Electric Vehicle Charging Infrastructure Strategy 2017-2026

Warwickshire County Council
November 2017

'Warwickshire – Leading the Charge'

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Introduction

The majority of vehicles on the roads today run on either petrol or diesel fuel. However, the situation is changing, with a number of challenges to the predominance of transport fossil fuels. There is overwhelming evidence that petrol and diesel-powered vehicles cause pollution, which contributes to poor air quality and is dangerous to public health.

For these reasons policy makers and vehicle manufacturers or other transport innovators are working to build interest in and around the use of alternative fuels e.g. electric, biomethane and hydrogen.

Therefore, a Strategy to support the implementation of a world class charging infrastructure to enable the development of such technologies is required in Warwickshire and this is supported by a number of key issues;

- The Queen's Speech in June 2017, referred to the advance in electric vehicles as part of the Automated and Electric Vehicles Bill.
- The Government recently announced its plans to ban new diesels and petrol vehicles from sale in the UK from 2040.
- Government announced a £255m fund to help councils tackle emissions, including the potential for charging zones for air polluting vehicles.
- Coventry and Warwickshire is a national hot-spot of low emission vehicle excellence. Furthermore, it is the leading location in the UK for hybrid and electric development, testing and manufacture, for example;
    - Within Warwickshire and Coventry there are over 30 car and off-highway vehicle brands with R&D and manufacturing centres for leading names such as BMW, Jaguar Land Rover (JLR), Aston Martin Lagonda, London Electric Vehicle Company, Tata Motors and Dennis Eagle.
    - JLR recently issued visionary plans to manufacture the next generation of electric cars in Coventry, subject to government support, which will impact upon the deployment of battery powered vehicles.
    - The National Automotive Innovation Centre (NAIC), located at the University of Warwick, will open in early 2018. The NAIC is a public/private initiative that brings together academics, students and industry including JLR and TATA and other OEMs to develop the low carbon vehicle technologies of the future.

Many transport users will make the transition to EVs over the next few years – residents, businesses, public transport, community groups, and public transport operators. It is vital that WCC adopt an electric vehicle charging strategy and launch its new initiative, '**Warwickshire~Leading the Charge'**, spearheaded by the Leader of the Council, Cllr Isobel Seccombe OBE. Warwickshire County Council (WCC) will

demonstrate its strong commitment to promote the uptake and deployment of Electric Vehicles (EV). This will be through the development of a county-wide charge point strategy and infrastructure that is 'fit for purpose', that represents good value for money, and responds directly to the increasing expectation and demand for a network of public access EV charge points.

Vision Statement:

Warwickshire County Council will provide the infrastructure necessary to enable residents, businesses and communities to use electric vehicles every day and for any purpose. Electric Vehicle Users will be confident that they will be able to recharge their vehicles quickly and conveniently, taking advantage of their lower cost operation and in doing so making a major contribution to air quality in the County through reduced emissions from road transport.

To realise our vision, the Council will work with the District and Borough Councils to:

- **Support an integrated network of EV charge points** (rapid, fast and slow) to match current and future demand, parking situations, and budgets
- **Work with charge point infrastructure providers** to trial new technologies e.g. on-street lamp post charging; in town rapid charging hubs, and show the benefits of EVs in general through 'drive and ride' demonstrations e.g. at Stoneleigh Park.
- **Explore opportunities to innovate** in the County by assessing the latest technology in electric vehicle mobility (e.g. e-bicycles, e-motorbikes, e-taxis, e-car clubs) and the infrastructure required to enable trials and full implementation of schemes if appropriate
- **Facilitate innovation and the development of EVs and associated technologies** by working with local OEMs to provide opportunities to test and develop technologies in local towns, rural areas and the highway network
- **Require private developers and Landowners to provide EV charging** to encourage residents to switch to low carbon vehicles
- **Work with Organisations to deliver Workplace Charging** to encourage uptake of grants and providing advice where appropriate
- **Review current parking management policies** to ensure consideration is given to the successful management of EV parking bays
- **Raise awareness of the EV market** so people can understand the options for and benefits of EV ownership

Warwickshire County Council will:

- **Provide work-based chargers for WCC staff and assess whether an electric vehicle lease scheme for staff is appropriate** to encourage our employees to switch to a low carbon vehicle (full battery or hybrid)
- **Investigate opportunities to deploy electric vehicles within WCC's fleet** to reduce the Council's own carbon emissions whilst carrying out its business

The Policy Context

National Policy

The Government set out its plan of action for greenhouse gas reduction in the Carbon Plan in December 2011. The plan identifies that transport has a critical role in meeting the Climate Change Act obligations.

