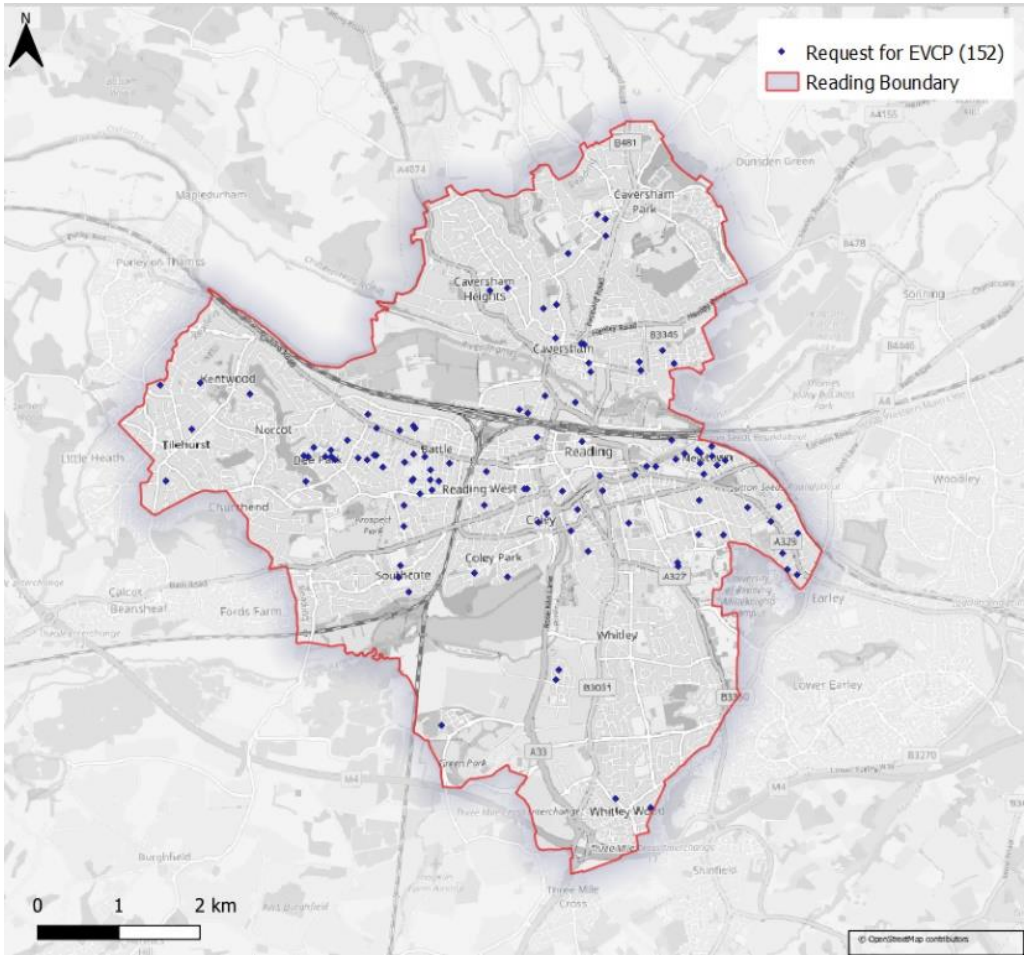
Infrastructure Demand

Requests for Charge Points

3.18 In order to identify potential charge point locations where there is already demand for infrastructure, Reading Borough Council invited residents to suggest a location for an EV charging point online. The map (Figure 3.7) below shows the locations of 152 suggestions received to date (May 2023).

3.19 In addition to charge points, Reading Borough Council has also offered to install either slot-drain in the pavement or cable covers that enable residents to connect a cable to a home charge point and charge vehicles on street. Take up has been very low with only 4 installed to date. At present dedicated parking bays are not being installed for residents requesting this infrastructure.

Figure 3.7 - EVCP Location Request Map



Infrastructure Requirements

3.20 EV charging Infrastructure will need to be implemented to address the following growth in EV demand:

- Residents of Reading – Slow to Fast charging on-street for those who cannot install home chargers.

- Commuters and Visitors to Reading – Rapid and ultra rapid charging at charging stations and slow to rapid charging at public and private car parks, workplaces, retail, entertainment venues etc reflecting typical duration of stay.
- Businesses providing local services, e.g. taxi services and delivery services

3.21 Section 4 sets out the infrastructure options appraisal including future technologies that may affect how we charge EVs. This infrastructure forecast reflects the expansion of current EV charging infrastructure, and the aim of the strategy is to continue monitoring EV growth, technologies, and use of charge points to be adaptable to future uncertainty.

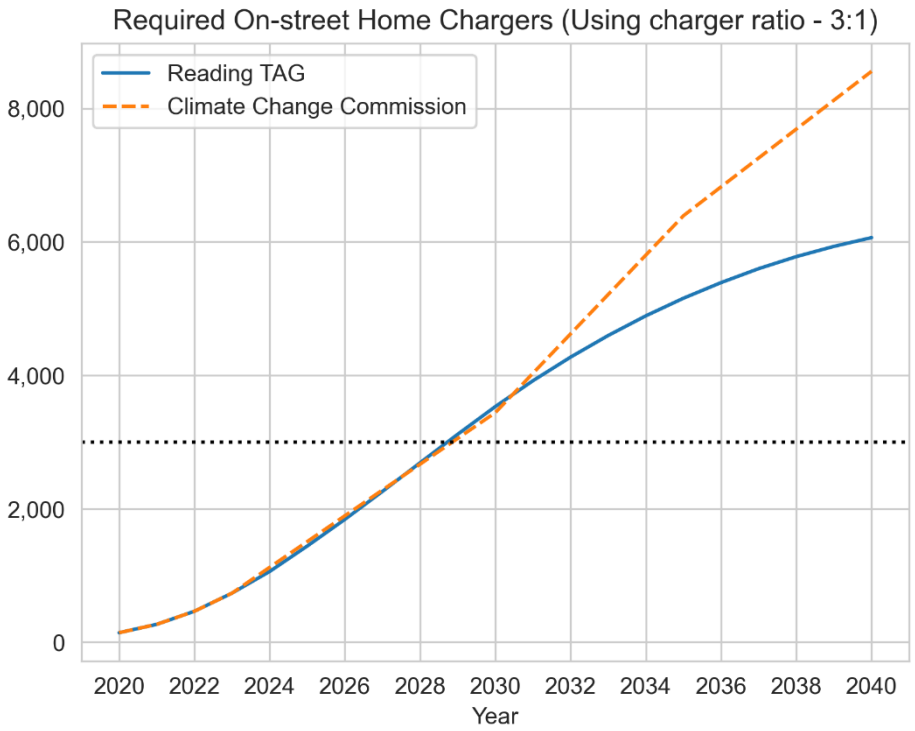
Local Residents

3.22 Figure 3.8 below shows an estimated forecast number of on-street chargers (and / or ducting provision in kerbs for home charging) required to meet the growth in demand for EVs. It assumed that these will be slow / fast lamp column chargers or similar on-street chargers and there will need to be one charger per 3 vehicles. It is not proposed to provide dedicated parking bays, but instead, by providing a large number of chargers there is much greater flexibility to park near one on the street. The requirement for one charger per 3 vehicles is based on an average annual vehicle milage of 7,500 miles[11] and the average daily milage that will need to be topped up (about 20 miles). This indicates that Reading should be providing around 3,000 on street chargers by around 2030 to enable EV growth. As set out above, the growth in EVs may be lower on-street in the early years with a higher proportion purchased by households with off-street parking and monitoring of demand to balance the supply of chargers will be a key element of the strategy delivery.

A particular challenge is large parts of Reading being a Victorian town with lots of terraced homes with on street parking only. Where charging infrastructure is provided on the street, the highest priority location for the infrastructure will be within the road where this is feasible (such as the example shown in the photo). This will ensure that obstructions are not created for pedestrians on footways which can often be narrow.

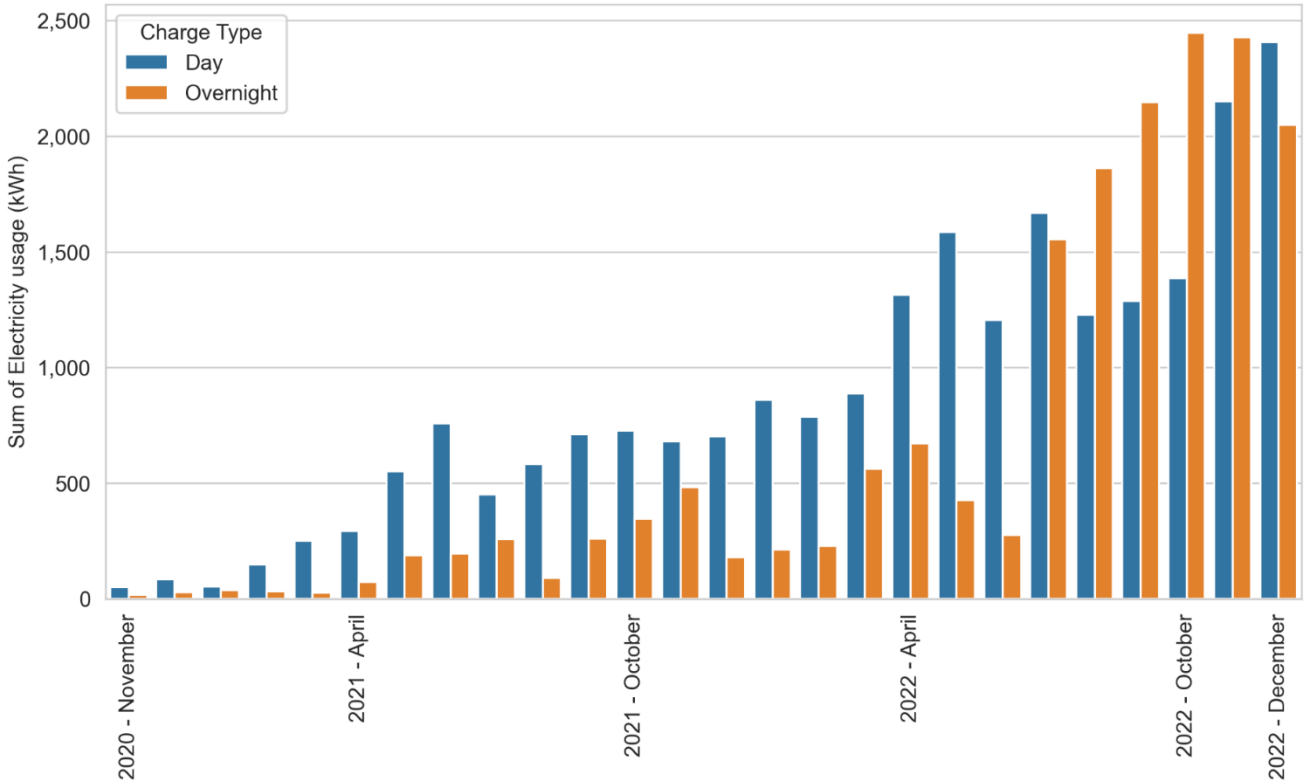
[11] NTS0901: Annual mileage of cars by ownership, fuel type and trip purpose: England, 2002 onwards

Figure 3.8 - Predicted Requirement of On-street EV Chargers



3.23 Council owned car parks also provide an option for EV charging. Parking is free overnight, and this provides the opportunity for residents to use the car park to charge rather than use an on-street charger and car parks are covered below. Figure 3.9 shows the car park EV usage within Reading by the estimated use type, where overnight charging is assumed to be usage by residents. This would indicate that the car parks are used as charging hub for residents when parking is free overnight, and this usage is similar to visitor usage during the day. At present, there is not an on-street charging alternative for people living locally to the car parks and it may be that when this is introduced that car park usage will fall. However, it also indicates that people will use a local hub for charging and that this could be an option where it is difficult to provide on-street parking.

