, [Front Cover]

Electric Vehicle Transition and Infrastructure Strategy

Summer 2023

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To be written

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Delivering

- **Take up of EV's**
- **EV Infrastructure**

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Leicester City Council

Leicester City Council (LCC) recognises the challenges associated with achieving these targets and understands the need to invest in an extensive, effective, and efficient electric vehicle charging network.

As the electric vehicle charging market continues to make advancements in factors such as; grid capacity, charge speeds, payment and connector types, LCC have developed a Strategy to inform and guide the successful delivery of electric vehicle charging infrastructure across the city's transport network to meet the demands of its residents, businesses and visitors.

Analysing the current network, demand forecasts, grid capacity and future commitments, the Strategy recommends the most effective charging infrastructure LCC can apply to optimise electric vehicle uptake across the region. The recommendations are evidence-led and have been informed by factors such as: expected usage, charge type, user needs, technological solutions / trends, spatial distribution, and the wider LCC strategic priorities.

EXECUTIVE SUMMARY

The world is facing an unprecedented challenge to halt and reverse the effects of climate change. In Leicester the City Council recognised this challenge by declaring a Climate Emergency in 2019 and setting a Net Zero Carbon target by 2030. In the Leicester City Council (LCC) Climate Emergency Action Plan and Strategy it is recognised nearly one quarter of all carbon emissions are from road-based transport, with the transition to electric vehicles being the key action. To support the successful transition from petrol and diesel cars to zero emission vehicles across the city and region, Leicester City Council commissioned Arcadis to develop the Electric Vehicle Transition and Infrastructure Strategy.

The Strategy aims to inform and guide the swift uptake of electric vehicles (EVs) with particular focus on the effective delivery of EV charging infrastructure to support predicted demands of its residents, businesses and visitors.

The Strategy identifies high-priority locations where EV charging points can be implemented to deliver the most effective operational benefits.

This understanding has been informed by a robust evidence base that has examined factors such as:

- The role of electric vehicles on a national and local scale,
- Barriers to electric vehicle uptake,
- Existing and projected demand for electric vehicle uptake, and;
- Types of charging options available.

LCC will undertake a series of Next Steps to support the expected growth in demand of electric vehicles across the region. These include:

- Identifying innovative Electric Vehicle Charging Infrastructure (EVCI) trials and partnerships, to enable us to be at the forefront of effective and efficient EVCI rollout.
- To collaborate with the public, academic institutions and private sector to generate EVCI solutions and promote behaviour change.
- Setting out a sustainable business model for an equitable EVCI network within Leicester to balance between feasibility and control over assets.

INTRODUCTION

In a strong effort to tackle climate change and reduce the UK's contribution to the global warming crisis, the UK has committed to achieving a target of net zero greenhouse gas emissions by the year 2050.

The UK's Transport sector is the largest emitter of greenhouse gasses - making up 27% of the total UK domestic emissions in 2019 (Gov, 2021).

To successfully deliver upon the UK's 2050 net zero emissions target, we must first effectively reduce the emissions from the cars and vans on our roads, as they accounted for almost a fifth of the UK's total emissions in 2018.

As a result, bold targets have been set-

- 2030 to mark the end of all new petrol and diesel cars and van sales
- All new cars and vans to be zero-emissions by 2035

This has created a rapid drive by manufacturers to deliver more affordable electric vehicle fleets between now and 2035. - However, as this industry continues to mature, there is a fluctuation in the speed in which they can deliver electric vehicle-only fleets.

Charge point infrastructure is advancing and charging speeds have increased, along with the range and versatility of the charge point infrastructure available across our transport network

LCC is supporting "the delivery of public and private **electric vehicle chargers** at home and in workplaces to encourage the uptake of zero emission vehicles and the conversion of company and bus fleets."