The Government published 'Making the Connection: the Plugged-In Vehicle Infrastructure Strategy' during 2011. At the time, the Government envisaged most EVs being recharged overnight, at homes or in vehicle depots. If such an approach was successful, this would have the benefit of balancing the demand for electricity across the day, increasing the energy savings offered by the uptake of EVs, while creating minimal infrastructure cost.

In 2013, the Government published 'Driving the future today: a strategy for ultra-low emission vehicles in the UK', with a vision that almost every car and van in the UK should be an ultra-low emission vehicle by 2050.

More recently the Government's ongoing commitment to EVs was highlighted in the Queen's Speech in 2017, as part of the Automated and Electric Vehicles Bill. If approved, this will release a fund of £800m for investment into new driverless and zero-emission vehicle technology to boost the Industrial Strategy. The Government will set a target for almost every car and van to be zero emission by 2050, require motorway service areas and large petrol stations to install electric vehicle recharging points, and ensure common infrastructure standards and £600m during this parliament to support ultra-low emission vehicles.

In July 2017, the Department for Environment, Food & Affairs and the Department for Transport published its Air Quality Plan for nitrogen dioxide (NO2) in the UK. In addition, the Government announced its plans **to ban new diesels and petrol vehicles from sale in the UK from 2040.**

Local Context: Warwickshire

Warwickshire is a leading member of The Coventry & Warwickshire Local Enterprise Partnership (CWLEP).

It is recognised that WCC will need to work together with the Boroughs and Districts to fully maximise the development of EVCI and ensure a consistent approach to EV charging across the County.

WCC has a number of policies which support the EVCI Strategy:

- The Local Transport Plan (LTP) 2011 – 2026: Air Quality Strategy;
- WCC Environmental Management Policy V2 June 2017;
- WCC Energy Policy for Properties 2015; and
- Coventry and Warwickshire Health Protection Strategy.

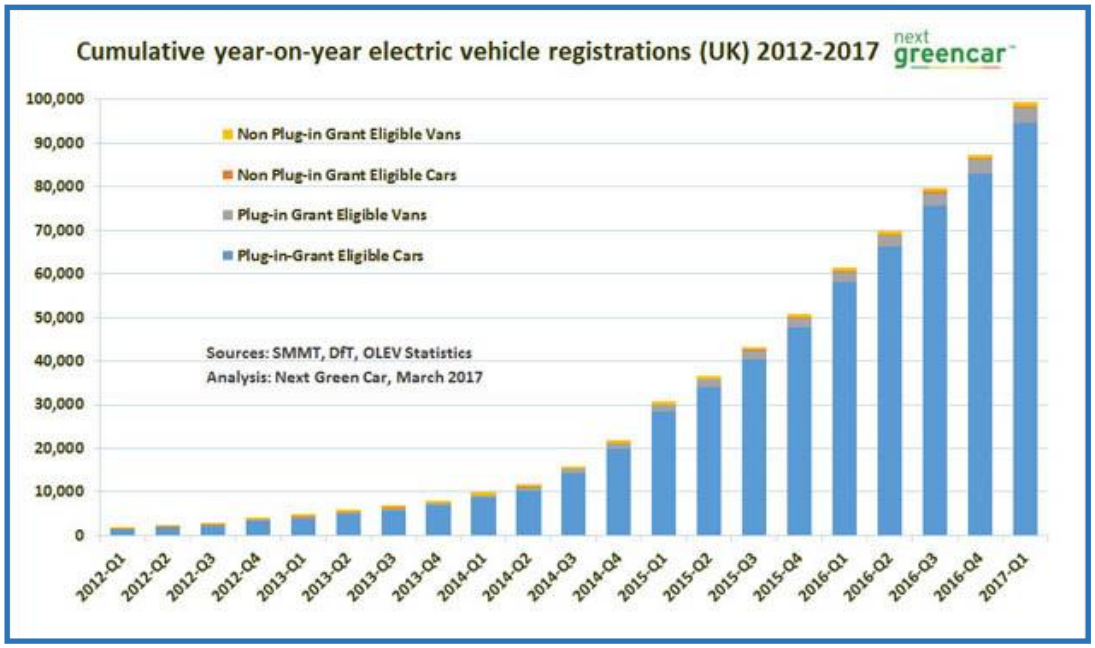
Given the momentum that is building for wider adoption of electric vehicles it is now appropriate for a strategy to de adopted by WCC to support the implementation of a world class charging infrastructure. This Strategy will be added as an addendum to the LTP 2011 – 2026.