Figure 3.9 - EV Charge Point Usage by Day/Overnight charging – Reading Car Parks



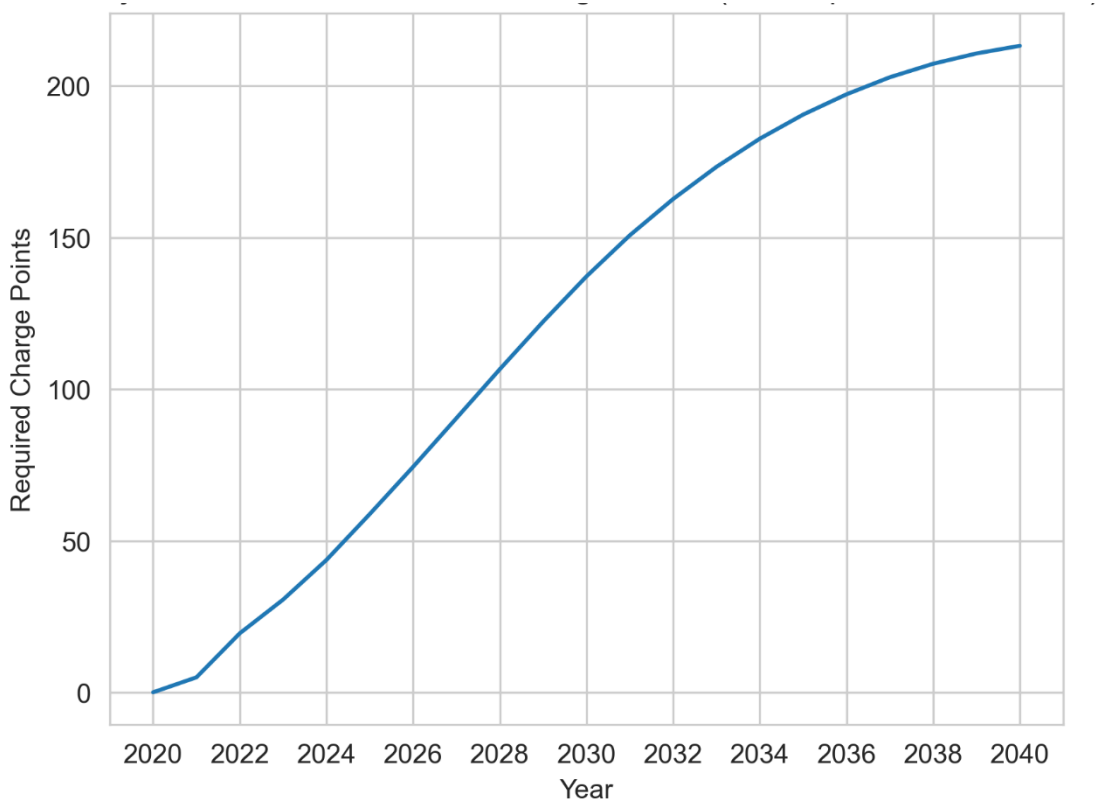
Commuters and Visitors to Reading and commercial users

We consider that there are two types of infrastructure requirements:

- Rapid and Ultra-rapid EV chargers which will be required to provide a full charge to a vehicle which is in-transit on a longer journey or has visited Reading from some distance and requires a full charge in a reasonable time. Also, taxi's and delivery vehicles may benefit from this type of charger if they need a top up during the day with minimum delay to their business. There is an expectation that existing fuel suppliers such as BP and Shell will install rapid and ultra-rapid chargers at charge hubs in Reading. The role of the Council may be to install some rapid / ultra-rapid charge hubs where the market is not going to provide them, such as providing for the electrification of taxis.

- Charging for local visitors such as 7KW chargers in car parks where vehicles may need an additional top up for the journey to the car park. Reading Borough Council (RBC)'s primary focus to meet this demand will be in the provision of EV charging infrastructure in the Council owed car parks. Analysis has been undertaken of the current car park use where 7KW EV charging has been installed and Figure 3.10 shows the projected requirement for charge points in the car parks. This figure reflects that it is likely that most cars visiting the car parks will have charged at home and the journey to and from the car park will be well within the capacity of the battery. As with on-street charging, keeping supply and demand under review will be key to delivery of the strategy. Also, greater investment will be required for car parks that act as overnight on-street charging for residents and where increased investment in on-street charging still leads to their use.

Figure 3.10: Projected number of Car Park Charge Points (RBC Operated Car Parks)



It is expected that workplaces will also continue to provide charging for their employees and visitors.

Regional Context

Geographical and Population Context

3.24 As shown in the map (Figure 3.11), Reading neighbours with Wokingham, South Oxfordshire and West Berkshire local authorities. Despite the geographical size difference between the boroughs, figures from the ONS Mid-Year Estimates for 2019[12] in Table 3.5 show that they have similar population sizes.

Figure 3.11: Local Authority Map

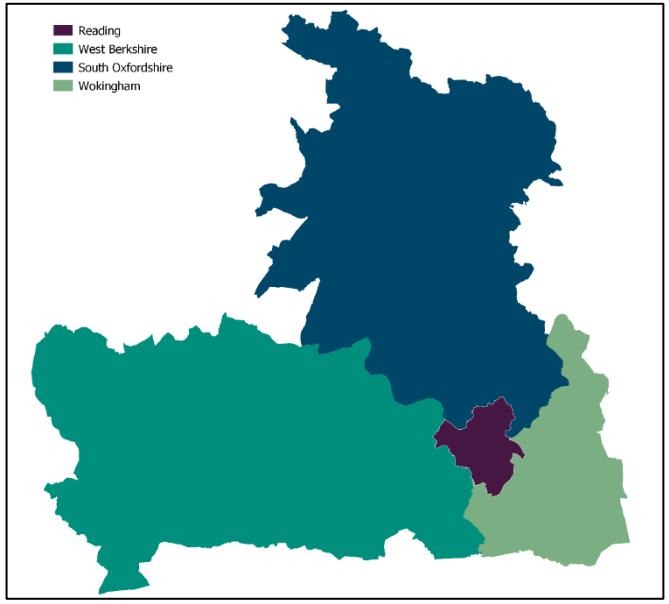


Table 3.5: Population estimates (2021)

Local Authority	Population Estimate (2021)
Reading	174,200
Wokingham	177,500
South Oxfordshire	149,100
West Berkshire	161,400

Ownership and Access to Private Vehicles

3.25 Car ownership ratios differ across local authority areas dependent on a number of factors some of those include:

- socio-economic status;
- access to quality and frequent public transport systems;

[12] ONS Mid-Year Estimates for 2019 - https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/populationestimatesforukenglandandwalesscotlandandnorthernireland

- cycle and walking infrastructure; and
- on and off-street parking availability, as well as parking constraints or fiscal measures to limit parking.

3.26 Differences in car usage are evolving with more urbanised populations favouring private car ownership less, with leasing or car-club options being a more economic option to owning, taxing, parking and running a vehicle.

3.27 Data from the (pre-Covid) 2019 National Travel Survey (NTS)[13] showed trip rates for urban (conurbations) and rural towns for car/van drivers during 2018/19 were at 296 and 460 trips respectively. The data show that cars/vans are used over 55% more in rural areas than in urban conurbations such as Reading.

3.28 Reading is a more urbanised authority than the other neighbouring authorities, hence private vehicle ownership and usage is lower, due to some of the aforementioned factors.

Numbers of EVs

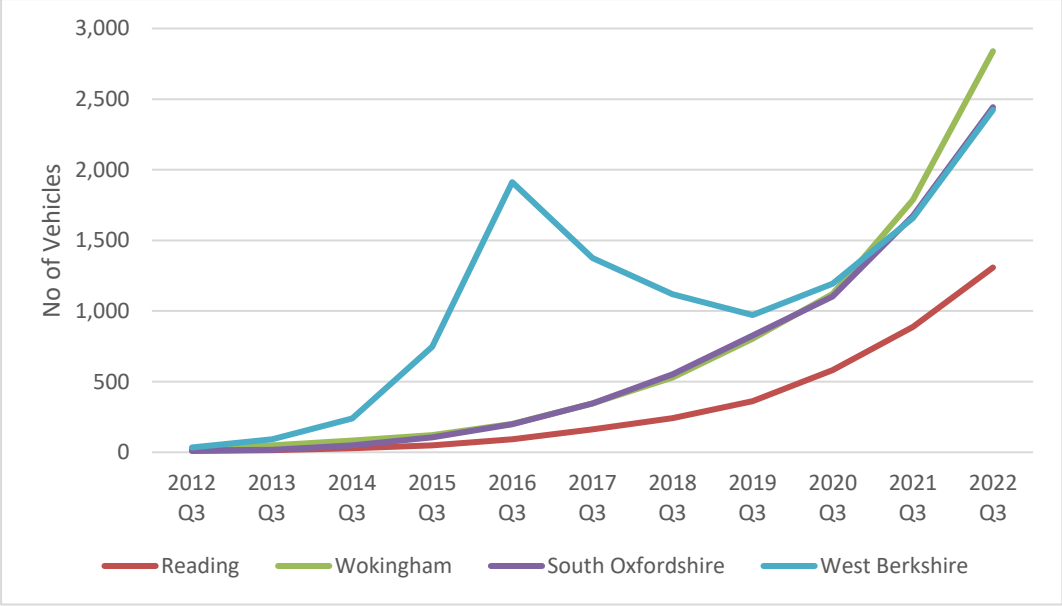
3.29 Table 3.6 and Figure 3.12 below show the number of plug-in vehicles licensed at the end of quarter 3, from 2012 to 2020, in Reading, Wokingham, South Oxfordshire and West Berkshire[14]. The data shows that Reading currently has fewer EV registrations than its neighbouring boroughs.