Draft Leicester Transport Plan, 2021

The UK is on track to becoming the **quickest G7 country to decarbonise cars and vans.**

UK Govt, 2021

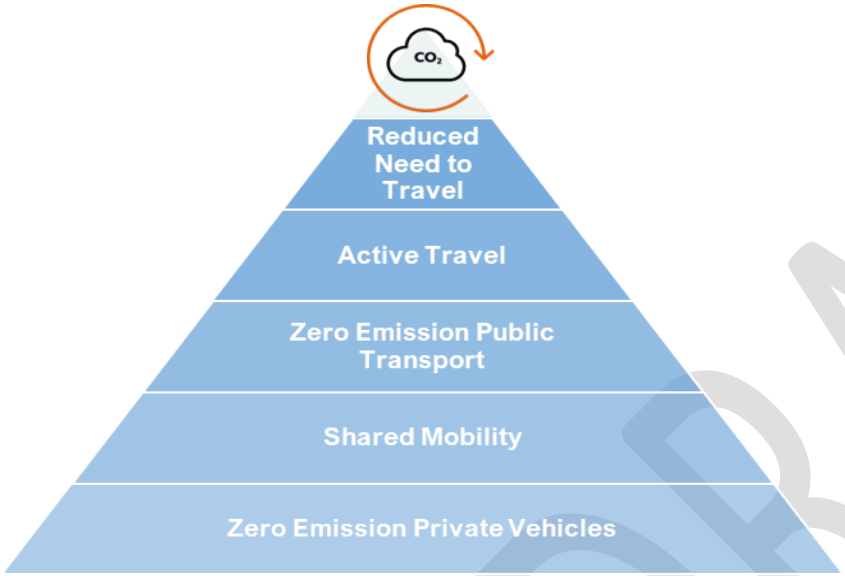
BACKGROUND

This Plan is embedded in, and supports key local, regional and national policies which outline the trajectory of the role of EVs across our transport network.

Key Strategies	Summary
Leicester Climate Emergency Strategy 2020-2023	Plans to expand the network of EV charging points across the region and review the need for hydrogen refuelling infrastructure. Seeks to promote the following to reduce carbon emissions and poor air quality throughout the region: • Car and bike sharing schemes • A transition to electric or hydrogen business fleets • Engaging and collaborating with taxi, private hire operators and bus fleet services • Enforce planning policies ensuring new employment sites enable sustainable and low-emissions commuting, business travel and fleet operation • Reduce fleet mileage and introduce electric and hybrid ultra-low-emissions vehicles
Leicester Draft Local Transport Plan 2021-2036	Presents a travel hierarchy prioritising a reduction in the need to travel and encouraging more walking, cycling and zero emission transport. Supports the delivery of public and private EV chargers to encourage the uptake of zero emission. Electric Charger Implementation Plan which works with other organisations to deliver enough electric charging points to support a shift to zero emission vehicles
Leicester Air Quality Action Plan (2015-2026)	Seeks to lobby and work with Government to introduce national measures to reduce pollution from diesel vehicles. Increase the uptake of ultra-low emission vehicles by residents and business Work with bus, freight, rail and taxi transport sectors to reduce their environment impact and reduce emissions by 50% by 2025 from the councils' fleet operations
Midlands Connect Strategic Transport Plan (2022)	Supports the Midlands in becoming a test bed for innovation projects for alternatively fuelled HGV's and the recharging/ refuelling infrastructure required for freight Work with partners to develop a regional Electric Vehicle Charging Infrastructure Plan and develop and implement an EV Charging Infrastructure Planning Tool by the end of 2022.
HM Government 'Taking charge: the electric vehicle infrastructure Strategy' (2022)	Supports the accelerated rollout of a comprehensive and competitive rapid charging network on major roads. Support local government to develop ChargePoint strategies and the rollout of public ChargePoint's on streets to allow sectors to thrive and address barriers to private sector rollout. Regulate ChargePoint's to ensure they are reliable and easy to use Work with Ofgem to ensure ChargePoint's are easy to connect and integrate with the electricity system.
Net Zero Strategy (2021)	End the sale of new petrol and diesel cars/ vans from 2030. All new cars and vans to be zero emission at the tailpipe by 2035. The government has committed £620 million to support the transition to EVs. The funding will support the rollout of charging infrastructure, focusing on on-street residential charging and targeted plug-in vehicle grants.

TRAVEL HIERARCHY

Transport contributes to approximately a quarter of Leicester's total carbon emissions. To reduce this, LCC have committed to a travel hierarchy; prioritising a reduction in the need to travel and promote greater walking, cycling and zero emission transport as the primary mode of choice.