Within the Districts and Boroughs, policies are currently being developed to include provision for supporting the advance of electric vehicles in the market. This is summarised below.

Overview of Current Situation

Ultra-Low Emission Vehicles

The UK has seen a surge in demand for ultra-low emission vehicles, including EVs, and 2016 saw a record year of sales. Ultra-Low Emission Vehicles (ULEVs) currently account for just over 1% of market share for new vehicles registered in London, but the pace of demand and ever changing technology means that by 2025 this is expected to have increased significantly. There are currently just over 100,000 ULEV cars on UK roads and that figure is expected to rise to around 1 million (OLEV) by 2025.



ULEVs are broken down into three main types:

- Battery Electric Vehicles (BEVs)
- Plug-in Hybrid Electric Vehicle (PHEV)
- Hydrogen Fuel Cell Electric Vehicles (FCEV)

Further details about each type can be found in Appendix C. The fastest growth is occurring in plug in hybrid electric vehicles.

There are currently four power levels associated with EV charging. These are slow, fast, rapid and super chargers (Details can be found in Appendix D).

Current charging Infrastructure in Warwickshire

ZapMap reports the current network of charge points in Warwickshire as of 1st June 2017:

- There are 55 charge point devices hosting 83 connection sockets (some are therefore double socket devices) at 24 different locations across the County.
- Of these, 10 locations offer open access to EV users and 14 offer restricted access e.g. limited hours; customers only; privately owned site etc.

The distribution of locations across the County is as follows:

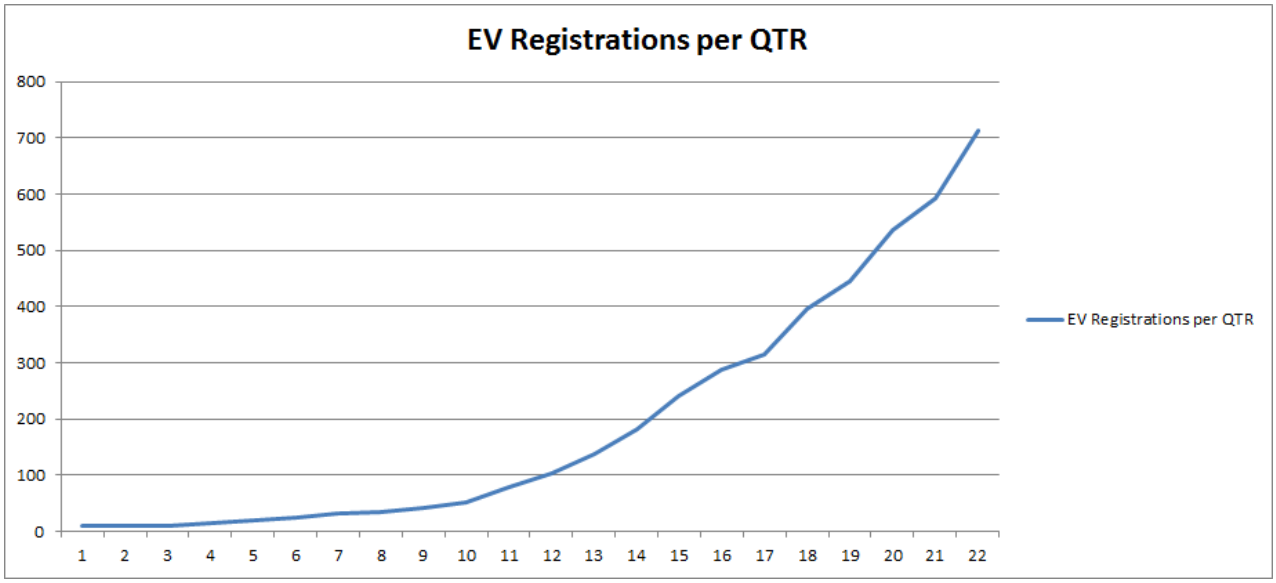
Location	Number of locations
Motor dealership	5
Retail centre car park	2
Railway station	3
Pub/hotel	6
Public car park	5
Petrol service station	2
NHS site	1
On-street	0
TOTAL LOCATIONS	**24**

