



Redditch Borough Council

Ultra-Low Emission Vehicles Strategy

REDDITCH BOROUGH COUNCIL

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Glossary

Acronym	Definition
AQMA	Air Quality Management Area – Location where Nitrogen Oxide levels exceed the national maximum threshold. Councils are required to produce and implement plans to reduce emissions in AQMAs.
EVSE	Electric Vehicle Servicing Equipment – effectively a generic term for electric vehicle charging points.
ULEV	Ultra-low emission vehicle – defined as vehicles with emissions of CO2 below 75g/km or fully electric powered.
WTW	'Well to wheel'. This describes the impacts of a vehicle fuel from production via distribution to usage.
Types of mass market vehicles are described in Figure 1.	
Types of electric vehicle charging situations are described in Figure 2.	
Types of electric vehicle charger are described in Figure 3.	

Figure 1 Types of vehicle in mass-market production

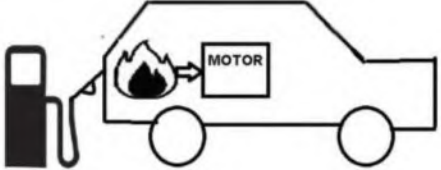
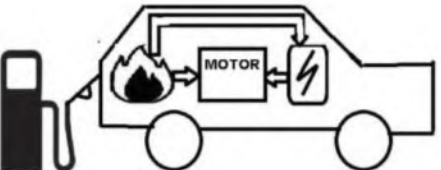
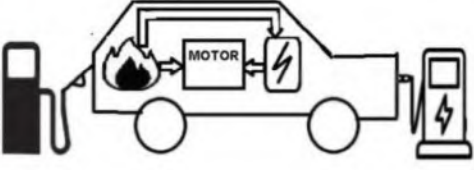
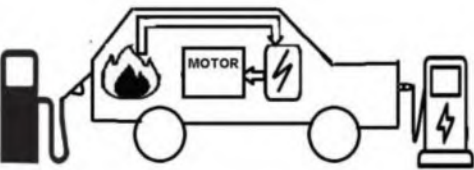
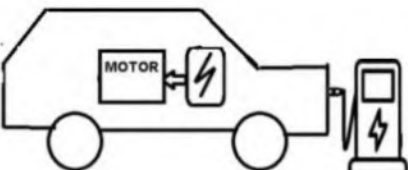
ICE Internal Combustion Engine.		Traditionally petrol or diesel fuelled.
HEV Hybrid Electric Vehicle.		Conventional petrol or diesel ICE and a relatively small electric battery. Uses ICE and/or battery to power the car and uses energy from the ICE to charge the battery, depending on the situation. In certain driving conditions, this will lead to lower emissions.
PHEV Plug-in Hybrid Electric Vehicle.		HEV which has the ability to plug in and charge the electric battery from an external source. This gives the potential to further reduce emissions over a non-plug-in hybrid, especially if this electricity comes from a renewable source.
EREV Extended Range Electric Vehicle.		A plug-in electric vehicle, where there is also a small ICE. Energy from the ICE keeps the battery topped up and extends the range of the vehicle.
BEV Battery Electric Vehicle.		A plug-in electric vehicle using solely battery power.

Figure 2 Types of charging situations

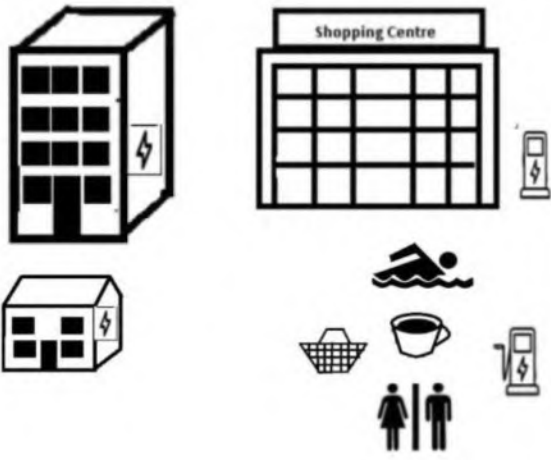
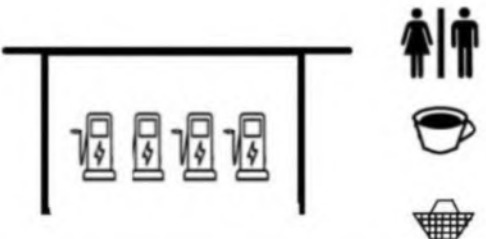

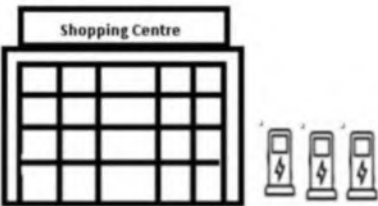


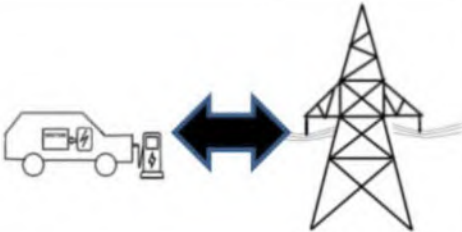
Destination charging		Charging your vehicle at your destination <ul style="list-style-type: none"> • When you travel and park for work, home, shopping or leisure. • Depending on the duration of stay, slow, fast or rapid chargers may be most suitable.
Charging station		Charging on route <ul style="list-style-type: none"> • Multiple rapid or ultra-rapid chargers with facilities

Figure 3 Types of electric vehicle charger

Trickle Charger or Slow Charger 3kWh power		<ul style="list-style-type: none"> • Destination: Homes or workplaces • 9 miles range in one hour¹
Fast Charger Usually 7kWh power		<ul style="list-style-type: none"> • Destination: Few hours stay • 21 miles range in one hour
Rapid Charger Up to 50kWh		<ul style="list-style-type: none"> • Destination: ~ One hour stay • OR • Quick top-ups on route • Up to 150 miles range in one hour • Different cars have different connection types
Ultra-Rapid Charger 150 kWh – 350 kWh		<ul style="list-style-type: none"> • Charging on route • 75-175 miles added in a 10minute charge • Cars in development with compatible chargers.
Vehicle to grid (V2G)		<ul style="list-style-type: none"> • Can discharge power from the vehicle back into the building or local network to provide power at peak times.² • Upcoming technology.

¹ As a rule of thumb, range is increased in 20 minutes by same number of miles as the power rating in kWh

² EV Charging in Car Parks CENEX



Foreword

Cllr Matt Dormer, Leader of Redditch Borough Council

At Redditch Borough Council we are keen to encourage ultra-low emission vehicles (ULEV) and the benefits they can bring to our residents, including improved air quality, environment, public health and medical conditions, as well as providing more opportunities for businesses, economic growth and other sustainable forms of travel.