The travel hierarchy supports individuals in making responsible transport decisions to improve their health and wellbeing and reduce the negative impacts on the environment.

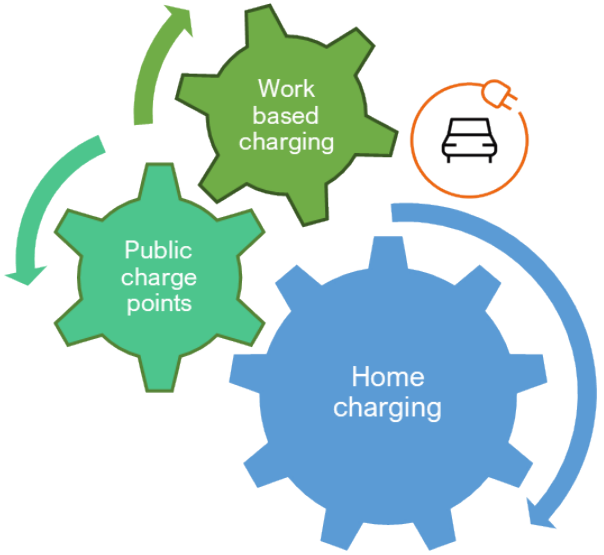
As part of this, LCC seek to increase the delivery of public and private electric vehicle chargers at home and in workplaces across the region to encourage the uptake of zero emission vehicles.

The Role of EVs in LCC's Transport Hierarchy

LCC recognise an extensive EV charging network is required to meet local and national targets. As a result, grid capacity improvements must be made all across the region.

Recently, public policy and funding opportunities have been focussed on providing EV charging infrastructure to those with access to dedicated off-street parking, However, for Leicester to effectively provide a long-term solution to its residents, businesses and visitors, it must holistically combine home-charging, publicly available charging and workplace-based charging - despite the challenges associated with factors such as, availability of on-street parking and existing grid capacity.

LCC will also transform their company and bus fleets; by making the most of technological advances in transport, including smart management of the highway network.



CHARGER TYPES

Electric Vehicle Charge Point Standards

EVs are evolving rapidly along with their charging technologies. Whilst EVs can be charged via a normal household plug socket, these are slow and inconvenient.

A variety of EV charging technologies are now available on the market to support the different requirements of cars, sites, and standards. These dedicated charge points have different charging speeds, sockets and power supplies.

One important aspect of an appropriate EVCP location is its power rating, which also dictates the speed of charge.

Power Supplies:

AC charging - Power drawn from the grid and then converted within the vehicle via an onboard charger

DC charging – Uses a converter built into the charger itself which can feed power directly to the EV battery. Although DC chargers are larger and more expensive than AC chargers, they can deliver more power and achieve a much faster charge time for users.

EV Location Types:

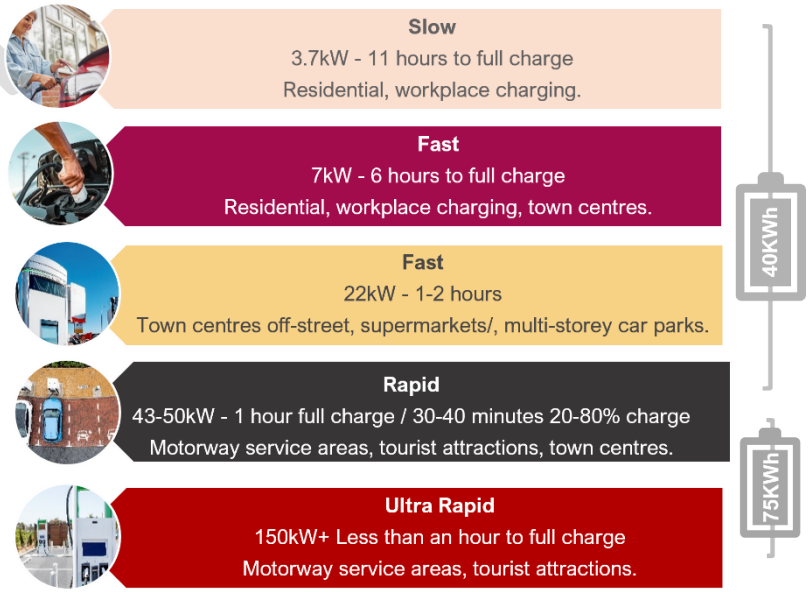
EV Charge Point/ Charging Unit: An upstand or wall-mounted structure offering one or more socket outlets or tethered plugs suitable for charging EVs.