The charge points that are currently provided by the Districts and Boroughs are ageing and do not necessarily reflect the necessary charging capacity required by local users. There is now demand for an improved network of faster, 7kW charge points as well as rapid 50kW charge points, suitable for residents, visitors and taxi firms.

EV Ownership in Warwickshire

The chart below demonstrates the rapid growth in registered EV's in Warwickshire since quarter 1 2012, till quarter 4 2017.

As the number of registered vehicles is only expected to rise, it is important that WCC deliver this Strategy to provide the infrastructure required to support the growth in the EV car market.



Source: Department for Transport Statistics – Vehicle Licensing Statistics (Table VEH0131)
https://www.gov.uk/government/collections/vehicles-statistics

Warwickshire's EV car ownership, as a proportion of the total number of cars, has increased over 3,000% since 2012, compared to 1,400% in England and 1,800% in West Midlands. This shows a larger than proportional increase in EV ownership, suggesting demand for EV's is growing faster in Warwickshire, relative to the rest of England.

The Strategy

The Objectives of the Electric Vehicle Charging Infrastructure Strategy (which reflect the wider objectives of the LTP) have been prepared to support national policy on air quality and transport. The objectives of the Strategy are:

- To **address air quality** issues that have, or will arise, due to transport-related issues;
- To **inform** and complement WCC's wider policies on transport contained in the LTP;
- To take a **proactive**, rather than reactive approach, to dealing with future demand for EVCI;
- To create a realistic, deliverable **Action Plan** with schemes and initiatives for improving provision to support the advance of ultra-low emission vehicles in the market; and
- To integrate the Strategy fully within the Local Transport Plan.

Policies

EVCI1 Provision and Delivery of Public EV Charge Points

WCC will work with the County's five district/borough councils to help facilitate the provision of a charging network that provides mixed speed public charging infrastructure which is available, affordable, consistent, convenient and user friendly.

The County Council will seek to provide an EV charging network that has standard charging posts and payment systems to ensure better usability and convenience, making the experience of charging better for the user.

The EVCI should also be placed in locations that are accessible to the majority to ensure good uptake.

The County Council will consider the speed of charging for each location considered, providing a range of slow and fast chargers as appropriate.

EVCI2 Trial new technologies and explore opportunities to innovate

Warwickshire County Council will work with the EV Charge Point providers and manufactures to trial new- technologies

WCC will also consider the provision of Rapid Chargers in suitable locations, where the energy supply is sufficient and available, to encourage the take up of e-taxis and e-light commercial vehicles. Rapid chargers may also be suitable for residents without access to private drives to charge their vehicle on their journey to or from home. WCC does not currently intend to provide on street residential EV bays due to parking capacity issues and traffic regulation orders in residential streets. However, WCC will trial appropriate technologies that may be suitable for residential streets (e.g. street light column charging).

WCC will explore opportunities to innovate in the County by assessing the latest technology in electric vehicle mobility (e.g. e-bicycles, e- motorbikes, e-taxis, and e-car clubs) and the infrastructure required to enable trials and full implementation of schemes if appropriate.

EVCI3 Require private developers and landowners to provide EVCI

Warwickshire County Council will work with the Districts and Boroughs to ensure policies are in place requiring new developments to provide EVCI where appropriate.

WCC will request that consideration is given to the delivery of EVCI through development opportunities and will work with District and Borough Councils as appropriate to secure the appropriate outcomes.

EVCI4 Review current parking management policies

Warwickshire County Council will ensure consideration is given to the successful management of EV parking bays.