Table 3.6: Registered EVs across Reading, Wokingham, South Oxfordshire and West Berkshire (2012 – 2022)

Local Authority	2012 Q3	2013 Q3	2014 Q3	2015 Q3	2016 Q3	2017 Q3	2018 Q3	2019 Q3	2020 Q3	2021 Q3	2022 Q3
Reading	9	16	29	50	92	162	242	361	581	888	1,308
Wokingham	22	49	83	122	201	346	529	803	1,122	1,788	2,839
South Oxfordshire	14	17	50	105	199	346	553	827	1,102	1,673	2,443
West Berkshire	34	93	239	748	1,913	1,375	1,118	971	1,194	1,659	2,424

[13] DfT (2020) https://www.gov.uk/government/collections/national-travel-survey-statistics and https://www.gov.uk/government/statistics/national-travel-survey-2019
[14] DfT and DVLA (Table 0132) https://www.gov.uk/government/statistical-data-sets/vehicle-licensing-statistics-data-tables#ultra-low-emission-vehicles

Figure 3.12: Registered EVs across Reading, Wokingham, South Oxfordshire and West Berkshire (2012 – 2022)



3.30 When comparing the ratio of EVs versus all vehicles registered in these authorities, to date Reading is slightly behind the other authorities. There is an apparent anomaly in the West Berkshire graph, but the numbers are correct as per the DfT/DVLA statistics and the reason for the high uptake peaking in 2016 is not known but could, for example, be a vehicle leasing company registering all its EVs in a West Berks location for a period of time.

3.31 Table 3.7 presents the percentage of total vehicles that are plug in (EV) since 2012, included in this table are data from a similar sized urban local authority (Brighton and Hove) for comparison.

Table 3.7: Percentage EVs across Reading, Wokingham, South Oxfordshire, West Berkshire and Brighton* (2012 – 2022)

LA	2012 Q3	2013 Q3	2014 Q3	2015 Q3	2016 Q3	2017 Q3	2018 Q3	2019 Q3	2020 Q3	2021 Q3	2022 Q3
Reading	0.01%	0.02%	0.04%	0.07%	0.12%	0.21%	0.32%	0.47%	0.76%	1.16%	1.69%
Wokingham	0.02%	0.03%	0.06%	0.08%	0.13%	0.25%	0.42%	0.66%	0.95%	1.55%	2.45%
South Oxfordshire	0.01%	0.02%	0.04%	0.10%	0.18%	0.31%	0.49%	0.72%	0.96%	1.45%	2.09%
West Berkshire	0.04%	0.10%	0.25%	0.76%	1.92%	1.36%	1.10%	0.93%	1.15%	1.57%	2.27%
**Brighton and Hove*	0.02%	0.03%	0.05%	0.09%	0.16%	0.24%	0.40%	0.50%	0.76%	1.18%	1.86%

*Note: *Brighton and Hove data has been included to demonstrate ratios of EVs in a similar urban authority.*

3.32 The current (2022 Q3) percentage of EVs in Reading is comparable to other urbanised authorities such as Brighton and Hove, indicating that private vehicle ownership is lower due to aforementioned urbanisation factors (see para. 3.25).

Numbers of Charge Points

3.33 Table 3.8 below shows the number of charging devices (EVCPs) within Reading and its neighbouring boroughs. West Berkshire has the highest total devices per 100,000 population, with almost double the numbers of Reading, Wokingham and South Oxfordshire.

Table 3.8: EVCPs per 100,000 population

Local Authority	Total devices (January 2023)	Per 100,000 Population
Reading	116	64.1
Wokingham	112	62.9
South Oxfordshire	74	49.3
West Berkshire	143	88.3

Reading's Own Fleet and Infrastructure Plans

3.34 The Council currently operates two electric cars and seven electric vans, with the remainder of the fleet currently petrol/diesel powered. It is, however, a very modern fleet with high emission standards and plans electrify the fleet are a part of the Council's Fleet Replacement Programme.

3.35 In addition, the Council now has six electric Refuse Collection Vehicle (eRCV) with the required charging infrastructure. These vehicles are being evaluated on an on-going basis and plans are being prepared to fully transfer the fleet of refuse collection vehicles to electric operation. The Council is also testing other vehicle types as they come on to the market and has one electric compact sweeper vehicle, with additional vehicles to be integrated into the Council's fleet as existing models approach the end of their lifetime and replacement from 2024 onwards.

3.36 Ongoing monitoring is enabling the balance of the fleet between cost, reliability and any operational limitations to be understood. Battery technology is also progressing rapidly and will be taken into account where vehicle range impacts on operations. The switch to electric is expected to follow the Council's fleet replacement programme over time, however, this will be reviewed to minimise carbon, e.g. upgrading diesel vehicles to make the best of embedded carbon, prior to replacement with electric vehicles.

3.37 There are 5 charging points for fleet vehicles to charge at the Council's offices at Bridge Street and a further 6 load balancing units at Bennett Road. These units are for Council fleet vehicle use only, as set out in Table 3.9 below.

Table 3.9: Reading Council EVCPs

Street Location	EV Charge Connector	Charge Power Rating	Type	Provider
LG Car Park Civic Offices 1and 2	Type 2	7kW	Fast	Swarco
LG Car Park Civic Offices 3 and 4	Type 2	7kW	Fast	Swarco
Bennett Road Depot 1 and 2	Type 2	7kW	Fast	Mer
Bennett Road Depot 3 and 4	Type 2	3.7-22kW	Slow- Fast	Mer
Bennett Road Depot 5 and 6	Type 2	3.7-22kW	Slow- Fast	Mer

Sustainable Transport Options

Buses

3.38 Electric buses are operating across the UK and Reading Buses is looking to introduce electric buses as part of their fleet replacement programme. Currently Reading buses are improving the fleet emissions through the provision of funding to upgrade their older bus fleet in conjunction with funding sourced through the AQAP.

Micro Mobility (e-Bikes and e-Scooters)

3.39 E-bikes are seeing a significant growth in popularity and hence Reading needs to consider provision of charging infrastructure. Electric ranges on e-bikes are generally good and hence most charging is expected to be at home or potentially at an office with little need for on-street parking. Provision would be required for occasional charging in the town centre for cyclists who have forgotten to charge, and for cyclists undertaking longer distance journeys. How charging infrastructure relates to the Sustrans strategic cycle network will be a key consideration.

3.40 The provision of charging infrastructure for e-bikes will also be important for delivery and cargo bikes for current and future logistics.

3.41 E-scooters are currently illegal on the public highway unless they are part of an official hire scheme. However, it is expected that the government will legalise e-scooters and hence consideration of public charging provision will be considered. As with e-bikes, it is expected that most charging will be at home or in the workplace with limited demand for public charging.

Taxis

3.42 There are currently 13 zero emission/EV Taxis (Hackney Carriage) and no zero emission/EV registered Private Hire Vehicles (PHVs) operating in Reading out of a fleet of 568 (Taxis and PHVs). The 2021 Energy Saving Trust (EST) research[15] showed that 95% of Taxi drivers would switch to EV with two in five planning to switch within the next 5 years, however many consider cost of electric vehicles as a major barrier to purchase or lease.

3.43 The EST research also identified that average taxi mileages reported were low: 81% stated their typical daily mileage was 100 miles or less. Usage patterns of both forms of taxi mean that access to Rapid and Ultra-Rapid charging would be important in the transition to EV Taxis. This will be important in allowing drivers to maximise their productive work time, and that charging infrastructure at company premises, and close to popular routes or ranks are beneficial to supporting the EV taxi business case.

[15] Energy Savings Trust (2021) Reading Taxi research

Car Clubs

3.44 Reading currently have no operating electric vehicle car club cars. Co-wheels operates in Reading and is a car-club which uses both new and existing vehicles as part of its fleet. Co-wheels is also one of the first UK car clubs to introduce electric cars.

3.45 Co-wheels currently host 7 locations in Reading including:

- Cemetery Junction, Oxford Road, Rectory Road, Sherfield Hall Reception, UoR Whiteknights campus, Cardiff Road and Filbert Street (Huntley Wharf).

3.46 The introduction of an EV car club scheme at key locations across Reading would increase access to zero emission vehicles for a variety of residents, students, business operators and visitors to Reading.

Infrastructure Options Appraisal

4. CHARGING INFRASTRUCTURE OPTIONS APPRAISAL

Charge Point Infrastructure Overview

4.1 There are a variety of EVCP's with different power outputs and physical design. It is beneficial to make up the charging network of different types of charge points, to ensure the needs of all users are best met. This includes charging infrastructure operating at different speeds (residential 5.5kW, trip-destination 7-22kW, and rapid charging >50kW) to provide for a range of needs.

4.2 This section provides information on charging solutions for both on and off-street, exploring the different types of charging infrastructure and their associated design considerations. Table 4.1 sets-out the EVCP information with regard to power rating, supply (AC or DC), connectors, usage and EV compatibility.

Table 4.1: EVCP Information

Charger	Slow	Fast	Rapid	Ultra-Rapid
Power Rating	3 – 5 kW	7 – 22kW	Up to 50kW	50-350kW
Electrical Supply Type	AC	Usually AC, DC available at higher rates	Usually DC. AC also available	DC
Charging time	6 to 8 hours	4 to 6 hours	25 to 40 minutes (80%)	10 to 15 mins
Connector	Type 1 or Type 2 Mode 2 or Mode 3	Type 1 or Type 2 Mode 3	CHAdeMO / CCS Type 2 (AC)	CHAdeMO CCS
Best Use	Residential or overnight charging	Home / workplace / destinations	Destinations / long distance trips	Long distance trips
EV Compatibility	All	All	Most BEVs and very few PHEVs	Most new BEVs. Few BEVs at top end.
Typical cost of public charger	Approx 5-7k (lamp column charger)	Approx £7-10k	Approx £20-25k plus power upgrade costs	Approx £25-60k plus power upgrade costs

4.3 Appendix 1 sets out the different types of chargers and provides further detail on their application and best use, including residential slow/trickle chargers; pop-up chargers; fast, rapid and ultra rapid chargers.

Key Developments and Emerging Technologies

4.4 Delivering an electric vehicle charging network that meets the needs of residents, businesses, and visitors will require incorporating emerging technologies and charging options as they develop, to ensure the infrastructure continues to be fit for purpose and meets the needs and demands of users.

4.5 With advances in technology, some of which we are already witnessing, the charging needs and demands of those within Reading may change. For example, we are already seeing emerging on-street charging technologies such as retractable charging units and smaller units attached onto existing street furniture.

Hydrogen

4.6 Hydrogen fuel cell electric vehicles (FCEV) convert hydrogen gas to electricity and can have a significant range of up to 400 miles between charging and only emit water at the tail pipe. However currently FCEVs are approximately twice the price of a similarly sized BEV, with operational costs also greater. Typical hydrogen consumption is approximately 1 kg per 100 km, with each kilo of hydrogen currently £10-15. Conversely, a BEV would typically require approximately £3 of charge to cover the same distance.

4.7 Hydrogen is currently being trialled for buses and heavy goods vehicles. Buses in London and Aberdeen have started using hydrogen buses on routes within their cities, as these buses are capable of ranges up to 250 miles between recharges.