EV Charging Station: A site with at least one ChargePoint suitable for charging. Can include, an energy supply enclosure, weather shelter, signage, and protection barriers for the equipment, etc.

Charging Speed Classifications:

Slow & Fast Chargers: Good for locations with the intention to park for longer periods of time – homes, workplaces, long-stay car parks & residential streets.

Rapid & Ultra Rapid Chargers: Best for locations where drivers intend to stop for shorter periods between their journeys, such as at a motorway service station.



CHALLENGES TO EV UPTAKE

EV uptake is a necessary process in meeting regional and national targets, yet through a variety of aspects can have some integral challenges to achieving this.

Behaviour, **Design** and **Delivery**

The attitudes and approaches of the public and authorities around EVs and its infrastructure provide the overriding associated challenges relating to uptake.

The issue of behaviour, specifically by members of the public, is something that continues to improve with education around the subject, though further assurance and information communication is vital in reducing the risk.

Pre-existing design issues significantly impact the possibility of implementing EV infrastructure in the region based on a variety of factors including grid capacity and pavement characteristics (the latter especially in relation to on-street charging).

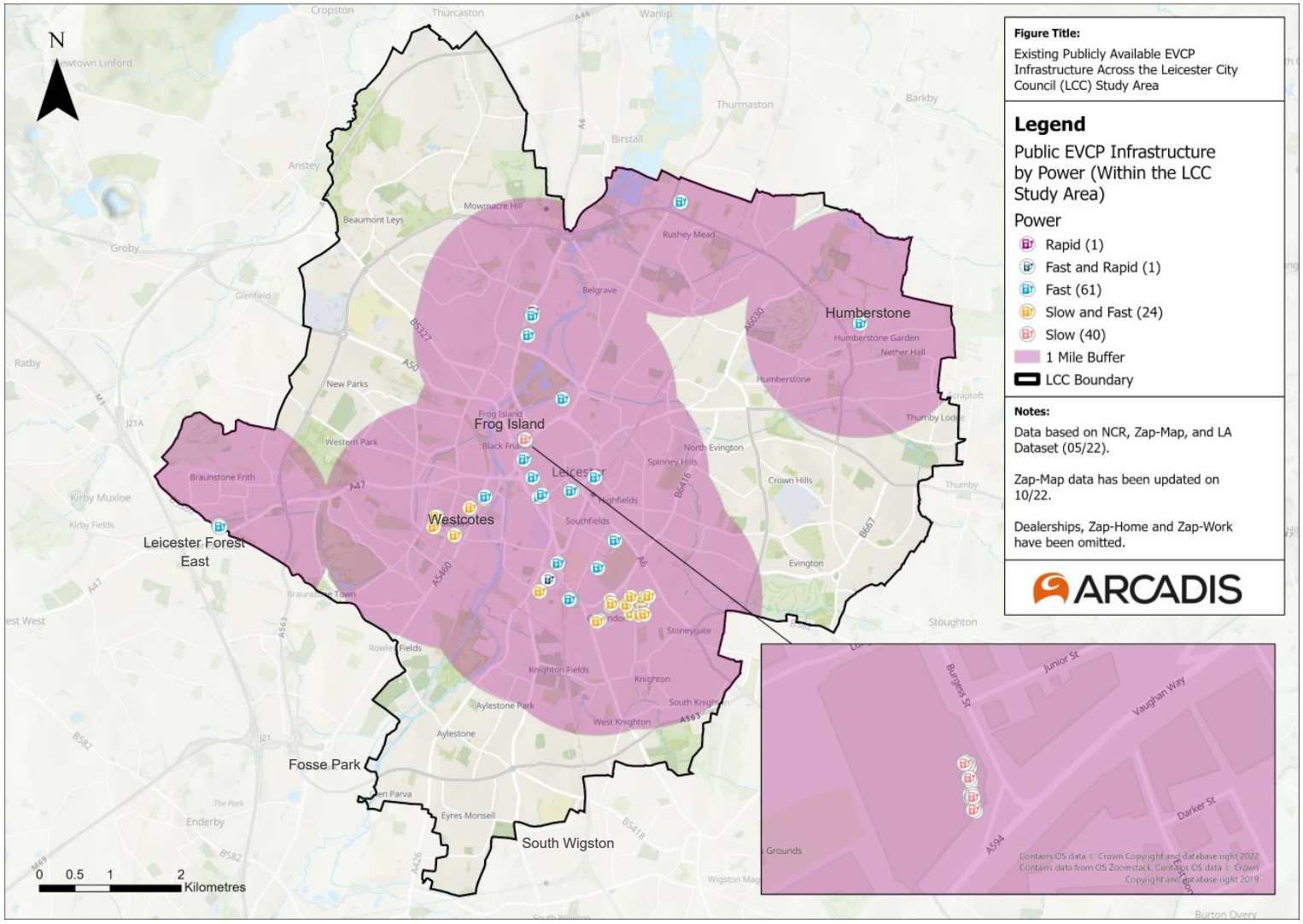
The Delivery of EV infrastructure is challenging with many obstacles to overcome through the delivery of the strategy, creation of policies and work with delivery partners including:

- Availability of funding
- Availability of land/suitable locations
- Legal; agreements or Service Level Agreements with private landowners
- Grid capacity / smart charging and innovative electricity storage solutions
- Planning and Highway legal requirements, including highlighting weight restrictions on the heavier EV vehicles and the reduction of trip hazards caused by charging cables
- Cost of electricity to driver – cheaper to charge at home which is also most convenient so what solutions are available for households without off street parking?
- Keeping pace with quick changing technology, especially car batteries so ranges are greater and chargers delivering lower charging times
- Ensuring charger locations are suitable for disabled drivers and following the British Standards Institute design standard (PAS 1899)

LOCAL NETWORK

At the end of 2022, 127 public EV chargepoints (EVCPs) were identified within the LCC boundary

- 20 of these are ‘Fast’ EVCPs and are located within the city centre
- 16 of the ‘Slow and Fast’ EVCPs are located in the south-east of the city; serving residential streets across Clarendon Park, and Westcoates;
- 13 ‘Fast’ EVCPs have been identified across the periphery of the LCC boundary, serving areas such as Rushey Mead, Hamilton and Meynell’s Gorse Park & Ride.



GROWTH PROJECTIONS

To facilitate an increased uptake of EVs, significant investment is required to expand the existing EVCP network across Leicester. To keep up with demand, it has been forecasted that Leicester will require:

Projected Number of ULEVs throughout Leicester			
Forecast Year	**Low**	**Medium**	**High**
2025	26,427	35,236	52,853
2030	81,385	101,732	142,424

As the growth in EVs is expected to continue, National Grid (2021)* have predicted the UK could have:

- Between 4 and 13 million battery EV by 2030
- Approximately 31 million by 2040

To better predict the UK's expected growth of ULEVs, (excluding hybrids), the following scenarios were considered:

Low - *Business-as-usual*: Assuming no change to policy; forecasts developed using current trends and DfT's Road to Zero benchmark of 15% and 40% of new car sales that will be Ultra Low Emission Vehicles (ULEV) by 2025 and 2030 respectively.

Medium - *Good practice:* Aims for 20% and 50% of new registrations to be ULEVs by 2025 and 2030 respectively.

High - *Exemplar*: In line with the Government's aim for 30% and 70% of new sales to be plug-in vehicles by 2025 and 2030 respectively.

Target Number of EV Chargers to Deliver

Applying the three scenarios it has been calculated the following numbers of different charger speeds would be needed to meet the demands by 2025 and 2030.

	2025	2030
Slow Chargers (3.3kW)	200 - 423	442 - 853
Fast Chargers (22kW)	10 - 22	23 – 44
Rapid Chargers (50kW)	28 - 57	75 - 132

LEICESTER CITY COUNCIL'S APPROACH TO THE CHALLENGE

LCC will adopt a collaborative approach to advocate, promote and influence EV uptake for its residents, businesses and visitors.