WCC will review its parking management policies to include provision for the management of EV charging bays where appropriate.

WCC will ensure that EV bays are provided and managed successfully where required.

EVCI5 Raise awareness of the EV market

Warwickshire County Council will raise awareness so people can understand the options for and benefits of EV ownership

WCC will update its web pages to include a section on electric vehicles to provide information enabling residents to consider switching to an ULEV in the future.

WCC will work with organisations to encourage uptake of grants to deliver EVCI and provide relevant advice where appropriate

WCC will ensure that EVCI is sign posted where appropriate and advertised through effective communication.

WCC will explore opportunities to work with charge point providers to identify suitable locations to trial new technology e.g. on-street lamp post charging; in town rapid charging hubs, and show the benefits of EVs in general through ‘drive and ride’ demonstrations.

WCC will assess suitable venues which are accessible to the public and OEMs

WCC will promote the vision, as appropriate, for a Showcase Centre with a view to obtaining stakeholder support to realise this ambition.

EVCI6 Provide EVCI for its employees

The County Council will provide EVCI within their staff parking facilities where appropriate to encourage the uptake of ULEVs.

WCC will provide EVCI for WCC staff.

WCC will encourage the EVCI in staff car parks to be utilised by local residents and visitors during evenings and weekends.

WCC assess whether an electric vehicle lease scheme for staff is appropriate to encourage our employees to switch to a low carbon vehicle (full battery or hybrid)

EVCI7 Deploy electric vehicles within WCC's fleet

The County Council will add ULEVs to its fleet to reduce the Council's own carbon emissions whilst carrying out its business.

WCC will consider the options for ULEVs during the procurement of vehicles with the intention to provide EVs within the existing fleet.

WCC will seek to introduce EVs within its pool fleet and ensure staff are aware of the EVs to encourage uptake for County business, thereby reducing its emissions from grey fleet.

WCC will explore opportunities to deliver EVCI and vehicles to a mixture of County Council establishments where appropriate e.g. schools, community centres.

WCC will work with Warwickshire's NHS to develop take up of EVCI and vehicles where appropriate in the public health sector.

Action Plan

Actions for delivering the EVCI Strategy are set out in the table below.

Policy	Action	Timescale
EVCI1 Provision and Delivery of Public EV Charge Points	• Explore opportunities to procure suppliers through the ESPO framework • Procure supplier/s that meet the needs of the EVCI Strategy • Secure necessary capital funds • Explore opportunities to generate revenue where appropriate • Work with Districts and Boroughs and supplier/s to identify appropriate locations for EVCI • Commence and continue delivery of EVCI	Commence delivery by end of 2017 Ongoing
EVCI2 Trial new technologies and explore opportunities to innovate	• Officers to understand developing technologies and identify opportunities to innovate • Work with Districts and Boroughs to identify suitable locations to trial new technologies • Officers to explore areas (UK and Europe) of good practice and use this learning to inform our approach	
EVCI3 Require private developers and landowners to provide EVCI	• Work with Districts and Boroughs to identify policies which can be updated to include provision for EVCI • Advise private developers submitting planning applications to install EVCI	As appropriate
EVCI4 Review current parking management policies	• Consider how EV bays could be effectively managed and adapt parking management policies accordingly	As appropriate
EVCI5 Raise awareness of the EV market	• Provide web based information on WCC's Website • Promote EVCI through media channels • Provide signage where appropriate • Provide advice and guidance re ULEVs to residents and businesses	As appropriate
EVCI6 Provide EVCI for WCC employees	• Identify suitable locations for EVCI	Ongoing

	• Apply for available grants and identify other funding sources • Assess schemes to enable staff to switch to ULEVs • Promote EVCI to staff	
EVCI7 Deploy electric vehicles within WCC's pool fleet	• Prepare a business case to consider the options for ULEV procurement • Deliver the infrastructure required to support ULEVS within the WCC's pool fleet • Procure ULEVs at the appropriate time • Encourage staff to use the ULEV when appropriate	By the end of 2017 Ongoing

The Strategy and Action Plan will be reviewed and updated as necessary on an annual basis. WCC will monitor the number of EV charge points available in the County and their usage to ensure that the supply meets demand.

The County Council will take appropriate action to rectify issues where necessary.