This strategy will inform our understanding of the needs of our residents and visitors and support works to develop appropriate infrastructure to enable more people to use ULEVs. It will also help us to work with our communities to explore other ways we can reduce vehicle emissions such as walking or cycling.

This is just another way we will unlock Redditch for everyone.

1. Vision, Aims and Objectives

1.1 Vision

A local area thriving in terms of local economic growth, public health, wellbeing and the environment, enabled by a sustainable travel network and a successful low carbon sector including ULEV related industry.

1.2 Aims

- i. To support the use of Ultra Low Emission Vehicles (ULEVs) in the area.
- ii. To support local economic activity and training opportunities in the ULEV industry.
- iii. To facilitate other actions to reduce vehicle related emissions.

1.3 Objectives

- i. Engage with local stakeholders to understand and address their needs in relation to ULEV technology.
- ii. To support and develop appropriate infrastructure for re-charging and re-fuelling ULEV vehicles.
- iii. To enable suitable opportunities for ULEV related business³
- iv. and training, including within the councils' commercialisation agenda.
- v. Work with other sectors such as communications, public health and sports development to explore other ways to reduce vehicle related emissions e.g. encouraging walking and cycling⁴ and decreasing vehicle idling.

³ See Appendix C Case Study Indra Renewable Technologies

⁴ See Appendix D Case Study Woo Bikes

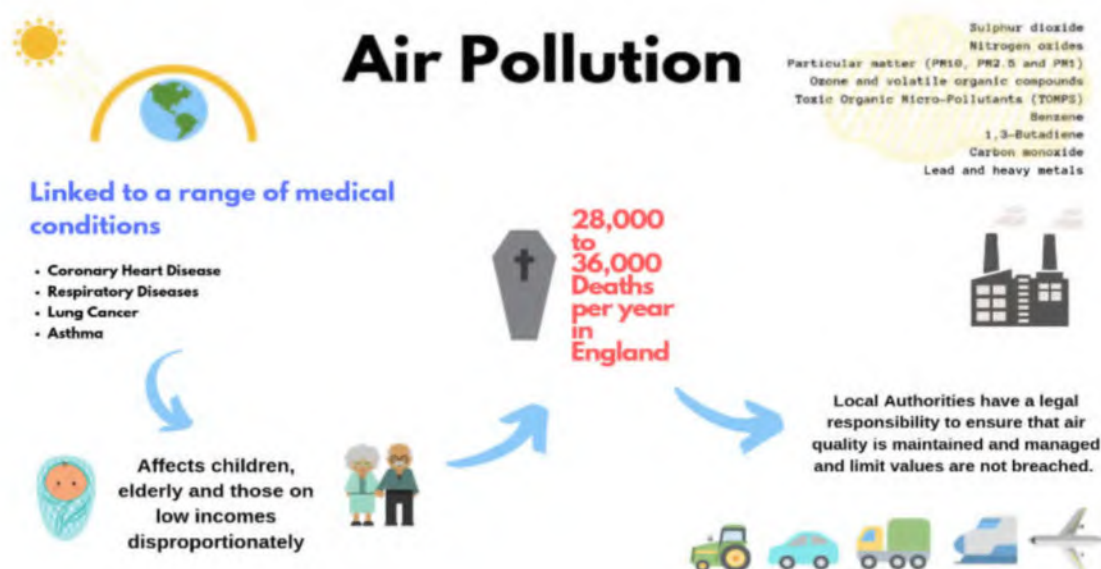


Figure 4: The Impacts of Air Pollution⁵

2. Setting the Scene

2.1 Introduction

There is a need nationally and locally to deliver economic growth along with improvements in public health, wellbeing and environmental welfare.

Diesel and petrol transport are key contributors to poor air quality, the largest environmental risk to public health in the UK. The annual mortality burden of human-made air pollution in the UK is roughly equivalent to between 28,000 and 36,000 deaths. Costs to society are estimated at more than £20 billion every year.⁶ There is strong evidence that man-made greenhouse gas emissions, including from fossil-fuel based transport, will have serious consequences within decades if not checked⁷.

Redditch Borough Council (RBC) need to take action to improve local conditions and provide resilience for our communities and industries, as well as contributing to a global solution.

Alternative fuels are available for vehicles, with lower emissions than conventional fossil fuel vehicles. National government have responded with the Road to Zero, Clean Growth and Clean Air Strategies and a commitment to end the sale of petrol and diesel cars and vans by 2040⁸. At a local level, all Worcestershire Councils and the Worcestershire Local Enterprise Partnership are committed to improve local air quality^{9,10,11} and to reduce greenhouse emissions¹².

⁵ Worcestershire Public Health Air Quality dashboard

⁶ Review of interventions to improve outdoor air quality and public health. Public Health England.

⁷ IPCC Special Report Global Warming of 1.5 degrees

⁸ Road to Zero Strategy

⁹ Worcestershire Climate Change Strategy

¹⁰ Worcestershire LEP Energy Strategy

The uptake of Ultra Low Emission Vehicles (ULEVs) in the UK presents a great opportunity to work towards a sustainable future and realise significant economic, social and health benefits. However it poses several challenges that need to be addressed, most notably the deployment of resilient re-charging and re-fuelling infrastructure.

This strategy sets out how RBC will support the use of Ultra Low Emission Vehicles (ULEVs) and related economic activity in our areas. It recognises the importance to Redditch of a sustainable travel network for residents, businesses, commuters and the visitor economy, and the need to attract growth industries that can provide local employment and education opportunities.

There is no intention to increase the number of vehicles on our roads, rather to enable residents across our areas to switch to ULEV's and facilitate other actions to reduce emissions and congestion.

Whilst much of the focus is currently on electric vehicles, innovation is happening all the time. It is important to be able to be ready to respond to future changes, therefore this strategy and action plan is designed to be flexible and responsive.

This strategy sets out national and local context along with our vision, aims and objectives and a proposed five year action plan. It will be reviewed as necessary to ensure that it remains fit for purpose.

¹¹ Worcestershire Air Quality Action Plan.

¹² Carbon dioxide, methane, nitrous oxide, ozone, CFCs and HCFCs.

2.2 Scope of this strategy

2.2.1 Figure 5 below depicts the traditional fuel type and future alternative options for different vehicle types. These future options are applicable to both private vehicles and fleet, including council fleet.