To meet current and future demand, LCC understands a parallel approach is required to developing solutions with partners from both the supply side (charging infrastructure) and the demand side (EV uptake). However, investment in both time and funding will be needed at a faster rate for supply side solutions to ensure the infrastructure is in place for the expected increase in demand. LCC will look to work alongside the private sector, micro-mobility providers, the public, and academic institutions to ensure an effective and equitable EVCI network is delivered across our region, whilst promoting EV uptake.

Local Electric Vehicle Infrastructure Fund (LEVI)

The Office for Zero Emission Vehicles (OZEV) will be announcing the new £500million LEVI fund in early 2023. We are expecting this funding, and associated guidelines, to have a significant influence on the delivery and elements of this EV strategy. However, for the time being the RoadMap on the following pages and the growth predictions on the previous page will set the foundation on which to build our LEVI Business Case.

Leicester City Council's Roadmap and Approach (work in progress / in collaboration with the designers)

Road Map			LCC's Approach	
Year	**Goal**	**Type**	**LCC' level of involvement***	**What will this involve from LCC?**
2022-2025	'Continued support for ChargePoint's in homes, workplaces, and on-street until at least 2024/25' - Transitioning to Zero emission cars and vans: 2030 Delivery Plan (2021)	Target	3	• Defining the role of LCC in supporting this transition. • Supporting the delivery of EVCP infrastructure throughout the LCC area. • Creating a public/ private forum to facilitate engagement. • Employing dedicated EV Officers • Produce data to inform site selection and mapping of charge points • Analysis of isochrone data to improve the access to ChargePoints to support the prospect of 15-minute neighbourhoods. • Develop and submit a Local Electric Vehicle Infrastructure (LEVI) capital fund proposal - Nov 2023 • Prepare and launch EV infrastructure procurement

2025	Reduce emissions by 50% by 2025 from the councils' fleet operations - Leicester Air Quality Action Plan (2015-2026)	Legislation	4	• Formally adopting design principles in line with PAS1899 standards
				• Collaborating with ChargePoint providers and suppliers to define LCC's pattern of delivery for ChargePoints. (Private sector delivery partners need to provide all / most publicly available chargers to make Leicester EV ready.)
				• Delivery of more EVCPs in LCC car parks
				• Trial On-Street Residential ChargePoint's
				• Greater information to the public and businesses around emissions
				• 2025 – Review Blink EV charger contract
				• Review EV Strategy, incl:
				  ○ Review private sector delivery partners
				  ○ Review grid capacity/ DNO progress with key upgrades
				  ○ Review comms & engagement

2025-2030	All government car and van fleet to be zero emission by	Legislation	4-5	Monitoring and evaluating utilisation rates across the region

	2027. - Net Zero Strategy (2021)			• Increase the amount of EVCPs in all LCC car parks • Increased delivery of public charging networks so all residents can access Residential Charge Points
2025-2030	All public sector fleet vehicles to be ULEV	Target	5	
2030	End the sale of new petrol and diesel cars/ vans from 2030. Net Zero Strategy (2021)	Legislation	4-5	
2030	All new cars and vans to be zero emission at the tailpipe by 2035. Net Zero Strategy (2021)	Legislation	4-5	

Useful Sources for Further Information

Leicester Transport Plan (Draft) 2021- 2036 -
https://consultations.leicester.gov.uk/communications/ltp4/supporting_documents/Leicester Transport Plan.pdf

Transitioning To Zero Emission Cars and Vans: 2035 Delivery Plan -
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005301/transitioning-to-zero-emission-cars-vans-2035-delivery-plan.pdf

Taking Charge: The Electric Vehicle Infrastructure Strategy -
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1065576/taking-charge-the-electric-vehicle-infrastructure-strategy.pdf

Consultation Outcome: Outcome and Response to Ending The Sale Of New Petrol, Diesel and Hybrid Cars and Vans -
https://www.gov.uk/government/consultations/consulting-on-ending-the-sale-of-new-petrol-diesel-and-hybrid-cars-and-vans/outcome/ending-the-sale-of-new-petrol-diesel-and-hybrid-cars-and-vans-government-response

ZapMap-

DENSITY OF TERRACED HOUSING IN LEICESTER