Appendix A

Executive Summary of EV Charge Point Review

Greenwatt Technology (July 2017)

1. Electric vehicles (EV) sales are showing strong growth and the Warwickshire public access EV charge point (EVCP) infrastructure needs to expand accordingly.
2. The Government (Office for Low Emission Vehicles) is firmly committed to supporting the development of EV charge point infrastructure and autonomous vehicles.
3. Local authorities have a key role to play in supporting the transition to low emission vehicles (LEVs) by facilitating and enabling a mix of public access charge points.
4. The 'hidden costs' of poor air quality in towns, cities and even rural situations are becoming more critical and demand action. EVs have zero tail pipe emissions and can assist in the mitigation of poor air quality.
5. Warwickshire County Council can take a lead in improving air quality by adopting EV technology within their own vehicle fleets thereby encouraging others.
6. EV charge point technologies and management systems are now fairly mature but the current network in Warwickshire may be regarded as unplanned and uncoordinated.
7. Councils in Warwickshire (county, borough and districts) have different policies and approaches to EVs and charging infrastructure which can be frustrating for EV drivers.
8. A coordination of charge point installations between councils coupled with a joint procurement framework would avoid duplication of efforts, lower costs and present a united public sector commitment to EVs and improvement of air quality.
9. Councils can now access the ESPO procurement framework for EV charging infrastructure from July 2017.
10. Attention should not only focus upon EV car users but should also be upon reducing emissions from public transport (taxis, buses) and [last mile] delivery vehicles.
11. The mix of charge point types in terms of speed of charging requires careful balance and attention to the various EV user demand profiles.
12. A closer liaison between local authority provision of charge points and those being installed by businesses and organisations across the county could be investigated
13. On-street charging is of particular importance to owners of terraced houses with no off-street parking. However there are issues to resolve, and there is opportunity to trial innovative technology e.g. lamp post chargers and in-town rapid charging hubs.
14. Inclusion of EV charge points as a planning requirement for all new residential and commercial developments will speed transition.
15. Liaison with surrounding counties would avoid duplication of network provision and create a Midlands network of rapid charge points on major roads.
16. With Coventry and Warwickshire at the forefront of future low emission transport technology and innovation, the County should maximise its advantage by ensuring a first class public access EV charging system is in place.
17. This Review supports a county-wide strategy led by WCC and in association with Tier 2 councils and other organisations engaged in EV infrastructure provision.
18. An extensive campaign promoting the benefits of driving electric would encourage more residents, businesses and organisations to convert to electric vehicles.

Appendix B

Overview of the EV Reviews Findings

The review established that **all** the councils except RBC have installed EV charge points at some point over the last three years. This is an indication that council officers responsible have some awareness of options and issues related to charge point installation, back office systems, customer interface and charge point management.

The installed network varied in each council area with SDC installing units in two locations (council public car parks), WDC in three sites (council public car park, council staff car park and estate service depot) and NBBC and NWBC in one location (council public car park). Only three councils installed charge points as part of the Plugged in Midlands grant scheme - NBBC, SDC, and WCC. Two other councils - NWBC and WDC - have installed charge points independently. Only three councils installed charge points as part of the Plugged in Midlands grant scheme - NBBC, SDC, and WCC. Two other councils - NWBC and WDC - have installed charge points independently. These responses indicate that councils have a different experience of charge point unit procurement and back office charge point management systems.

WCC has installed charge points at three railway station car parks. No charge points have been installed by any of the councils to date at venue car parks, tourist centres or hotels.

The majority of charge points installed are 'fast' charging (32amp; 7kW max; 3-4hrs full charge) or 'slow' charging (16amp; 3.3kW max; 8 hrs for full charge). No 'rapid' charge points (43 AC / 50kW DC; 20-30mins full charge) have been installed to date.

The responsibility for EV charge point infrastructure varied across the county which may reflect different emphases in policy development and management responsibility:

Council	Department with main responsibility for charge point infrastructure and maintenance
NBBC	Assets & Street Services
NWBC	Streetscape and Facilities Management depts.(Community & Environment Division)
RBC	Likely to be Parking Services and Corporate Property
SDC	Technical & Community Services
WCC	Transport Planning Unit
WDC	Housing and Property Services – Asset Management

Two councils (NWBC and RBC) do not have a policy in place to support public-access charge points. However, RBC's planning policy is presently being adapted to include provision for EV charging requirements for new build houses.