Figure 5: Traditional fuels and future alternative options for vehicles

Vehicle type	Fuel type		
	Traditional fuel	Transitional options	ULEV options
<ul style="list-style-type: none"> • Cars • Small vans • Taxis 	<ul style="list-style-type: none"> • Petrol • Diesel • LPG¹³ 	<ul style="list-style-type: none"> • Hybrid • Plug-in hybrid • EREV 	<ul style="list-style-type: none"> • BEV • Hydrogen fuel cells (not mass market) • Hydrogen ICE: concept vehicles only
<ul style="list-style-type: none"> • Large vans • HGVs (including refuse collection vehicles and buses) 	<ul style="list-style-type: none"> • Diesel 	<ul style="list-style-type: none"> • Methane: <ul style="list-style-type: none"> ○ Compressed natural gas (CNG) ○ Liquefied natural gas (LNG) 	<ul style="list-style-type: none"> • Some BEV and hydrogen fuel cell trials • Hydrogen ICE: concept vehicles only

The only commercially viable ULEV option available at present is electric cars, vans and taxis. Therefore, this will be the focus of our current strategy and actions. However, we also outline below the options above that are still in development and our approach to emerging opportunities in relation to these technologies.

¹³ Liquid Petroleum Gas (LPG) – have NOx and particulate emissions similar to petrol and greenhouse gas emissions per mile are similar to diesel, therefore this is not a viable future option to support in the area

2.2.2 Natural gas (methane)

Compressed natural gas (CNG) from high pressure gas mains is a potential transitional fuel for larger vans and HGVs. Liquid Natural Gas (LNG), delivered to site in liquefied form, is an alternative where CNG is not feasible, including for long-haul HGVs as it has a higher energy density. Vehicles that use both CNG or LNG and diesel are also available, with less benefit in terms of emissions compared to fully gas-powered vehicles.

For CNG/LNG, air quality emissions are equivalent to Euro VI diesel. WTW CO₂ emissions for CNG and LNG are similar to diesel if operated on fossil natural gas, but up to ~85% if operated on bio-methane¹⁴. CNG/LNG vehicles are also quieter compared to ICE vehicles, reducing noise pollution in residential areas and alongside busy roads.

While there are no mass-market ULEV options for larger vehicles, we will be supportive of high quality, appropriately sited CNG/LNG operations using bio-methane, including local filling stations and associated anaerobic digestion. We will consider these options for larger vehicles in our council fleet including refuse collection vehicles.

2.2.3 Hydrogen

Hydrogen can be used to power vehicles by producing electricity using hydrogen fuel cells. Water is the only tail pipe emission. However refuelling infrastructure is currently very limited and hydrogen production varies in its emissions profile.

We will watch this technology closely¹⁵ and be supportive of investment in this industry in the area, provided there is a trajectory towards a lifecycle low emission profile.

¹⁴ Low Emission Technology Options for Local Authority Fleets CENEX

¹⁵ Birmingham City Council jointly won £2.8 million with TfL in 2016 for 42 state-of-the-art hydrogen fuel cell buses <https://www.gov.uk/government/news/government-awards-30-million-funding-for-cleaner-greener-bus-journeys>

2.3 Key drivers for a ULEV strategy in Redditch Borough

2.3.1 Reduction in Emissions

ULEVs do not release any harmful tailpipe emissions and improve air quality when replacing ICE vehicles. When powered by renewable electricity, emissions are negligible. The UK is gradually decarbonising electricity production as renewable energy sources rapidly increase. Renewable electricity accounted for 29.3% of electricity generated in the UK during 2017¹⁶.

2.3.2 Improved Carbon Footprint

In the UK, the lifetime carbon footprint of an electric vehicle is lower than for an ICE vehicle, even when taking into account manufacturing, running and disposal¹⁷. Further gains can be brought about by facilitating alternatives to car use and also by increasing understanding that smaller lower range batteries are sufficient in many cases. There is significant opportunity to re-use degraded electric vehicle batteries for other purposes such as storage of renewable energy. Further development of batteries and recycling capability is a priority. The Midlands is leading the way in this respect¹⁸, with increased electric vehicle uptake likely to provide more of a commercial driver for these improvements.

2.3.3 Reduction in Noise Pollution

ULEV's operating by electric power is very quiet compared to ICE vehicles. This benefits residential areas and alongside busy roads as noise pollution is reduced.

2.3.4 Financial benefit for ULEV vehicles

BEVs are more economical to run when compared with traditional ICE vehicles, although the vehicles themselves are still relatively expensive to buy. However when drivers consider full lifetime (of the vehicle) cost, buying decisions sway towards ULEVs.¹⁹ Up-front purchasing cost for electric vehicles is predicted to be on a par with petrol and diesel models by 2024 in the UK, or earlier if subsidies towards purchase continue²⁰. As well as lower fuel costs, it is believed less maintenance will be required, as fewer moving

¹⁶ Renewable electricity accounted for 29.3% of electricity generated in the UK during 2017 UK Energy in Brief, DEFRA, 2018

¹⁷ Department of Transport, Transport Energy Model Report, 2018

¹⁸ <https://www.gov.uk/government/collections/faraday-battery-challenge-industrial-strategy-challenge-fund>

¹⁹ Science Direct; Total cost of ownership and market share for hybrid and electric vehicles in the UK, US and Japan (January 2018)

²⁰ <https://www2.deloitte.com/uk/en/pages/press-releases/articles/21-million-more-electric-vehicles-expected-worldwide-by-2030.html>

parts are involved and regenerative braking increases life of braking components.

2.3.5 Commercial opportunities relating to the ULEV industry

This emerging market offers scope for local growth in the low carbon economy, building on the legacy of the region's motor, metals and manufacturing industries.

2.3.6 Limited Local Charge Point Infrastructure

There is insufficient accessible and reliable charging²¹, despite the increasing sales of electric cars. Restrictions by car manufacturer, business opening hours, charger reliability and ICE vehicles blocking charge points contribute to the inadequacy of the infrastructure. In order to increase public confidence, charge-points need to be reliable, convenient, affordable and attractive to use.

2.3.7 Households without access to home charging

Where residents can charge at home on drives or in garages, this is convenient and gives confidence to make a switch to ULEV, also enabling access to specialist electric vehicle tariffs with reduced costs depending upon time of use. These are not accessible to households with communal parking, on-street parking and where home-charging is unavailable for other reasons. We are aware of households of this type in Redditch Borough, including terraced housing, apartments and other housing with communal parking including social housing.