Standards and Regulations

Following the Minimum Standards

4.8 As a minimum, parties should pay particular attention to:

- BS 1899
- BS 7671,7 especially s722
- Electrical Safety Regulations
- Electricity Safety, Quality and Continuity
- Regulations 2002
- BS EN 61851 on the EV conductive charging system

- EMC Regulations11

4.9 Plugs, socket types and wall boxes are covered in the standards. Parties should ensure compliance where appropriate with:

- BS EN 60309-2
- BS EN 60309-4
- BS EN 62196-2

Grid Demand and Preparing for the Future

Energy demand

4.10 Following the Government's initial announcement in July 2017 of plans to ban sales of "all new conventional petrol and diesel cars and vans" from 2040 (subsequently amended to 2035), concerns were raised by the energy industry that this policy would require significantly more capacity in the power sector and present challenges for balancing the electricity grid.

4.11 National Grids (NG's) analysis estimated that by 2046 peak demand as a result of EVs charging would be 30 GW. By contrast, the most likely scenario in NG's analysis saw peak demand from electric vehicles alone being around 5 GW, about an 8% increase on today's peak demand value. This is because NG believe the switch to EVs will not be as extreme, and consumer behaviour will change to avoid charging at peak times, therefore resulting in a less significant increase to peak demand[16].

Smart Charging and Vehicle to Grid

4.12 With the wider proliferation of electric vehicles adding demand to the grid, smart charging can reduce charging at peak times, and the batteries in the vehicles could become an asset to National Grid, as they have the potential to be used for grid balancing.

4.13 'Smart' use of the electricity system involves using power at times when demand (and therefore prices) is low. Consumers can benefit from cheaper power, and operators benefit from an easier to balance system and avoiding all cars being charged simultaneously, such as at the end of rush hour.

[16] National Grid, Our Energy Insights, Electric vehicle announcement and what the papers say, August 2017.

4.14 The concept of 'Vehicle to Grid' (V2G), is that when supply is low and demand high, EVs connected to the grid to charge can instead release power back into the grid. Owners of the vehicles can then be paid for this balancing service in a similar way to electricity storage unit operators. In theory, if a vehicle is needed to be charged for a certain time the owner could register that time and this would override the use of the car as a power source. Some suppliers have been developing V2G offers for their customers, though availability is currently limited.

Future EV Market

4.15 The number of electric vehicles across the UK is expected to quickly increase over the next decade, especially due to the ban of new internal combustion engine cars and vans in 2030. It is then expected, by 2050, for almost all vehicles to be electric.

Cars and vans

4.16 The current market projections show at least 200,000 new electric vehicles (BEVs) were registered in the UK in 2021. The increase in recent years has also been influenced by the 1% Benefit in Kind (BIK) company car tax in 2021/22, which increased to 2% in April 2022 and will remain at 2% until 2025. At the end of Q2 2020 plug-in-hybrid, battery electric, range-extended electric or fuel cell electric cars accounted for 10.9% of all newly registered cars. A year earlier this was just 2.2%.[17]

4.17 The EV car market has now more models available to consumers with all major manufacturers joining the EV market with BEV and PHEV ranges, these include: Tesla, Nissan, VW, Mercedes, Jaguar, Peugeot, Kia, Mazda, Ford, Honda, Vauxhall, Hyundai, MG, Renault, Polestar and Volvo. In addition, we are seeing new manufacturers to the UK, such as BYD, the second largest EV manufacturer globally, joining the UK market which will further increase competition and drive down prices.

4.18 Although EV prices at the lower end of the market range between £20k to £30k, the costs are expected to reduce further with mass market production of vehicles and falling battery prices, and new models now starting to appear in the market between £15k to £20k.

Buses

4.19 The decarbonisation of buses is a key ambition of both UK Government and bus operators alike. The Confederation of Passenger Transport (CPT) aims for all buses to be ultra-low or zero emission by 2025. However, they also note that the range of EVs is not suitable for longer or more rural applications and that other options, such as hydrogen Fuel Cell EVs (FCEVs), may offer potential.

4.20 Electric buses are operating across the UK and Reading Buses is looking to introduce electric buses as part of their fleet replacement programme. The

[17] House of Commons (June 2021), Research briefings - Electric vehicles and infrastructure.

Council, in partnership with Reading Buses has submitted a bid for the Governments Zero Emission Bus Regional Area (ZEBRA) funding opportunity for the provision of Zero Emission Buses throughout Reading.

Micro Mobility (E-Bikes and E-Scooters)

4.21 It is anticipated that demand for e-scooters and e-bikes will significantly increase in the future, particularly if the use of e-scooters is legalised, therefore sufficient charging infrastructure will need to be provided to facilitate and encourage usage of these sustainable modes.

Heavy Goods Vehicles

4.22 Zero-emissions technologies exist across the freight / heavy goods vehicle sector. Whilst the technologies are more advanced for smaller vehicles, electrification has also been proven for larger heavy goods vehicles, with hydrogen also seen as a viable alternative. Further development has been supported by funding the Low Emissions Freight and Logistics Trial (£20 million)[18] and Integrated Delivery Programme (IDP) 14 (£18.1 million specifically for heavy goods vehicles)[19].

4.23 Low emission goods vehicles are also eligible for the low-emission vehicle plug-in grant, with the current grant covering 20% of the purchase price, up to a maximum of £16,000.

Rail Freight

4.24 Network Rail set forward their Traction Decarbonisation Network Strategy (TDNS) within the Environmental Sustainability Strategy (2020 – 2050)[20]. The TDNS will set-out the investment for electrification of the rail network, and opportunities for further decarbonising rail freight. A further shift in moving freight onto rail and commuter services will assist in driving down local carbon emissions.

Taxis

4.25 There were 4,202 electric taxis registered at Q4 2020. Most electric taxis (4,047) within the UK had been registered in England. London represents the region with the greatest number of electric taxi registrations, at 2,715. A significant number have also been registered in the East (647) and the South East (442).

[18] Department for Transport, Decarbonising Transport: Setting the Challenge, March 2020
[19] Department for Transport, Road to Zero, July 2018
[20] Network Rail (2020) https://www.networkrail.co.uk/wp-content/uploads/2020/09/NR-Environmental-Strategy-FINAL-web.pdf

4.26 The low-emission vehicle plug-in grant applies to taxis. There are two models included, the LEVC TX and the Dynamo Taxi, both of which are produced in Coventry. The grant will pay for 20% of the purchase price for these vehicles, up to a maximum of £7,500. Meanwhile, private hire vehicles can be eligible for a plug-in grant provided they meet the scheme requirements which include being wheelchair accessible.

Electric Motorcycles

4.27 Electric motorcycles will be capable of using EVCP infrastructure, however it is likely this market will remain small until the phasing out of internal combustion engine motorbikes is bought forward by Government. Electric mopeds are likely to become popular in the near-term, however these are only to be chargeable on Home/ Slow/Trickle Charging (5.5kW) EVCPs.

Future Proofing

4.28 Future proofing the EV charging network is essential for the following reasons:

- Less expenditure needed in the future to replace obsolete or unused EV infrastructure
- Public confidence in EV infrastructure decreases if it is not being replaced regularly.
- Having a practical and robust network will be important if emergency and essential services become dependent on charging infrastructure.
- Prevents issues of waste management when infrastructure 'false starts' and lead to working assets being removed and scrapped.

4.29 Charge points can be procured, installed, maintained, and operated in the knowledge that they are resilient to unforeseen technical, market, behaviour, and regulatory changes. Technical and physical interoperability, interchangeability and adaptability supports the purchase and rollout of infrastructure in a way that allows providers or investors to gradually build their provisions without unreasonable risk of costly false starts or of needing to replace equipment before the end of its life.

4.30 Outlined below are ways in which Reading can make sure the charging network and associated infrastructure are implemented and designed for long-term use:

Smart Charging

4.31 Smart EV charging refers to a system where an electric vehicle and a charging device share a data connection, and the charging device shares a data connection with a charging operator. As opposed to traditional charging devices that are not connected to the cloud, smart charging allows the charging station owner to monitor, manage, and restrict the use of their devices remotely to optimize energy consumption.

4.32 A key feature of a smarter energy system is the ability to minimise peak demand and network congestion, allowing the use of cheaper, low carbon

generation to be maximised. The current electricity system has been designed to meet a peak in demand between 17:00 and 20:30. For the rest of the day there can be large amounts of underused generation and network capacity. Generation during these off-peak periods is usually cleaner and cheaper. EVs can support the transition to a smarter energy system by, for example, charging overnight (during the off-peak) reducing the need for investment in infrastructure, but also providing power back to the grid via 'Vehicle2Grid' technology. This makes it cheaper for people to charge and integrates EVs into the electricity system in an affordable way.

Charge Point Design and Placement

4.33 When designing charge point locations and identifying potential sites on and off-street, consideration will be given to the following:

- Driver and pedestrian safety
  - Adequate lighting where necessary.
  - Placing charge points on the carriageway where appropriate to keep the footway clear for pedestrians (whilst taking account of e.g. cycle lanes).
  - Avoiding trip hazards from trailing cables.
  - Not positioning charge points too close to busy junctions or crossings.
- Inclusivity
  - Interoperability - Ensuring charge points can be used by all vehicle makes and models.
  - Ensuring drivers do not need to sign up to a specific network for membership in order to charge.
  - Design in accordance with BSI PAS 1899, Electric Vehicles - Accessible charging - Specification
- Coherence
  - Easy to use interfaces and payment methods.
  - Clear signing directing drivers to charge points.
  - Clear signing for length of stay/marked parking bays.
- Attractiveness
  - Charge point may need to blend into existing surroundings e.g. heritage sites/conservation areas.
  - Infrastructure should not clutter the streetscape.

- Reliability
    - 24-hour access to charge points.
    - Efficient maintenance and repair of the infrastructure to reduce downtime.
- Grid Capacity
    - Adequate electricity network capacity.
    - Collaboration with SSE over grid strengthening to facilitate EV charging growth and optimise charging locations.

4.34 Both technology and behaviour change will result in changing infrastructure needs; therefore, all parties should plan for the future projected demand instead of for the present situation only. This would mean finding a suitable balance between providing enough infrastructure to service the current and expected demand and shielding against over-procuring. When installing public charge points, laying passive cabling at the same of the time will enable the installation of additional charge points at the same location in the future, as and when demand increases. Having said that, installing modular infrastructure, which can easily be updated without having to replace the entire unit is vital. EV range will increase and charging times will fall as vehicle, charge point, and battery technology all improve. Consumer charging behaviour may also change, emphasising the importance of futureproofing.

Coordination and Involvement of Different Organisations

4.35 In order to future proof the EVCP network, Reading must have a clear understanding of the challenges and constraints faced by the different actors involved with the existing and future infrastructure. Installing a considerable number of charging stations to achieve a significant uptake of EVs will demand a mid/long-term planning strategy as well as the coordination and involvement of various entities working together to make Reading's network a success story.