NWBC reports awareness within the Council of the potential and need for EV charge points - however, limited resources and political buy-in are stated as 'current challenges'. Two councils (NBBC and WDC) do have air quality and planning policies in place that include a level of provision for electric vehicle charging.

There is also little uniformity amongst councils with regards to parking bay usage for EV charging. Three councils (NBBC, SDC and WDC) state that their public access charging bays are used exclusively for EV/hybrid recharging. WCC and NWBC have EV/hybrid recharging points shared with disabled (blue badge) parking. NWBC also provides EV charging bays, but not on an exclusive basis i.e. non-electric vehicles can also use the parking bays. Management of EV parking bays is an issue which needs addressing. There is a lack of consistency amongst local councils which can be confusing and frustrating for EV drivers; most of whom expect bays to be provided exclusively for the purpose of charging EVs.

Appendix C

Types of Ultra Low Emission Vehicles

- **Battery Electric Vehicles (BEVs)** – these rely solely on battery power and can travel between 100 and 300 miles on a single charge. Current examples seen on our roads include the Nissan Leaf, BMW i3 and the Tesla S saloon. 2015 saw a 48 per cent increase in pure electric registrations compared to 2014

- **Plug-in Hybrid Electric Vehicle (PHEV)** – these employ a conventional petrol or diesel engine alongside an electric motor. They have a relatively short range on electric power (20-40 miles) but the use of both drive systems can return figures in excess of 130 miles per gallon equivalent. Examples include the Mitsubishi Outlander SUV, the newer Toyota Prius PHEV and the BMW i8 sports car. 2015 saw a 137 per cent increase in plug in-hybrid registrations compared to 2014.

- **Hydrogen Fuel Cell Electric Vehicles (FCEV)** – still currently at a development stage with limited production due to the difficulties of hydrogen production, storage and refuelling. As no charging is needed, and with the lack of any significant hydrogen refuelling infrastructure these are not being considered as part of the current low emission transport strategy but could be a future consideration for the County as the technology matures.

Appendix D

Power levels of EV Charging

- **Slow / trickle** - 3kW: this is the oldest standard and can typically be supplied by a standard household 3-pin plug, a wall or post mounted purpose built unit or via a street light charging point. A typical full charge of an electric vehicle (from empty) takes between 7 and 8 hours, meaning that it is most suited for overnight charging at or near home or work, and the number of users in a 24 hour period is low (typically 1 – 2).

- **Fast** - 7kW a newer standard that requires a dedicated power source and connecting cable type. A typical full charge on an electric vehicle takes 3-4 hours, meaning that 3 or 4 users a day could fully charge. This supply is becoming common in many current on-street or public car park charging points, as well as in supermarkets and businesses. 22kW units can be deployed for faster charging where 3-phase charging is available e.g. multi-storey car parks.

- **Rapid** - 43kW AC / – 50kW DC : a high power rapid charging option to suit the needs of users who need to charge their electric vehicle quickly to keep them in use, such as taxis, commercial vehicles or company cars. An 80% charge from empty typically takes 30-40 minutes for a standard EV e.g. Nissan Leaf, allowing for a high number of charges per day. Rapid points are now available at most motorway service stations. Although smaller designs are becoming available, these units are relatively large and expensive compared to lower power units and require significant local grid connection capacity which can impact upon locations for rapid charge point installations.

3kW charging point

7kW charging point post

Rapid 50kW charger

Examples of charging point technology in the UK

- **Supercharge Rapid** – 120-140kW: these are currently installed exclusively by Tesla – enabling their larger battery powered EV range (60-120kWh capacity) to charge quickly e.g. Tesla Model 'S' can charge up to 80% in about 40 minutes or add 170 miles of range in about 30 minutes.

Superchargers will become increasingly important as other high powered EVs enter the UK market e.g. VW and JLR models. Tesla has indicated that arrangements with other EV manufacturers are likely to enable such EVs to access the Tesla supercharge highway. They also expect that their Tesla models will be able to fully charge within 10 minutes in future.