²¹ See Appendix B for summary of local public electric charge-point infrastructure June 2019

2.4 National Context

2.4.1 UK government view EV technology as an exciting opportunity for the UK, It is expected that the UK's automotive sector will need to become a leader in this area in order to remain a player in the global market. The shift from ICE vehicles to ULEVs is seen as essential in achieving the national decarbonisation targets whilst maintaining economic growth.²²

2.4.2 It is also recognised that ULEVs provide the opportunity:

- i. To reduce greenhouse gases from the largest emitting sector
- ii. An opportunity to reduce local air pollution; the second highest cause of avoidable morbidity in the country
- iii. As a new industry with substantial export opportunities.

2.4.3 There will be more than 1M electric vehicles in use by 2020, which will require a total of 100,000 EV charging points but currently there are only **16,500 points** in the UK.²³

2.4.4 Road to Zero, 2018

This is the recently published government strategy in relation to ultra-low emission vehicles. It comes with an ambition to see at least half of new cars to be ultra-low emission by 2030 and a detailed 46 point action plan that provides us with an improved understanding as to where ULEV technology is seen to be heading from a government perspective. Its main aims are to:

- Enable a massive expansion of green infrastructure across the country
- Reduce emissions from vehicles already on the UK's roads
- Drive the uptake of zero emission cars, vans and trucks
- End the sale of ICE cars and vans by 2040

2.4.5 The Clean Air Strategy (2019) echoes the end of sale of ICE cars and vans by 2040.

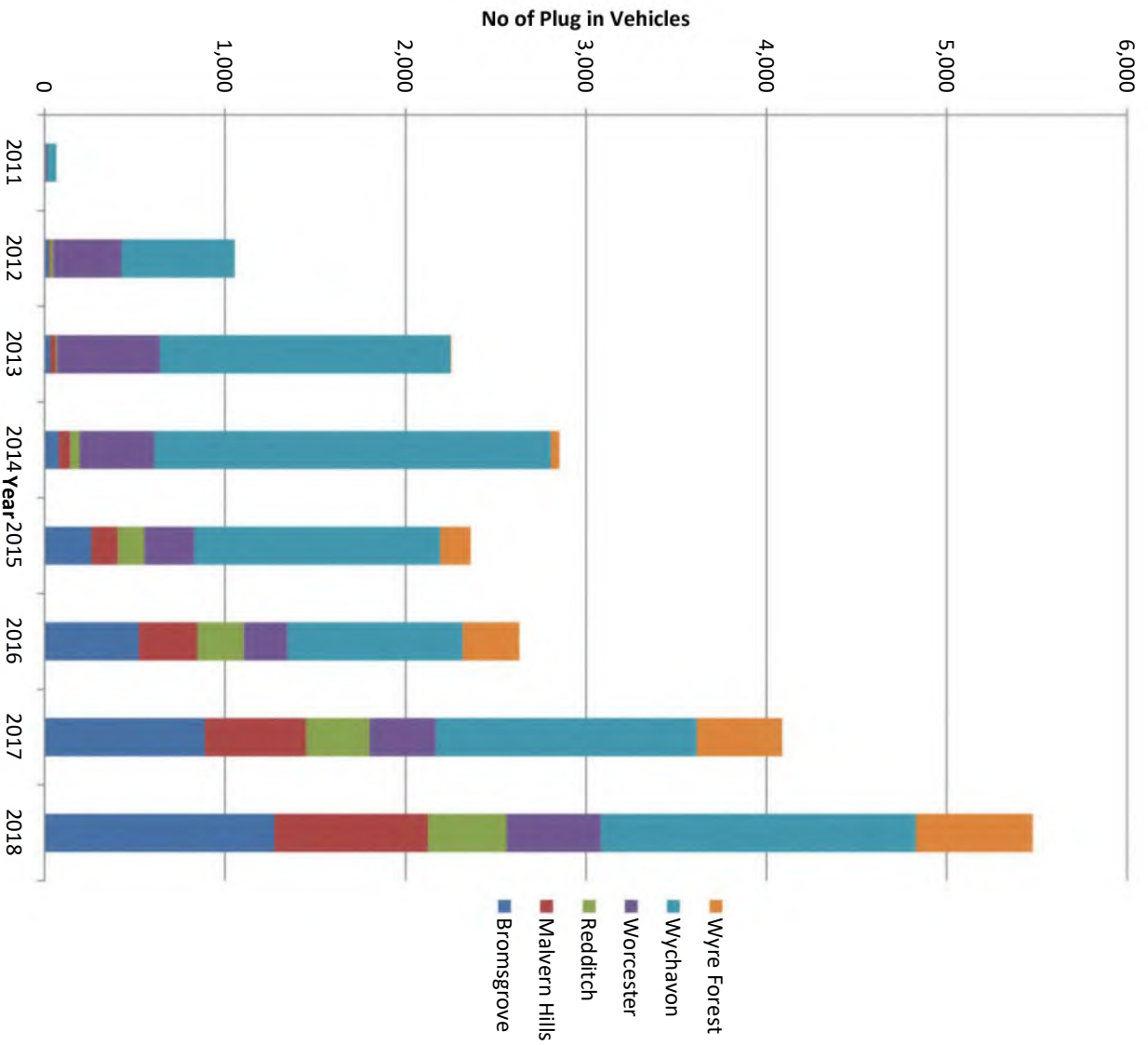
²² Electric Vehicle: Driving the Transition, the Business, Energy and Industrial Strategy Committee. House of Commons. 2018

²³ Source Zap Map

2.5 Local Context

2.5.1 The take up of ULEVs in the UK is steadily increasing with the number of plug in Vehicles registered reaching 144,000 in the first quarter of 2018. The local picture is following suit²⁴. Figure 6 below presents registration of plug-in cars and vans in Worcestershire. This increase is set to continue as additional ULEV models are introduced to the market in the coming years.

Figure 6: Number of plug-in cars, vans and quadricycles licensed in Worcestershire 2011-2018



²⁴ <https://www.gov.uk/government/statistical-data-sets/all-vehicles-veh01>

2.5.2 Worcestershire Climate Change Strategy 2012-2020

This sets targets to reduce the county's carbon emissions by 30% from 2005 levels by 2020 and put in place measures to enable reduction by 80% by 2050. One of its stated aims is to develop smarter travel choices programmes (including smarter use of ICT to help residents avoid travel), and facilitate use of alternatively fuelled vehicles.

From the latest available evidence²⁵, the majority of reductions in local carbon emissions are in industrial and domestic sectors, as a result of a necessity to adapt to legislative and fiscal instruments. Transport only shows a 10% reduction.