- As private developers bear the cost of installing charging infrastructure on-site, they perceive EVCPs as an amenity rather than a direct source of revenue. Therefore, building owners may try to meet their customers' demands at the lowest price point possible. In the long run, developers are at risk of having to incur even greater expenses to retrofit the units or, worst of all, not being able to afford the cost of those at all. Many building owners do not plan for EV-charging needs in the mid/long term future, increasing the risks of not having an adequate electrical grid able to support the energy requirements to install EVCPs.
- By setting clear standards in our planning policy requirements for charging infrastructure in new developments costly retrofitting can be avoided. Reading will enforce the new building regulations (part S) adopted in 2022 requiring all new dwellings to have EV charging provision.

- Charge-point operators are likely to play a key role in managing EVCPs and in offering a wide range of charging options best suited for public buildings' needs. Open-charging protocols, standards and charger interoperability will be key to unlocking a healthy range of operators, EVCPs network and energy providers as well as energy-management providers.
- Distribution operators and utility companies should be consulted on nearly all projects that exceed approximately 10 kW to study the implications for power-distribution equipment. Early planning and adoption of charge-management and building-energy-management solutions are likely to save important sums of money in feeder upgrades and demand charges to fleet and commercial customers.

4.36 Short-sighted decisions made today over electrical and civil infrastructure and the capacity and technology of charging solutions could cause EV-infrastructure costs to increase to hundreds of billions of pounds in the future. Added to the costs of electricity peak demand charges and grid upgrades, the impact of this additional investment could stall the progress of fleet electrification as well as affordable, unhindered access to EV charging.

Planning Support

4.37 Infrastructure providers also need support to get installations in the ground, with some EVCPs taking 2 years to get through the planning and installation system. Planning policy at local level maybe beneficial and assist in fast tracking installations. New residential developments are required to provide access to an electric vehicle charge point for each associated parking space [21].

[21] Approved Document S: Infrastructure for the charging of electric vehicles (publishing.service.gov.uk)

Funding Options and Opportunities

5. FUNDING OPTIONS AND OPPORTUNITIES

Infrastructure Funding Business Models

5.1 This section provides a summary of the different approaches that are available for the delivery of public EV charging infrastructure. There are a variety of infrastructure funding business models available, each with its own costs, revenue projections and associated risks and uncertainties. These will be investigated further to develop each option as part of the delivery of this strategy, including working with Southern Electric Power Distribution to understand the power upgrade requirements and associated costs to enable the delivery of this charging infrastructure.

Ownership and Lease Options

Own and Operate

5.2 Own and Operate is becoming a commonly used approach where a contracting local authority or other public body publishes a tender, inviting suppliers to submit a competitive offer to provide and install the charge point equipment, and manage the network for a set period of time. The capital costs are funded by the local authority, potentially with a capital contribution from a central or devolved government grant. Following procurement, the charging infrastructure is owned by the authority, which receives all revenue and typically pays a monthly fee to a supplier for operation and maintenance.

5.3 Table 5.1 sets-out the Own and Operate option advantages and disadvantages.

Table 5.1: Own and Operate option

Advantages	Disadvantages
• Local authority retains full ownership of the charging network and collects revenues • Local authority can determine locations, irrespective of commercial viability, ensuring equity of access for residents and businesses. • Easier procurement route as more familiar and requires less involvement from legal, procurement and property teams. • Likely to be a quicker process, leading to faster network growth. • National procurement frameworks available to streamline process and ensure confidence in suppliers.	• Limited central government and local authority funds available • Use of public funds comes with accountability to taxpayer and therefore political risk • Requirement for local authority to cover costs for ongoing operation, maintenance and upgrade • Local authority may become the owners of low value or redundant equipment as charging infrastructure market and technology is developing rapidly • Local authority carries the risks of unexpected costs and the reputational risk if the network is unreliable • Charge point operator less incentivised to repair faults, although a service level agreement (CSLA) should be in place • Missed KPIs/SLAs may be more difficult to enforce.

Leasing

5.4 A leasing model is similar to an own and operate model, however some risks can be transferred as the Council leases the charger equipment and back-office software for an ongoing hire fee from a charge point operator, typically for a minimum period of 5 years.

5.5 This period of lease removes or significantly lowers the upfront capital costs required and, in most cases, reduces the maintenance liabilities of the chargers. However, non-warranty repairs following accidental damage and vandalism are often chargeable to the authority and all equipment must be returned at the end of lease in a reasonable condition.

5.6 The ongoing costs are higher, but they are fixed (excluding damage repairs) which provides budget certainty; however, these costs are applicable regardless of network usage and if charge points aren't utilised this can become a heavily subsidised provision.

5.7 Table 5.2 sets-out the Lease option advantages and disadvantages.

Table 5.2: Lease option

Advantages	Disadvantages
• The Council retains all revenues • The Council has the option to choose locations, regardless of commercial viability, to ensure equity of access for residents • Lower or zero capital costs, dependant on initial hire fees being applicable • Equipment is removed and returned if it becomes redundant • Hardware and software fault repairs included	• The Council carries the risk of lower revenue generation than anticipated • The whole life cost of the chargers is much higher due to ongoing leasing costs • The Council will never own the charging equipment • Equipment must be removed and returned at the end of the lease period • The Council will still be required to meet the cost of accidental damage and vandalism • Significant revenue costs for Council

Private Public Partnerships

Private Sector Match-Funding Partnership

5.8 To date, most central government grant schemes for charging infrastructure cover 75% of the eligible capital costs. The remaining 25% can be covered by the local authority but in some cases, EV charge point operators have provided this match-funding. Where central government funding is not available, private sector funding could be matched directly against local authority capital.

5.9 Table 5.3 sets-out the Private Sector Match-Funding Partnership option advantages and disadvantages.

Table 5.3: Private Sector Match-Funding Partnership option

Advantages	Disadvantages
• Reduces the up-front financial burden that local authorities face when installing charging infrastructure.	• Reduced income from the charge points for authorities • Reduced control over where charge points are located for authorities • There will also need to be agreement on equipment ownership and/or upgrades throughout and at the end of the contract

Concession Framework

5.10 A concession model is an agreement where a charge-point operator will offer to install charging equipment on Council owned land or the public highway, free of charge. This model is low risk, but low reward, often these agreements provide a small, guaranteed income or 'rent' to the Council in return for allowing the equipment to be installed which is paid regardless of how high or low the usage of the chargers is, however the Council is never liable for any costs associated with the chargers.

5.11 Under a concession model, the operator will only offer to install chargers in high demand locations where they are confident that the chargers will return their initial investment costs quickly and provide them with an ongoing profit.

5.12 Concession model agreements are typically long term, requiring a 10-30 year contract which enables the supplier a better chance of recouping their costs and maximising profitability over the duration of the term. Under this type of agreement, the Council would act as a facilitator/landlord rather than having an active involvement in the operation and delivery of the charger network. The cost to the end user is often set at the sole discretion of the supplier and expansion of the network or addition of new chargers is also at the supplier's sole discretion. The Council are limited in their ability to expand the provision as the supplier will usually only consider this where usage is extremely high and the opportunity is commercially attractive, although the Council may be able to pay both the capital and ongoing costs to provide a charger in a specific location. These agreements typically include exclusivity clauses, so the Council is unable to add additional chargers from another supplier.

5.13 Table 5.4 sets-out the Concession Framework option advantages and disadvantages.

Table 5.4: Concession Framework option

Advantages	Disadvantages
• Some income shared/rent paid by concessionaire to the Council • Charge point operator is responsible for maintenance • Reduced risk to the Council in terms of income not meeting ongoing maintenance and operation costs • Some contract renewal terms require the concessionaire to update and refresh equipment and software • Council can put its own investment in to help ensure that the scheme is delivered equitably in terms of locations and tariffs. • No capital costs	• Lower income potential compared to other models • Low usage on some or all chargers may make the operator reluctant to spend money on repairs and maintenance • Concessionaire likely to only be interested in profitable sites or where cross-subsidisation can occur resulting in reduced LA control over locations • Long contract terms tie the Council in beyond the foreseeable future and restrict the Council's ability to react to demand or capitalise on increased usage

National Funding Options

Office for Zero Emission Vehicles

5.14 Currently OZEV funding, administered via the Energy Saving Trust, is the key source of government funding available for the installation of EVCPs.

5.15 OZEV is a team working across government to support the early market for ULEV (ultra-low emission vehicle). The OZEV funding is available for eligible projects and Councils must secure a minimum of 25% of capital funds via sources other than OZEV funding, which makes available 75% of the capital costs.

Department for Environment, Food & Rural Affairs (Defra)

5.16 Defra operates an Air Quality Grant Programme which provides funding to eligible local authorities to help improve air quality. The scheme helps local authorities to make air quality improvements and to meet their statutory duties under the Environment Act 1995. Although the grant can no longer be used specifically for charging infrastructure, it has awarded over £70 million in funding to a variety of projects since it started in 1997.

Local Electric Vehicle Infrastructure (LEVI) Fund

5.17 The Local Electric Vehicle Infrastructure (LEVI) Fund is a new government funding stream for local authorities which aims to deliver a step change in the deployment of local EV charging infrastructure across England. It is comprised of capital funding to support investment in charging infrastructure, and capability funding to ensure local authorities have the resource to plan for and deliver charge points. The Fund's two main objectives are to deliver a step-change in the deployment of local, primarily low power, on-street charging infrastructure across England and accelerate the commercialisation of, and investment in, the local charging infrastructure sector. Reading Borough Council will use its LEVI Fund to deliver the objectives as set out in our EV

Charging Infrastructure Strategy. In addition, the On-street Residential Charging Scheme (ORCS) fund is available for projects up to £200k.

Influencing and Encouraging Infrastructure

Reading Borough Leading by Example

5.18 Potential EV owners are often reluctant to purchase an electric vehicle without the confidence that there is sufficient charging infrastructure in place locally. Similarly, electric vehicle infrastructure operators can be reluctant to install new charge points without confidence that they will have adequate usage. Subsequently, it is often questioned whether demand for charge points should come before the supply, or whether supply should lead demand. In order to influence and encourage infrastructure, the Council proposes to take the lead and use a 'supply leading demand' approach to the public charging network working with EV infrastructure suppliers. However, it should be noted that the Council is heavily reliant on Government policy and funding for the implementation of charging infrastructure.

Trials

5.19 Local authorities can undergo electric vehicle trials to help influence and encourage infrastructure. Reading Borough Council are undertaking a trial to allow residents to enter into a licence agreement with the Council to privately charge their EVs parked on the public highway.

5.20 The EV Charging Licence includes a range of criteria and conditions to reduce the risk to the public and the applicant. The licence will allow alternate solutions to trial. The includes free installation of slot drain and cable cover options for getting the cable safely from the property boundary to a vehicle parked on street. Reading had 68 initial requests, however only 4 have gone forward to date for the slot drain type and there is now a request for cable cover. The low take up could be due to homeowners not having a dedicated parking space immediately outside their homes and this will be explored further in the trial. Home owners will be able to still have the opportunity for slot drain and cable covers to be installed after the trial, but these will be at cost to the homeowner.

Policy - Residential Developments

5.21 Following its Road to Zero strategy commitment and consultation during summer 2019 on changing building regulations (Part S), the new building regulations came into force in England as of June 2022.

- Every new residential building with an associated car parking space must have a charge point. This also applies to buildings undergoing a material change of use to create a dwelling
- Every residential building undergoing major renovation with more than 10 car parking spaces to have one EV charge point per dwelling along with a cable route for electric vehicle charge points in every car parking space.

Reallocating Parking

5.22 As the number of on-street electric vehicle charge points increases over time, a number of existing parking bays will need to be converted to electric vehicle charging bays. Currently, people are often not able to use the existing lamp column charge points due to non-electric vehicles blocking the available parking. In the future, the Council will consider introducing bays with traffic regulation orders for existing and future lamp column charge points. Subsequently, when new electric vehicle charging bays are created, it is important to ensure that they do not reduce the provision of essential parking spaces such as disabled bays, loading bays, doctors' bays and ambulance bays.

Partnership with Key Stakeholders

5.23 Key stakeholders need to be engaged and involved in delivering Reading's EV Charging Infrastructure Strategy to support and work in partnership with the Council. Key stakeholders can contribute to and benefit from infrastructure being available for their businesses, customers, staff and local residents.

5.24 Stakeholders can contribute to the provision of or sharing of EV infrastructure or EV services, such as:

- Shared business EVCPs for evening residential charging;
- Hub-sharing: Taxi rank by day/residential EVCP by night;
- Shared spaces for EV car clubs; and/or
- Provision of private sector land for EVCP infrastructure.

Major Employers and Local Businesses

5.25 The Council will work with stakeholder businesses to identify locations where infrastructure can benefit business users and residents.

NHS Trust

5.26 The NHS Carbon Footprint programme, which relates to carbon emissions under NHS direct control, are targeting net zero by 2040 and have the ambition for an interim 80% reduction by 2028-2032[22]. NHS Trusts operate significant fleets of vehicles in the UK internally and in wider supply chain and in partnership with the NHS's national carbon commitments, there are opportunities to support the NHS in greening their fleet locally.

[22] NHS, 2020 https://www.england.nhs.uk/greenernhs/a-net-zero-nhs/ (October 2020)

University of Reading

5.27 The University of Reading (UoR) currently have four EVCP locations on campus and operate only a small fleet of vehicles of which two are BEV.

5.28 UoR sustainability policies cover:

- Ban on student vehicles as part of Student contracts; and
- Support for Co-wheels car club.

5.29 UoR are supportive of installing further EVCPs and increasing on-campus car club access for students and staff. UoR are involved in developing the Innovation Valley Science Park and are to investigate the opportunity that this site can become an EV charging destination for Reading buses to encourage sustainable travel between campuses and Reading.

Operators of Sustainable Transport Options

5.30 The Council will work with operators of sustainable transport options including buses, car clubs, e-scooter and e-bike hire schemes to ensure sufficient provision of electric charging infrastructure is in place for these modes of travel.

Scottish & Southern Energy (SSE)

5.31 The Council will work with SSE to ensure there is sufficient capacity in the electricity grid to enable the provision of the required amount of electric vehicle charging infrastructure within the borough.

Neighbouring Local Authorities and Highways England

5.32 The Council will work with neighbouring local authorities and Highways England to ensure the provision of strategic electric vehicle charging infrastructure is co-ordinated across the wider region.

Owners and Operators of Existing Combustion Engine Infrastructure

5.33 The Council will work with owners/ operators of existing combustion engine infrastructure, such as petrol stations and car parks, regarding the potential to convert this existing usage into charging for electric vehicles.

Future Partnerships

5.34 The Council will continue to develop future partnerships as joint working will be key to implementing the Strategy. Stakeholder engagement is a key component in the Action Plan presented in Section 7 of this strategy.

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6. CONCLUSION

Current Status of EV Charging in Reading

6.1 Reading currently has a comparable number of EV charging infrastructure to other similar urban authorities in the UK. However, as demand for EVCPs will inevitably increase as we approach key dates in the future, there is a need to consider a pathway to support the uptake of EVs through the wider provision of charging infrastructure.

6.2 Reading has policies that target carbon reductions and has an integrated transport infrastructure which supports modal shift toward public and low carbon active transport modes. This EV Charging Infrastructure Strategy supports these policy areas and provides appropriate provision that enables equitable access to EV infrastructure and support bids and schemes such as bus fleet improvements, EV car clubs, EV taxis, micro-mobility options (e-bikes and e-scooters) and on-street charging.

Projected Requirements for EV Charging

6.3 Reading has a higher-than-average number of properties with no off-street provision for EV home charging, particularly Victorian terraced housing. To help address this the Council has already successfully installed an initial set of lamp column chargers, and is trialling slot drain and cable cover options to allow for on-street parking from home wall boxes. The strategy supports a significant investment in charging for residents to provide equity in charging for residents across the borough and enable rapid take up of EVs with around 3,000 on-street chargers proposed to take Reading to around 2030.

6.4 The Council has developed a strategy that shows its commitment to working with transport operators, businesses, energy suppliers and EV charging suppliers to support the delivery of EV charging infrastructure for operators and visitors to Reading. It is estimated that around 200 chargers will be required in the Council's car parks and other infrastructure will need to be defined for taxis, buses and to meet rapid charging requirements of through traffic and visitors and delivery vehicles.

Future Developments

6.5 The Reading Transport Strategy 2040 aims to deliver equitable access to zero-carbon transport options and this EV infrastructure forms a key part of that wider strategy.

6.6 The Council will lead, support and enable access to EV infrastructure. However, as the EV market evolves and more commercial companies enter the market, the Council does not necessarily need to provide all of these assets. The Council is therefore seeking to deliver a 'concession framework' entering into agreements with operators to provide charging facilities at key locations throughout the borough as the main mechanism for EV infrastructure provision. Reading is looking to have a financial stake within these concessions to deliver fair and equitable infrastructure.

6.7 The Council will also look to develop the best fit business model and policies which enable EVCPs to be installed and used for domestic charging (on and off-street), destination charging and en-route charging. Supporting policy to fast-track EVCP installations would benefit and encourage operators to deliver infrastructure to match demand of EV take up in the future.

6.8 The provision of charging infrastructure for electric buses, car clubs, taxis, e-bikes and e-scooters also forms a core element of this strategy and will help to promote these sustainable forms of travel. For instance the provision of rapid chargers for car club and taxi use at strategic locations.

6.9 Reading will seek to form partnerships in both the public and private sectors to develop and install infrastructure where needed. It should also work with large public bodies (i.e. NHS), Universities and other local authorities to identify demand and joint opportunities. Commercial operators are installing infrastructure in and around Reading and as the EV market increases and competition grows, these operators will be supportive of policy and engagement with the Council to assist in installing more EVCPs.

6.10 The Electric Vehicle Charging Infrastructure Delivery Plan, as included at section 7 of this strategy, sets out the strategy objectives and actions to be taken forward to enable the core aims and objectives of this strategy to be achieved. An important element of the delivery of this plan will be to ensure, as far as is possible, that charging infrastructure does not become outdated and therefore creates legacy issues where it has been installed.

6.11 This strategy is a live document and will be updated regularly to reflect the latest and newest developments in the uptake of electric vehicles and changing charging and vehicle technologies. Progress will be monitored alongside delivery of the wider Reading Transport Strategy 2040 and the Reading Climate Emergency Strategy, including the objective to achieve net-zero carbon.

Infrastructure Delivery Plan

7. CHARGING INFRASTRUCTURE DELIVERY PLAN

7.1 This section details the objectives that Reading Borough Council have set and provides guidance on how these objectives are to be achieved. Five key objections that Reading are setting out to achieve through the Infrastructure Delivery Plan are provided the following Tables 7.1 and 7.2.

Table 7.1: Five Key Objectives

Objectives	Details
Objective 1	Reading will develop a Reading-wide approach to facilitate and encourage the growth in use of electric and zero emission vehicles by Reading's residents, businesses, and visitors. This will be developed to include buses, taxis, car-clubs e-bikes and e-scooters and will be developed through engagement with residents, businesses, and other stakeholders including companies who are commercially installing charge points in Reading.
Objective 2	Reading will deliver a reliable and well-maintained public EV charging point infrastructure in line with projections, and as amended through monitoring, to facilitate the move to electric vehicles. Deliver and implement through a policy for appropriate, safe, equitable and disability aware accessible provision across the borough.
Objective 3	Reading will seek to provide renewable energy sources for charging points on Council land or highway, working with cross Council smart energy initiatives such as linking to other infrastructure projects such as heat networks.
Objective 4	Reading will innovate and respond flexibly to fast-paced and changing technologies within the EV sector and changes in EV take up including seeking to enable residents to benefit from Vehicle to Grid technologies as they come forward.
Objective 5	Reading will lead by example by using EV technology as much as possible to further reduce the environmental impact of our day-to-day operations. This will also include working with Reading Buses and Readibus to support them in their electrification plans.

Delivery Plan

7.2 Table 7.2 sets out the Infrastructure Delivery Plan linking the five "Objectives" to "Actions", with "Time scales" for delivery (Short term: <2 years, Medium: 2-5 years, Long term: 5+ years) and provides "Immediate Recommended Actions" to kick start the process.

7.3 The Delivery Plan sets out a pathway to developing policies and further actions to be taken forward. These policy areas will be developed following public engagement and consultation.

Table 7.2: Infrastructure Delivery Plan

Objective	Actions	Timescale	Immediate Recommended Actions
1. Reading will develop a Reading-wide approach to facilitate and encourage the growth in use of electric and zero emission vehicles by Reading's residents, businesses, and visitors. This will be developed to include buses, taxis, car-clubs e-bikes and e-scooters and will be developed through engagement with residents, businesses, and other stakeholders including companies who are commercially installing charge points in Reading.	1.1 Residential **Reading will:** ▪ Install charge points in areas without off street parking to facilitate uptake of EVs for residents living in these areas. ▪ Provide a balance of commercially viable and more community centred options to deliver equality in charging provision ▪ Provide a balance of residential and fast charging strategy. ▪ Install charging points in clusters of 2 or 3 to ensure points are accessible for residents. ▪ Consult with residents and respond to local demand by considering these locations for charging points if suitable, especially if residents do not have access to off-street parking. ▪ Explore potential for local amenities such as community halls, parks and business parks within proximity to residential areas in which charge points could be installed to enable overnight charging where on-street charge points are not suitable ▪ Understand demand on housing estates and consider the provision of charging infrastructure where appropriate	Short-term	**Reading will:** ▪ Undertake a review of potential charge point locations taking account of on and off street parking, socio-economics, power constraints and charge point design and placement considerations. ▪ Explore options for suitable charge point suppliers and understand the different charging/delivery models that are available. ▪ Tender for a suitable supplier to install appropriate infrastructure in residential areas. Target of 2,500 – 3,000 on-street chargers to be delivered by 2026. ▪ Install infrastructure at suitable identified residential locations. ▪ Engage with eligible residents (tenants and owners of rented flats) about The Electric Vehicle Homecharge Scheme (EVHS) that provides grant funding of up to 75% towards the cost of installing electric vehicle charge points at domestic properties across the UK. ▪ Create a timescale to review on-street parking as this will be necessary alongside EVCP delivery.