Figure 7: Reduction in carbon emissions from 2005 to 2016* (%)

	Reduction per sector			National/ Worcestershire target
	Industry	Domestic	Transport	
Redditch	-50	-30	-10	-30

*There is a two-year delay in the collation of national greenhouse gas figures

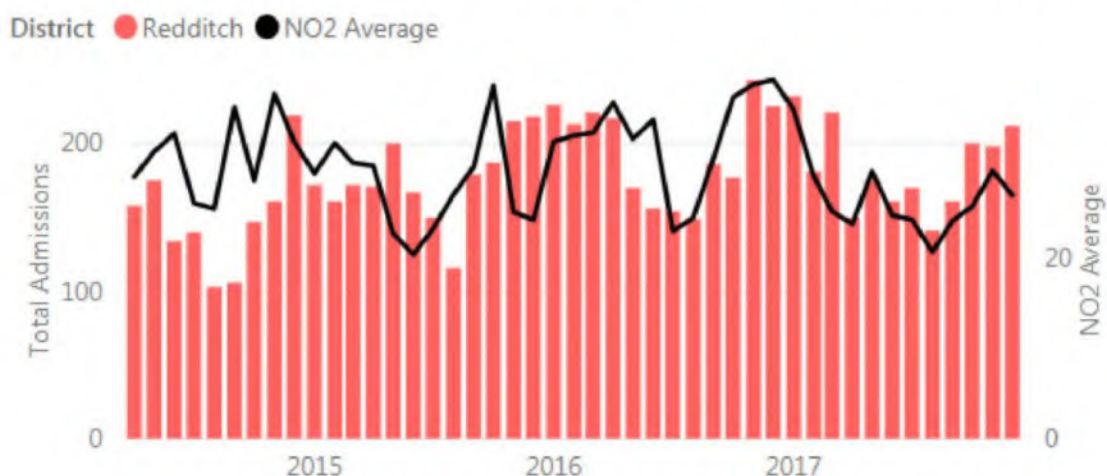
²⁵<https://www.gov.uk/government/collections/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics>

2.5.3 Air Quality

Redditch Borough has three air quality management areas (AQMAs) where air pollution contravenes national standards. Recent research as part of Worcestershire Public Health's analysis for the Joint Strategic Needs Assessment (JSNA), has shown that hospital admissions with air quality exacerbated conditions, is often correlated with Borough level air quality.

Figure 8: Air quality and hospital admissions in Redditch ²⁶

Total Admissions and NO2 Average by Month Year and District



2.5.4 Birmingham's Clean Air Zone (CAZ)

In 2015, the government revealed plans to improve air quality in cities, with the introduction of five CAZs, to be operational by 2020. The government mandated CAZ in neighbouring Birmingham will be in effect in 2020 and is an area where targeted action is taken to improve air quality, in particular by discouraging the most polluting vehicles from entering the zone.

No vehicle is banned in the zone, but those which do not have clean enough engines will have to pay a daily charge if they travel within the area. For cars, private hire, taxis and LGVs that do not meet the emissions standards this will mean a charge of £8 per day and HGVs, coaches and buses that do not meet the standards will be charged £50 per day to drive in the CAZ.

2.5.5 Worcestershire Local Enterprise Partnership Energy Strategy

In line with the 2018 IPCC report's focus on the need for more urgent decarbonisation in order to keep the world below 1.5 degrees of warming,

²⁶ Worcestershire Public Health Air Quality dashboard

this strategy aspires to a target of net zero carbon emissions for Worcestershire by 2040. In order to meet these more demanding goals, significant policy and funding commitments will be needed at a national as well as local level, such as a zero carbon national electricity network, enforcement of building control to zero carbon standards and commitment to bring forward the phase out date for high emission vehicles and include HGVs from where it stands currently at 2040.

The strategy includes key measures of reducing carbon emissions by 50% on 2005 levels by 2030, doubling the size of the low carbon sector between 2016 and 2030 and tripling energy production from renewable generation by 2030.

Priority themes are interdependent and are as follows:

- i. Low carbon transport and active travel - aiming for a fully connected hub of low carbon transport, including a comprehensive system of rapid chargers for electric vehicles, next generation low carbon public transport and safe active travel corridors.
- ii. Increasing clean economic growth
- iii. Overcoming infrastructure and development barriers delivering affordable clean energy.

It also aims to grow Worcestershire's low carbon sector, which is already an area of strength, with many innovative businesses in this area. The Low Carbon and Renewable Energy sector has outperformed the growth of the wider economy, with growth in turnover nationally of 5% from 2015 to 2016. With the Government putting Clean Growth at the forefront of its Industrial Strategy there is a clear opportunity to maximise the local benefits of this and keep growing Worcestershire's low carbon economy.

2.5.6 Worcestershire Local Transport Plan

Worcestershire's Local Transport Plan focuses on new transport infrastructure Schemes, with a number of policy and guidance documents that sit alongside, for example:

POLICY TCC2 – ULTRA-LOW EMISSION VEHICLES

Worcestershire County Council will adopt a proactive approach towards ultra-low emission vehicles (ULEVs) and associated infrastructure, in line with Government policy. For example:

- Expand on its existing county-wide network of public charge points;
- Encourage businesses to provide workplace charging facilities for employees and customers;

- Ensure that developers are aware of ULEV guidance provided in the Streetscape Design Guide;
- Support access to charge points for residents without off-street parking;
- Facilitate (where possible) adoption of new and improved technologies and charging infrastructure developments (such as easy payment access);
- Explore the provision of dedicated charge points for taxi and private hire operators;
- Encourage bus operators to implement an ultra-low emission fleet and associated infrastructure;
- Work with partner organisations to support educational programmes that encourage the take-up and use of ULEVs; and
- Develop business cases and funding bids to access the funds needed to implement ULEV measures.

2.5.7 Redditch Borough Council Local Plan

- As part of the National Planning Policy Framework (NPPF), these set out the Councils planning policies that shape and regulate local development.
- They reflect national aims to reduce carbon emissions, improve quality of life and health of residents and aim to conserve and improve the character and quality of the environment whilst promoting economic growth. They recognise that new and existing low carbon communities will be highly accessible and attractive.
- Several policies highlight low carbon, sustainable vehicle infrastructure as key to delivering the visions of these strategic plans.

2.5.8 Redditch Borough Strategic Plans

These set out the Councils principles, strategic purposes and priorities.

- Be corporately responsible by ensuring we meet our ethical, environmental and social responsibilities, and that services support our communities to develop.
- Constantly innovate, to make the best use of our resources to ensure we deliver efficient, quality services and eliminate waste.
- Make decisions and provide challenge based on data, evidence and learning.
- Use the Council's unique position in the community to encourage and support change amongst partners and other agencies.

Our strategic purposes are as follows:

- **‘Help me to run a successful business’**
- **‘Help me to be financially independent’;**

Priorities to be worked on with partners involve supporting local business, encouraging inward investment, supporting training that meets employer skill needs and enabling employment opportunities.

- **‘Help me to live my life independently’**

Priorities include working with health and other partners to reduce hospital admissions and keep people in their own home, enabling access to appropriate transport, supporting physical activity and supporting access to work, education and training.

- **‘Keep my place safe and looking good’**

Gives priority to reducing emissions and limiting the effect of climate change, including working with our communities. This also includes working with stakeholders to improve the infrastructure for cycling and walking.

- **‘Provide good things for me to see, do and visit’**

Envisions vibrant and flourishing town and local centres and aims to utilise our Councils’ facilities to promote healthy lifestyles.

3 Our Approach

3.1 Joined-Up Approach

- 3.1.1 Worcestershire County Council (WCC), as highways authority, is in the preliminary stages of developing a county-wide policy for ULEV infrastructure. RBC will engage with the development of this policy.
- 3.1.2 The RBC strategy sets out principles and actions that are tailored to our local situation. RBC have responsibility for many of the off street car parks across the Borough, leisure centres, some business premises and lead on creating air quality action plans.
- 3.1.3 The County level and Borough/District level strategies therefore have a slightly different but complimentary focus. Any future reviews will aim for an integrated approach, as far as practically possible.
- 3.1.4 A North Worcestershire working group has been set up to ensure a joined up approach between councils and cross border. This including representatives from Redditch Borough Council (RBC), Bromsgrove District Council (BDC), Wyre Forest District Council (WFDC), North Worcestershire Economic Development and Regeneration (NWEDR), Worcestershire Regulatory Services (WRS), Worcestershire County Council (WCC), Midlands Energy Hub and neighbouring Local Authorities. Minutes are also circulated to the RBC Strategic Planning Manager and Worcestershire Public Health.

3.2 Approach to electric vehicle charging infrastructure

- 3.2.1 In order to futureproof for local needs, including for streets that do not currently have off-street parking provision, we will facilitate the creation of a comprehensive network of rapid/ultra-rapid charging hubs and destination charging facilities (visitor and workplace, including communal overnight locations) that is reliable, convenient, affordable and attractive, considering rural as well as urban needs.
- 3.2.2 It is our intention that all new homes, workplaces and visitor attractions, should have access to adequate electric vehicle charging infrastructure, where appropriate. We will work to achieve this through development and implementation of local planning policies in line with the National Planning Policy Framework and through enforcement of future Building Regulations which will incorporate requirements for electric vehicle charging infrastructure from 2020.
- 3.2.3 On-street charging is the jurisdiction of Worcestershire County Council where the land is adopted by WCC Highways.

3.2.4 Where the land is under the control of Redditch Borough, suitability for on-street charging solutions will be assessed on a case by case basis and will be supported where it is deemed to be practical, cost-effective and low risk. We do not anticipate that on-street charging e.g. via lampposts will be a practical solution in most cases however, for a number of reasons:

- The need for lampposts to be at the front edge of the pavement.
- Significant upgrading of the electrical infrastructure associated with the lampposts is usually required.
- Trailing charging leads create a potential hazard, especially for those with visual impairment.
- Could potentially cause or exacerbate conflict when on-street parking spaces (with a charging facility or otherwise) are in high demand.

3.2.5 The electricity supply to electric vehicle charging infrastructure should be from renewable energy sources.

3.2.6 Site Selection

In order to ensure that installations of charge points are fit for purpose, we advise that the following criteria be used to assess potential locations.

Figure 9: Site Assessment Criteria

General	
Site Conditions including safety, accessibility, security	Potential for expansion of charging points if required
Closeness to existing/proposed chargers	Statutory Utilities
Potential for onsite renewable electricity generation	Grid constraints/ opportunities for demand management;
Links and proximity to AQMAs	Potential for contributing to or alleviating congestion
Cost of implementation	
Destination chargers	
Proximity to key destinations such as leisure, retail, housing without off-street parking	Impact on parking supply
Ultra-rapid charging hubs	
Proximity to key routes	Highways access
Proximity to refreshments and toilets	

3.2.7 Type, location and numbers of charging points

Fast charging points (7 kWh) are considered to be the most appropriate charging level at public car parks or major destinations where a three or four hour stay is realistic. Slow chargers (3.5 kWh single phase) are considered to be the best option in business parks for daytime charging. Rapid chargers (≥ 43 kWh in appropriate locations close to major routes in places where stay is usually around one hour. Ultra-rapid charging hubs (150-350-kWh chargers) are ideal for those needing a quick top-up on route and would be ideally located near to refreshment and toilet facilities.

This will enable a mix of chargers for those needing a quick charge, those looking to stay somewhere for a minimum of a morning or afternoon and also for those parking all day at work.

Locations for electric vehicle charge-points should be attractive, visible and safe and the process of charging should be straightforward. There should be multiple chargers at a location and a high priority should be given to reliability.

The numbers of chargers needed across the area is hard to estimate as multiple variables including car-ownership, battery size of cars, daily distance travelled. The best approach is to have accessible destination charging at parking at all main trip attractors, with consideration given to future proofing in terms of minimising additional civil works required for electricity supply if demand increases and in terms of compatibility with vehicle charging technology, and simple payment methods.

3.2.8 Accessibility of charging-point spaces

All electric charging points should be designed to be accessible to all, with consideration given to accessibility of associated facilities by all. However, traffic control orders will not be used to prevent able-bodied drivers from using any electric vehicle charging points, nor to allow blue badge holders to park in an electric vehicle charge-point space when they are not going to be charging a car. The number of parking spaces designated as accessible and reserved for blue badge holders or parents and children by a traffic control order would remain unchanged.

3.2.9 Operation of proposed charging infrastructure

Management options of charging points have been assessed by other councils²⁷ and the outcome shows that in the short term (next five years) the preferred option will be a third party managing the public charging infrastructure. This has a number of advantages which are summarised below:

- Benchmarking shows that this is the option preferred by other local authorities that have already installed charging points at their car parks.
- RBC could be at disadvantage compared with experienced operators as we don't have the level of expertise or resource to be the scheme operator across a wide network of charge points.
- There is a risk of negative public perception towards RBC in case of poor performance of the charging points.
- Opportunity to connect electric vehicle charging point infrastructure in RBC to a network of charging points across the country.
- A third party operating the charging points will potentially be a better use of public money and better for the user. Should engagement on this draft strategy ratify this approach then the procurement procedure will be reported through the appropriate council meetings.