	▪ Ensure that charging units are included for consideration at the planning stage as part of all new housing developments and all housing re-developments		▪ Seek to secure Govt EV infrastructure funding (EG LEVI – Local Electric Vehicle Infrastructure Fund)
		Med-term	**Reading will:** ▪ Investigate planning restrictions due to high number of conservation areas and listed buildings limiting on-street parking solutions. ▪ Engage with planning to improve the installation of charging points in new developments. ▪ Identify priority locations to target
	<u>1.2 Businesses</u> **Reading will:** ▪ Provide public charge points for drivers who need to recharge during the day without returning to a depot or home (e.g. businesses or taxi/private hire drivers) ▪ Explore the potential for private car parks to install rapid charge points for workers or customers ▪ Promote business fleet decarbonisation - Educate and inform businesses about the long-term benefits of decarbonisation. ▪ Consider incentives such as introducing tax breaks (business rates) for businesses fulfilling decarbonisation targets	Short-term	**Reading will:** ▪ Carry out a survey of business to identify where they have charging points and their policies for installing them. ▪ Carry out a mapping exercise to identify parking sites and business park opportunities. ▪ Develop a strategy that engages specifically with business owners / charge point operators (CPOs) ▪ Investigate grid implications and charging strategy for potential locations for rapid charge points and whether they would be adequate for an EV taxi scheme.
		Med-term	**Reading will:** ▪ Engage with key stakeholders including Reading Chamber of Commerce, UoR, NHS, Reading Buses, Taxi Association. ▪ Promote vehicle schemes and tax incentives with businesses. ▪ Identify priority locations to target
	<u>1.3 Visitors/Destination Charging</u> **Reading will:** ▪ Install charge points in Council car parks	Short-term	**Reading will:** ▪ Carry out a mapping exercise that builds on current RBC owned car park provision and usage, include separating EV charging during the day and locations where local residents

	▪ Ensure charge points are installed in high visibility, high footfall areas without compromising road or footway space ▪ Identify opportunities for charge points near leisure centres, near Park and Rides, supermarkets and places of work ▪ Develop sites with a minimum capacity of two vehicles per site ▪ Review opportunities to power charge points in car parks through solar powered canopies		use free parking overnight to charge. Initial evaluation shows a target of 150 -200 fast car park chargers being required by 2040. ▪ Engage with operators of private car parks to understand their EV charging usage (where provided) and their strategies for expansion. ▪ Engage with commercial EV rapid charge hub operators (EG Shell, BP at traditional garage forecourts) to understand what is likely to be delivered commercially in the town. ▪ Develop a strategy and seek to secure Govt EV infrastructure funding (EG LEVI – Local Electric Vehicle Infrastructure Fund)
		Med-term	**Reading will:** ▪ Explore options for suitable CPOs and understand the different charging/delivery models that are available ▪ Identify priority locations to target
	<u>1.4 En-route/Strategic Route Charging</u> Reading will: ▪ Partner or support the opportunities to install en-route charging hubs on corridors into Reading ▪ Partner or support the opportunities to install en-route charging hubs with neighbouring authorities such as on motorway services, new employment and education destination sites or other authority Park and Ride locations.	Short-term	**Reading will:** ▪ Develop a Berkshire-wide strategy that engages specifically with business/ charge point operators
		Med-term	**Reading will:** ▪ Work with owners/ operators of existing combustion engine infrastructure, such as petrol stations and car parks, regarding the potential to convert this existing usage into charging for electric vehicles. ▪ Engage with neighbour authorities and Highways England, motorway service station operators/CPOs on strategic network locations to be developed
	<u>1.5 Charging Infrastructure for Other Sustainable Modes</u> **Reading will:** ▪ Explore and develop opportunities for electric charging infrastructure for sustainable modes of travel.	Short-term	**Reading will:** ▪ Engage with bus operators to review business case to install EVCPS for buses in Reading. ▪ Engage with car club operators to prepare business case to install EVCPS for car clubs.

	▪ Deliver electric charging infrastructure for sustainable modes of travel.		▪ Engage with taxi drivers to prepare business case to install EVCPS for taxis. ▪ Review opportunities to install EVCPs the use of e-scooters and e-bikes. ▪ Review opportunities to install EVCPs the use of electric motorbikes.
		Med-term	**Reading will:** ▪ Secure funding for and deliver infrastructure requirements to encourage the use of buses. ▪ Secure funding for and deliver infrastructure requirements to encourage the use of car clubs. ▪ Secure funding for and deliver infrastructure requirements to encourage the use of taxis. ▪ Secure funding for and deliver infrastructure requirements to encourage the use of e-scooters and e-bikes. ▪ Secure funding for and deliver infrastructure requirements to encourage the use of electric motorbikes.

Objective	Actions	Timescale	Immediate Recommended Actions
2. Reading will deliver a reliable and well-maintained public EV charging point infrastructure in line with projections, and as amended through monitoring, to facilitate the move to electric vehicles. Deliver and implement through a policy for appropriate, safe, equitable and disability aware accessible provision across the borough.	**Reading will:** ▪ Prioritise residents without access to off-street parking, those in high density dwelling areas, and those that already own an electric vehicle. ▪ Review on-street charging partnership and funding options ▪ Require charging infrastructure for new housing developments, through planning policies. ▪ Install an even spread of fast and residential charging points throughout the borough where footway space is sufficient. ▪ Support EV car-club opportunities across Reading esp. in low-income areas. ▪ Design in accordance with BSI PAS 1899 for accessible EV charging.	Short-term	**Reading will:** ▪ Build on initial forecasting work undertaken for this strategy to develop a town wide delivery plan. ▪ Map out opportunity areas where EV charging can be provided. ▪ Engage with car club operators to review business case to install EVCPS for car clubs (see objective 2).
		Med-term	**Reading will:** ▪ Review funding model options and EVCP market operators to determine potential delivery partners for on-street charging options.
Objective	**Actions**	**Timescale**	**Immediate Recommended Actions**
3. Reading will seek to provide renewable energy sources for charging points on Council land or highway, working with cross Council smart energy initiatives such as linking to other infrastructure projects such as heat networks.	**Reading will:** ▪ Explore solar charging hubs as a resolution to grid capacity implications. ▪ Consider energy storage and charging hubs for Evs and hydrogen refueling.	Long-term	**Reading will:** ▪ Review options and opportunities for solar charging hubs. ▪ Review options and opportunities for refuelling hubs.

	Objective	Actions	Timescale	Immediate Recommended Actions
4.	Reading will innovate and respond flexibly to fast-paced and changing technologies within the EV sector and changes in EV take up including seeking to enable residents to benefit from Vehicle to Grid technologies as they come forward.	▪ Ensure charge point infrastructure and designs are futureproofed. ▪ Once charge points are installed, monitor usage data to ensure locations are suitable and charge points are being used. ▪ Install active and passive charging points in new developments to account for future growth and up-take. ▪ Embed capacity for EV infrastructure into other Highways and Transport projects and programmes and ensure these are aligned with the EV objectives as far as possible, to encourage and support further expansion. ▪ Ensure partnership infrastructure agreements include flexibility to be upgraded and not left redundant.	Short-term	**Reading will:** ▪ Analyse usage data from charge points in designated monitoring sites to gain an understanding of charging patterns - Create a projection of how many EV charge points will need to be installed each year based on this data. ▪ Understand electricity and gas grid constraints for future development.
			Med- term	**Reading will:** ▪ Work with DNO and electricity suppliers to target grid reinforcement areas for future (equitable) access to EVCPs.
	Objective	**Actions**	**Timescale**	**Immediate Recommended Actions**
5.	Reading will lead by example by using EV technology as much as possible to further reduce the environmental impact of our day-to-day operations. This will also include working with Reading Buses and Readibus to support them in their electrification plans.	<u>5.1 Council Actions</u> **Reading will:** ▪ Install additional charge points in car parks and on all Council owned sites for use by Council staff and visitors ▪ Understand the challenges faced by Reading Borough Council employees in the purchase of EVs ▪ Identify further locations to install EV charge points to benefit Reading Borough Council workers ▪ Explore grid implications of providing charge points for both Council fleet and workers private vehicles ▪ Undertake analysis into travel patterns for fleet vehicles to understand which vehicles should be prioritized for electrification	Med-term	**Reading will:** ▪ Support EV upgrades across Council vehicle fleet ▪ Provide information on EVs and EVCP availability for staff ▪ Engage with and encourage feedback from Reading Borough Council staff/workforce ▪ Discuss barriers to EV purchase with Council staff ▪ Review options to provide a salary sacrifice scheme for staff to purchase an electric vehicle
			Long-term	**Reading will:** ▪ Develop policy to ensure no new internal combustion engine vehicles are purchased as part of the fleet

	5.2 Engagement and Promotion **Reading will:** ▪ Engage and promote the benefits of low and zero emission travel options with the public	Med-term	**Reading will:** ▪ Provide information on benefits of EVs and funding available for vehicles and charge points

Cost of Delivery Plan

7.4 The future cost of infrastructure delivery is uncertain as it is dependent on both the take up of EVs and how people choose to charge them. Home charging and on-street charging are likely to be a key driver for ownership and charging, although there is evidence from the US that a number of EV owners rely entirely on the ultra-rapid charging network and this 'fuel station' type model may prevail. Only approximately 3% of cars on the UK's roads are currently EVs and this means that any insights based on current data are very much biased towards early adopters and hence forward projections are difficult. Reading's strategy is based around RBC delivering the on-street charging and destination charging in their car parks. Rapid / Ultra-rapid charging is being delivered in Reading by the commercial sector. The below cost estimates to around 2030 represent a broad estimate of demand as set out in this strategy and should be seen as an expected order of cost rather than a detailed budget.

Type of Charger	Number of Chargers / Channels	Approx Cost	Funding Sources
Residential On-Street – Slow	3,000	£10m – £15m	Government funding (LEVI grant) / Council funding / Private sector (Concessionaire investment)
Car Park - Standard	250	£1.5m - £2m	Government funding (LEVI grant) / Council funding / Private sector (Concessionaire investment)
Pavement Channels	150	£1m	Government funding (LEVI grant) / Council funding / Resident payments
Bus Charger	-	£2m	Government funding (LEVI grant) / Council funding / Bus Company funding
TOTAL	**3,400**	**£14.5m – £20m**	

Note: Costs include cost of supply and installation of chargers, with reasonable electrical connection costs. Ongoing management and maintenance is expected to be covered by revenue.