²⁷ Harrogate Borough Council Ultra-Low Emission Vehicle Strategy Final Report 2019-2024

3.2.10 Funding installation of EV Charge-points on council land

Where appropriate grant-funding options will be sought as the first option.

Rapid/Ultra-rapid charging infrastructure

Where such chargers are sited on council land, we will aim to generate an income towards provision of public services, through leasing of land and income sharing.

The council recognises that operators will be generating revenue from the sale of electricity.

Our aim will be for these chargers to be open access allowing contactless payment via a credit or debit card²⁸, in line with legislation to improve accessibility of the public charging infrastructure^{29, 30}.

Provision of slower charging infrastructure will be considered when procuring rapid/ultra-rapid charging infrastructure or leasing land for that purpose, especially where there is potential to undertake works synergistically and decrease capital costs.

Slower charging infrastructure

To help enable slower charging infrastructure to be installed on suitable council sites, we will consider other mechanisms of revenue generation such as parking permits, charging permits, income from associated spend at sites and innovative opportunities e.g. providing grid services such as demand management.

The council recognises the potential to generate revenue from operating slower chargers is restricted by the limited kWh that can be provided.

²⁸ <https://www.zap-map.com/charge-points/public-charging-point-networks/>

²⁹ The Alternative Fuels Infrastructure Regulations 2017

³⁰ Automated and Electric Vehicles Bill 2018

3.2.11 Parking Fees

Parking fees will remain in public car parks for BEV users as it is important, for congestion management purposes, to ensure that car use is not incentivised over other sustainable modes of transport.

3.2.12 Affordability/Transport Poverty

The upfront cost of EVs are still high at present and charges should not be so high as to dis-incentivise take up e.g. higher lifetime cost or higher running cost than petrol/diesel. Consideration should be given for not worsening and if possible improving equality and this is particularly relevant for those without home charging at present.

3.2.13 Charging bay enforcement

Parking bays with electric vehicle charging infrastructure included must be used only by electric vehicles that are plugged in and charging and require a time restriction to prevent abuse. This will be proportionate to the type of charger associated with the recharging bay. These bays will be supported by new Traffic Regulation Order (TRO) and will be signalled by DfT approved signs.

3.2.14 Innovative technology

The use of innovative technology to support the proposed charge points will be considered. For instance, installing solar panels and battery storage at appropriate locations or implementing demand management. Further to this we will look at integrated smart car-parking and EV point management technology and software.

4. Action Plan

To deliver the objectives an action plan has been established. As electric vehicle charging is very much an emerging technology it is important for the council to be able to adapt to changes and ensure a flexible approach to delivery of the strategy. The action plan will, therefore, be reviewed as required to ensure adaptability to changes in technology, trends in mobility and financial considerations. The Action Plan is outlined in Appendix A.

Appendix A Redditch Action Plan

Action		Year of completion					Progress & Comments
		1	2	3	4	5	
1	Review current funding opportunities and consider applying to Department For Transport (DFT) / Office for Low-Emission Vehicles (OLEV) grants if applicable. Current grants include: <ul style="list-style-type: none"> • Workplace charging scheme • On-street residential charge point scheme 	Ongoing					Meeting with WCC and District LAs to look at the possibility of a Worcestershire-wide bid for the On-street residential charge point scheme (which can now include off-street car-parks).
2	Identify possible locations for charge points. This will involve considering the following along with the site selection criteria: <ul style="list-style-type: none"> • Demand • Availability of land /parking spaces • Type of charge points • Feasibility such as the cost of installation • Security of car parks • Accessibility 	Ongoing					Monitor requests for public charge points through RBC /WCC website, social media, contact centre, MP enquiries and direct contacts to relevant staff. Criteria for appraising such requests will be developed.

3	<p>Review Council Fleet (and use of grey Fleet)</p> <ul style="list-style-type: none"> • Utilise free fleet reviews and other related support • Plan for migration to alternative fuel options 					<p>Work with other waste collection and disposal authorities and commercial operators to investigate the possibilities for anaerobic digestion that may come with the national mandatory food waste collection and the potential to use this to produce bio-methane for vehicles.</p>
4	<p>Review current parking strategy and parking management policy for the Borough and for Council employee car parks, to ensure consideration is given to ULEV charge points and appropriate parking bays.</p>					
5	<p>Raise awareness of ULEVs through working with organisations to encourage the uptake of grants and provide relevant advice where appropriate through signposting and possible promotional events.</p> <ul style="list-style-type: none"> • Set up a local ULEV user group • Develop links with relevant industries, education and businesses • Develop a Communications plan • Encourage low emission electric public transport options • Education for second-hand car-dealerships on EVs via EST • Work with local dealerships to promote new and used EVs 					

6	<p>Integrate ULEVs as well as the Council's wider sustainable transport agenda (promotion of public transport, walking and cycling) into all relevant Council policies and operations.</p> <p>Consider:</p> <ul style="list-style-type: none"> • EV pool cars • Internal HR policies (e.g. mileage allowances etc) • Review Taxi Licensing with respect to incentivising and enabling uptake of electric vehicles 		
7	<p>Ensure the planning process is supportive of ULEV developments.</p>	Ongoing	<p>Discussions have been held internally with the Strategic Planning and Development Control Managers who are engaged to facilitate this.</p>
8	<p>Maximise use of renewable electricity and minimise grid implications. Consider renewables, local storage, smart chargers, V2G and behind the meter demand management.</p>	Ongoing	<p>Good links with key officers in WPD established. Good links with Midlands Hub Energy Advisor. WCC are part of a bid to a Pilot scheme with Virgin Media to link EV charging to their equipment cabinets.</p>
9	<p>Investigate communal charging facilities for those without access to personal home-charging charging e.g. social and private housing with communal parking areas. Work with other RSLs and private owners to learn from them and share or knowledge and experience</p> <p>Consider OLEV funding.</p>		<p>Possible trial at an RBC block of flats where there is interest in having EV infrastructure.</p>

10	Liaison with other public health agencies in support of clean air policies.						Representation on Worcestershire Air Quality Partnership Group and North Worcestershire ULEV working group.
	Work with sports development, HR, Public Health and Parenting and Community Team to integrate with the Councils Health and Wellbeing agenda	Ongoing					
11	Commercial opportunities for low carbon economic growth. Consider opportunities to generate revenue to support public services.						E.g. leasing land for charge-points, investment in the low carbon economy, revenue generation from grid services or optimising behind the meter usage, renewable electricity generation e.g. solar car-ports, local energy storage, vehicle-to-grid charging; leasing cars. Via Land and Buildings Asset Group, areas of land available for possible leasing have been identified and via soft market testing there appears to be some interest. Officers visited innovative ULEV technology company Indra – an inspirational Malvern based technology company that has teamed up with Ovo Energy and Nissan to produce the world’s first wall-mounted V2G Electric Vehicle charger that can also supply energy to the electricity network Indra has a rapidly growing workforce and aims to use local supply chains. Further work is needed to investigate how we can best attract and support such companies.
		Ongoing					