Appendix 1 - Types of Public Car Charge Points

	About	How do they work	Design Considerations
Residential Lamp Column Slow/Trickle Charging (up to 5.5kW)	Most charging occurs at home, in residential areas. Lamp post chargers are a different approach to the majority of the existing electric vehicle chargers. Primarily, they are intended to address the challenge of charging electric vehicles when owners do not have access to off-street parking. 	Lamp post chargers tap into the existing power network created for street lighting and are either integrated into the lamp column or are attached to it; making them a less expensive alternative to floor-mounted units. As they piggyback on an existing power grid, they are limited in the power they can supply but are sufficient for overnight charging. Integrating these charging units into existing street furniture means that there is no additional street clutter. These units can be accessed using a standard Type 2 charging cable and are typically Pay-As-You-Go.	Consider whether lamp column infrastructure is appropriate for the chosen location. Ensure lamp columns are positioned adjacent to the carriageway or ideally on carriageway build outs, to avoid trailing cables and ensuring the footway is kept clear and footway space is maximised for pedestrians. If a lamp column is back of footway, allow adequate footway widths for bollard at front of footway. To optimise use, two or three lamp column chargers may be installed at each location to ensure residents are always able to access a charging point. Locations for consideration should be resident led, in areas of existing demand and where there is likely to be future demand. Ensure columns are practical for the installation of the infrastructure – columns must adhere to a prescribed standard of earthing, increasing the fuse size to cope with the extra energy usage, and metering an otherwise unmetered energy supply. Steel lamp columns are required; concrete or heritage columns are often unsuitable. Adequate space is necessary, and no existing electrical infrastructure or utility covers within 2.5m of the kerb. Does not require a marked/dedicated EV bay - if the lamp column charge point is located within a CPZ, the local parking controls will apply and anyone can use the parking space. The Council may need to introduce EV charging bays with Traffic Regulation Order's (TROs) to control access to these charge points.

	About	How do they work	Design Considerations
Popup chargers (3-7kW) 8 hours +	Popup chargers are generally used for residential charging. By being fully retractable, their design is pedestrian-friendly. They have characteristics of both lamp column and fast chargers and are deployed as hubs. 	Popup chargers are designed to sit flush to the pavement when not in use, minimising the impact of street clutter on the landscape. These units can be accessed using a standard Type 2 charging cable and are app operated. They are typically Pay-As-You-Go.	Hidden when not in use, reducing the risk of vandalism and street clutter. Ensure hubs are positioned at the front of the pavement, to avoid trailing cables and ensuring the footway is kept clear for pedestrians. Each on-street charging hub typically comprises 6 charging bays/sockets for dependability (minimum 4). Require a marked/dedicated EV bay. In terms of installation, they have the same criteria as fast chargers with the added complication of needing to be placed underground.
Standard/Fast (7-22kW) 6-8 hours	Fast 7kW-22kW chargers are suitable for the vast majority of electric vehicle users. Standard chargers are usually installed in public on-street locations, with high visibility and high footfall, or in off-street locations, such as car parks, where users can leave their vehicle for three to four hours. 	Floor-mounted charging points require dedicated EV parking bays, with signing indicating length of stay restrictions. Having marked bays ensures electric vehicle owners can access charging points and emphasise that bays are dedicated. EVs must be plugged in and actively charging to use the parking bays. Some networks prefer drivers to use an RFID card and others a smart phone app, while some allow access using either. Charge points have set charges which tend to be a connection fee, price per time, price per energy consumed, or a combination of the above; most charging points offer Pay As You Go.	Install on carriageway build outs to avoid impinging on pedestrian footway space Ensure sufficient pavement space and distance from trees and existing electrical street furniture Consider which charge point networks to introduce. Consider the impact that the charging point will have on the street scene. Consider the spread of charge points across the borough The visibility of charging points is key to increasing public awareness. Consider the balance of on-street and off-street charging points Minimise impact on parking bays – consider flank walls and areas without significant parking stress. Consider sites that are not expected to change in the next 5-8 years. Install infrastructure on public highway to ensure footways are kept clear. Ensure adequate power supply Ensure viable access for the installation team

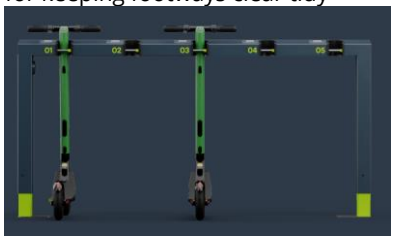
	About	How do they work	Design Considerations
Rapid/ Ultra Chargers (AC, 43kW; DC, 50-350kW; Tesla Supercharger V3, 250kW) 80% in 30 -45 mins	Rapid chargers can recharge a vehicle in minutes rather than hours. They are vital to long distance travel and for commercial vehicles such as taxis, which will need to top-up during the day. Rapids are ideal for off-street locations near arterial roads, service stations and car parks, due to their size.  	Rapid chargers work in the same way as a standard floor mounted charger but charge at a more accelerated rate. The standard rapid charging speed is currently 50kW, which can charge a vehicle to 80% full in 30-45 minutes, although some companies offer Ultra-Fast charging speeds of up to 150kW. They usually use a tethered cable equipped with a non-removable connector.	Consider the impact that the charging point will have on the street scene, especially due to the size of rapid charging points Consider locations based on whether they are in an appropriate position to service fleets and commercial delivery vehicles, for example, close to major road networks bringing traffic in and out of the borough. Consider whether a rapid charging hub, normally consisting of 5 or more charging points, can be implemented. Consider whether there is sufficient space for a feeder pillar or substation, if required Consider the available power capacity from the local grid and whether it can support a rapid charging point
Other types of chargers			
Trailing cables	It is generally considered that Council's cannot condone the trailing of cables from private properties across the footway to vehicles due to it being a trip hazard, however cable protecting mats and gullies have been proposed to mitigate these risks.		

Appendix 2 - Types of e-Bike and e-Scooter Charge Points

	About	How do they work	Design Considerations
E-Charge Point	E-charge points are small wallboxes that can be wall mounted or be free standing as an option for E-bike charging. They are ideal for being convienient and requireing low infrastreucture space to install. Some models also have a charging point for singular vehicles. 	Charge points are connected to a 230v / 400v power supply and can be placed near cycle infrastructure (such as bike stands) to provide an easy access point to charge bikes directs from the grid. Cables are not supplied so users would need to carry their respective charging cable to use the charging service. Has multiple charge points to allow for different cable types to connect allowing greater accessibility. Some models also allows for EV charging at points as well	Users required to carry own charge cables, may be unlikely to use as a result. Designed to be installed on buildings, although free standing option May not be suitable for E-scooters. While weatherproof, would likely need to be stored in bike sheds to make more identifiable and to provide protection to bikes in weather. Risk of vandalism through damage to unit. Consider impact on street scene.
E-Charge towers	Similar to e-Charge points but includes the option of a cabinet which contains charger cables. 	Works The same as Charge points but with the option to provide a cabinet to supply cables needed for charging.	Could potentially be installed on lighting column to reduce amount of footway required for install. May not be suitable for E-scooters While weatherproof, providing shelter to bikes should be considered. Risk of vandalism through theft of cables and damaged to unit Consider impact on street scene.

	About	How do they work	Design Considerations
Charging Stand	E-bike charging stands are suitable for locations where E-bike users will be spending a longer amount of time such as University, Libraries etc where they will need to secure their back for a longer period of time. They act as a safe place to store and Charge bikes. 	A power supply to the location of the stand is required which can be directly under or discreetly leading to the unit. Key locked doors provide access to the cables and power connection which can be locked after connecting to prevent theft.	Adequate power supply would need to be provided. Locating the stands would be best near Leisure facilities and areas where users should or would expect a more lengthy visit. While weatherproof, providing shelter to bikes should be considered. Risk of vandalism through theft of keys and damaged to locking mechanism. Consider impact on street scene. May not be suitable for E-scooters. Use by traditional bike users will limit capabilities.
E-Bike Charging dock	Charging docks are Similar to charging stands but differ in being used for e-bike hire services and therefore tend to have more secure locking. Some models have connections which allow for charging and locking at a single point where as others (Shown below) have more secure locking with cables provided. 	Similar to the above, thar connected discreetly or directly to a power supply and will typically have an electronic locking system instead of a typical bike lock. For e-bikes a contactless reader would "hire" the bike out and release the lock but for personal bikes would provide secure locking and charging, likely at a cost. They can even be used by non-e-bike users for secure locking.	Not suitable for e-scooters, would require more infrastructure put in place to provide power to lock mechanism. Use by traditional bike users will limit capabilities. Some models offer the ability to provide extra power using solar energy to offset use of DNO power.

	About	How do they work	Design Considerations
Storage and charging lockers	The most secure of the charging options as this provides the most physical security and fire security of all options. It provided protection in case of fire from damaged batteries while containing charging and bike lock facilities inside with a secure locking door for further security. 	Works as above but with the added benefit of having a securely lockable door and being self-contained in case of fire to provide protection to others. They are available for both e-scooters and e-bikes but they require different infrastructure for charging and locking.	Takes up a large amount of space for limited storage space. Use by traditional bike users will limit capabilities
Solar stand	The most efficient option, Powered entirely by solar energy the freestanding units can be placed anywhere. 	Powered entirely by solar energy they require no power input and are freestanding so can be moved freely to new locations if the existing location is not popular with e-Cycling	Storage capacity may limit effectiveness of charging. No locking mechanisms so cyclists would be unlikely to leave bikes for extended periods of time due to risk of theft. Important not to install in shaded areas. No groundworks required to install.

	About	How do they work	Design Considerations
Shared Dock	Shared docks would provide the benefits of a Scooter dock and E-bike dock at the same time. Allowing for all users to access them while limiting access to traditional cycle users (In most designs) 	These work the exact same as the e-bike docks but will the provision to allow e-scooters to charge as well. They are typically owned by companies running e-scooter trials and as such they would also offer the e-bike service.	Run as a service rather than a charging station. May be able to be run independently as a charger station but locking may be incompatible with standard locking mechanics. Some models offer the ability to provide extra power using solar energy to offset use of DNO power. Traditional bike users would be unable to use (In most designs)
E-Scooter Dock	e-scooter docks are designed mainly for companies who are currently running e-scooter trials. They offer security and charging which is ideal for keeping footways clear tidy 	As above, e-scooter docks will be connected either directly or discreetly to a power supply and users will lock the e-scooter into the dock and begin charging either by manually connecting a cable or automatically when the scooter docks (Model dependant)	Would currently be hire only service due to use of personal e-scooter in public still being illegal. Compatibility to charge other scooters may not be available at this time as well as a result of the afore mention ban. Some models offer the ability to provide extra power using solar energy to offset use of DNO power. Many companies prefer swappable batteries for e-scooters over charging.

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