Appendix B Charge points available to the general public in vicinity of Redditch Borough June 2019

Location	Destination			Rapid	Charging Network	Access	Location
	3kW	7kW	Other				
Hyundai Neale's Garage B60 2BS		2			Hyundai Dealership	Restricted	Bromsgrove
Bromsgrove Train Station B60 3LX		4			Polar		
Arbury Nissan B60 3AJ				1	Nissan Dealership	Restricted	
Westlands Toyota B60 3AJ		2			Polar	Restricted	
Grafton Manor B61 7HA			2 x 11 kWh Tesla only; possibly 1 all cars		Tesla Destination	Restricted	
Singletons Nurseries B61 0HT			2 x up to 22kWh depending on car		Pod Point	Restricted opening hours	
Fire Safe Services B60 4AD		1			Other	Restricted	
Hopwood Park Services B48 7 UA				16 2	Tesla Supercharger Ecotricity	Restricted	
Asda B98 7ER		2			Polar		Redditch
Abbey Stadium B97 6EJ				1	Polar/Charge your Car Worcestershire County Council		
Robbins & Day Citroen B97 6RH		2			Pod Point		
Greenlands Business Centre B98 7HD				1	Polar/Charge your Car, Worcestershire County Council		

Brickholes Farm B98 9DD		2			Other		
Webbs of Wychbold WR9 0DG				1	Polar/Charge your Car, Worcestershire County Council	Restricted opening hours	Droitwich
Chateau Impney WR9 0BN				1	Polar/Charge your Car Worcestershire County Council		
Lidl Droitwich WR9 9RB				1	Podpoint		
Waitrose Droitwich WR9 8LB	2				Polar		
Longbridge Retail Park B31 2UQ	2	6			Other		Birmingham
Longbridge Technology Park B31 2TS			5		Hubsta, Polar		
Kings Court Hotel B49 5QQ				1	Polar		Stratford
Alcester Road Service Station WR74DB				2	Instavolt		Wychavon

Appendix C Case Study: local economic activity and training opportunities in ULEV industry

Indra Renewable Technologies

Earlier this year the world's first widely available domestic electric Vehicle-To-Grid (V2G) Charger and EV Smart Charger were released. These products were developed and manufactured by Indra Renewable Technologies in Malvern, Worcestershire, a fast-growing electric vehicle and smart energy technology company, as part of an Innovate UK collaboration project with OVO Energy and Nissan.

The V2G Charger will optimise vehicle charging to take advantage of cheaper electricity when it's available and when there are more renewables on the system. The V2G charger also provides balancing services and can sell power back to the grid at peak time. This means that in theory, EV drivers using V2G may never have to pay to drive their car again.

Like the V2G charger, the Smart Charger enables EV's to be charged during off-peak hours, thereby easing pressure on the electricity grid, as well as allowing drivers to take advantage of cheaper off-peak electricity.

As well as electric vehicle charging technology, Indra also produce a Home Energy battery system and Indra's EV Service Centre specialises in EV battery upgrades, OEM repairs and EV diagnostics, catering for a growing EV aftersales market.

Mike Schooling, Founder and Chief Technical Officer of Indra, started working on electric car technology as a hobby in 2011, when he was 19 years old. Indra was formed in 2013, when operations moved out of Mike's spare bedroom in Malvern into a 2,000 sq ft industrial unit. The business and projects continued to grow and in 2018 transitioned into a modern, state of the art, 25,000 sq ft warehouse in Malvern, Worcestershire, with a 26-strong and growing team developing clean technology solutions, focused on accelerating the global transition to EV's.

Mike is passionate about using local supply chain and workforce where possible and feels there is a real need in Worcestershire for suitable business premises to enable this industry to grow throughout the county.

Indra were winners of the award for 'Excellence in Innovation' at Herefordshire and Worcestershire Chamber Business Awards 2018 and are finalists again in 2019, for two categories; 'Excellence in Innovation' and 'Small Business of the Year'.



Appendix D Case Study: Woo Bikes



Woo Bikes – City bike share pilot

What is it?

Since 2010/11 the University of Worcester has operated a short term [bike share scheme](#). This 50 bike scheme has increased in popularity in each year of operation. Students and staff can join for an annual £45 fee then borrow bikes at no extra cost. Members hire pedal bikes for a 7 day period and return them to two locations, City and St Johns Campus reception. Members are issued free helmets and lights and bikes can be used and locked anywhere. There is a small daily fine £2 for late returned bikes.

Woo Bikes extends this scheme by adding an additional 50 electric bikes, or e-bikes. These bikes have a battery, you ride it like a normal bike, but as soon as you pedal, the motor gives riders a boost whenever you need it. These bikes have no gears, you pedal to go faster, brake to slow. Members can hire e-bikes for a 24 hour period with a £4/day late return fee.

Why are we doing this?

One of the key aims of the scheme is to enable a 'try before you buy' approach to encourage our community to cycle. We anticipate that those who try, and become regular users, may commit to buying their own bike. The City is experiencing increased car congestion. There is an increase in single occupancy car use and there is an increase in both University students and staff using cars, including driving between University sites. It is likely that these trends are adding to air pollution in key City road corridors. The City is also experiencing a fall in cycling. The aim is to offer a wider travel choice as part of an overall strategy to manage congestion; reduce travel costs and support healthy living styles.

Research supported by central government in e-bike hire schemes across the country concluded that e-bike share schemes "widen the appeal of cycling" and particularly "supports the switching to e-bikes from up to 5-mile car journeys, compared to 3-mile car journeys for conventional cycling". This meets the profile of car commuting in and out of Worcester City and the hilly nature of the City.

What is it trying to achieve?

Encouraging potential new students to not even contemplate bringing a car with them when they apply to study in Worcester. Reducing the number of commute journeys by people who currently drive on their own to work or study and live within 5 miles of their destination.

Who is it for?

Initially for University of Worcester students and staff and rolling it out to other major employers and Worcester citizens.

When did it start?

At the University of Worcester 12th February 2018 and expanded into Worcester City with students' leading on *have a go sessions* from 17th April 2018.

Who are the partners?

Worcestershire Local Enterprise Partnership, Worcestershire County Council, Worcester City Council, Gtech, Emily Jordan Foundation and the University of Worcester.

