



West Midlands
Combined Authority

Environment Board

Date	24 October 2019
Report title	Low Emissions and ULEV Strategy
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Report has been considered by	STOG - 7 October 2019

Recommendation(s) for action or decision:

The Environment Board is recommended to:

- (1) Consider the scenarios presented in this report for the acceleration of electric charging and enabling energy infrastructure in the West Midlands – noting the strategic importance of this issue to our Industrial Strategy, Strategic Economic Plan and Climate Change ambitions.
- (2) Agree to take forward a paper to WMCA Board – which presents these scenarios, including our recommendation of ‘option 3’ in the report below: a collaborative, at-scale model which gives local authorities maximum control and leverage over the way in which EV infrastructure is rolled out across the whole region.
- (3) Note that work has been commissioned within WMCA/TfWM to create a more detailed evidence base as to existing provision and future demand that will be needed in order to progress any of the options noted in this paper. The results of this will be brought back to Environment Board in Spring 2020.

1.0 Purpose

- 1.1 The purpose of this report is to ask for the Environment Board's support and steer in moving forward a key plank of the region's ambitious agenda around clean transport and industrial strategy. It does this in three ways:
- First, it provides the Board with the current position relating to the development of Ultra Low Emissions Vehicle (ULEV) infrastructure provision for the West Midlands – including the provision of electric charging points, and the underlying energy provision needed for them to be viable;
 - Second, it presents the Board with an analysis of potential scenarios for scaling up EV charging in the region, presenting a recommendation to the Board which will shape the nature and pace of this provision from here on in – including the scale at which regional partners act together; and the nature of collaboration between us. The optimal scenario we present seeks to maximise private sector leverage, minimise public sector cost, and ensure the most inclusive delivery;
 - Third, it situates this within the context of the West Midlands region's ambitions to accelerate its transition to a net-zero carbon economy; and realise its commitment to supporting greater regional autonomy and stability within its energy sector.
- 1.2 In short – the paper argues that approaching EV infrastructure collaboratively would give the West Midlands the best chance of achieving economies of scale, a long-term revenue stream (eg more private capital into the region), and better benefits to more people. It explains the principle and the rationale behind this argument – but does not pre-judge whether this is necessarily the right choice for WMCA members; and does *not* assume that WfWM or WMCA would lead.

2.0 Background

- 2.1 Creating the conditions for growth in electric vehicle manufacturing and take up is fundamental to this Region's headline economic strategy and its strategic transport plan. It has the potential to create a triple benefit – impacting on citizen wellbeing embedding inclusivity, environmental sustainability, and the creation of new avenues for export growth within a key West Midlands industry.
- 2.2 The EV market – and the associated market for battery technology – is small but growing fast – as evidenced by the prevalence of EV model lines across the major car manufacturers, and the number of chargepoints springing up within major cities in the UK and Europe. The West Midlands is already innovating in electric, hydrogen and autonomous vehicles, reflecting the key role they have to play as one part of a wider modal shift towards cleaner travel and increased use of integrated public transport.
- 2.3 The effective roll out of EV infrastructure requires a number of issues to be brought together, including:
- Number and scale of charging points for electric vehicles – guided by analysis of how many points we will need across our places, based in turn on projections of current and future demand and consideration of how market failure may be avoided for areas that are disadvantaged

- Nature of the underlying energy infrastructure – which is impacted by demands on the underlying low voltage (LV) network created by more chargepoints, and the cost of necessary upgrades
- The value of collaboration and scale – recognising there are a number of routes to achieving the outcomes above, and choices to make about whole-regional or sub-regional working; and the value add that a co-ordinated Region wide approach can provide
- Potential delivery models – which will depend on choices made on the above, and which have important implications on the commercial readiness and viability of our ULEV approach

2.4 Meeting our climate change goals as a country and a region inevitably means being more proactive about moving away from fossil fuel based transport (initially through EV, then progressively through hydrogen), whilst in parallel increasing the proportion of this fuel source that is generated from renewables. The WMCA Climate Action Plan - which is under development and will be published at November WMCA Board - will ensure that the EV agenda is fully aligned and integrated with the wider climate change drivers in a way that maximises benefits and impacts.

3 A Brief Outline of the Policy Environment

This section outlines the backdrop to the questions posed to Environment Board – in particular the clear signal provided nationally and regionally as to the importance of transition to cleaner transport and infrastructure:

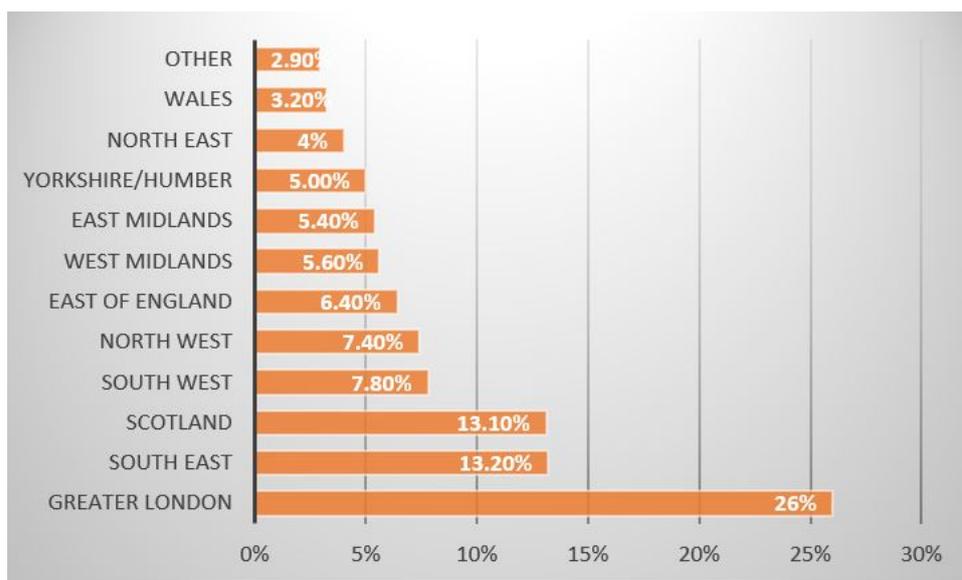
- 2.1 New national and regional targets have recently been established, which set out a vision to achieve zero carbon emissions from transport. This will be achieved through a transition of vehicles from current fossil based fuels, to lower carbon fuels, and ultimately to pure battery electric and hydrogen fuel cell based powertrains powered from sustainable energy sources.
- 2.2 The draft Climate Change Act 2008 (2050 Target Amendment) Order 2019, approved by Parliament in June 2019, commits to achieving net zero greenhouse emissions by 2050.
- 2.3 In July 2019, WMCA committed to setting a West Midlands target of net-zero emissions no later than 2041, with interim targets based on a 2018 baseline of 36% reduction by 2022, and 69% reduction by 2027. A Climate Action Plan is to be taken to WMCA Board in November 2019 for consideration, covering the key themes of 'clean growth', 'clean air', 'nature gain' and 'lead by local example'. Local authorities are developing their own approaches to the climate challenge, and the WMCA has committed to supporting those approaches however possible.
- 2.4 The overarching aim of Government strategy is for the UK to be at the forefront of the design and manufacture of Ultra Low Emission Vehicles (ULEVs), and for all new cars and vans to be effectively zero emission by 2040. Government is seeking at least 50% and up to 70% of new car sales to be ULEV by 2030. Recent government announcements have reinforced this high level of ambition.
- 2.5 In the UK there are now over 17,000 publicly available chargepoints, including 1,700+ rapid chargers (50kW) which is one of the largest rapid networks in Europe. The country has 100,000+ residential off street chargepoints, 2,000 workplace located chargepoints and over 1,250 on street residential chargepoints in place.

- 2.6 The Committee on Climate Change (2018) has forecast that 60% of new cars and vans will be plug in electric or hybrid by 2030. In order to meet associated charging infrastructure, they predict the number of rapid chargers located near the major roads network needs to expand to 1,170 by 2030 (from 460 in 2016), and demand for ‘top-up’ charging while parking around towns and local areas is estimated to require a rise from 2,700 chargepoints in 2016 to over 27,000 by 2030.
- 2.7 As of August 2019, battery electric car sales are up 93% year on year in the UK compared to 2018 (OLEV). However, plug in hybrid car sales are down by 37% over the same period. As we note further on in this paper, detailed work is being commissioned so that we have a detailed and nuanced understanding of current and future demand for electric charging here in the region.

3.0 Current Position

- 3.1 In the West Midlands region, there are 1,450 chargepoints (Zap-Map, 2019). A comparison with UK regions is shown in Table A below:-

Table A: Percentage share of chargepoint installations by UK Region



- 3.2 Following a bidding process undertaken by Government in 2015, a number of cities were successful in sharing Go Ultra Low City scheme funding of £40 million, including London, Bristol, Nottingham and Milton Keynes. This has enabled them to provide significant chargepoint installations in their respective areas.
- 3.3 Many new chargers are installed on a commercial basis by destination locations such as workplaces, hotels and supermarkets providers in an effort to attract EV customers and promote sustainability. In the WMCA area, Birmingham, Coventry, Wolverhampton and TfWM have been successful in winning Government grants to install slow, fast and rapid charging infrastructure.

3.4 Current public installations are in progress or planned as follows -

- Birmingham will install 100 rapid (50kw) and 96 fast (22kw) chargers, with an announcement on procurement process expected imminently
- Coventry have completed installation of 24 out of 39 rapid chargers with partner ESB and Siemens and have completed installation of 80 slow and 10 fast on street residential charging points
- Wolverhampton have installed 6 out of 24 rapid/fast chargers
- TfWM – currently have 14 chargers across 6 P&R sites and at Summer Lane and are considering options for upgrade of facilities across the 20,000+ P&R spaces
- TfWM/LAs (not inc. Birmingham) are installing circa 200 on street residential chargepoints (7-22kw) with Virgin Media and partners, with project funding from Innovate UK

4.0 Strategy development

This section outlines how the options presented in this paper have been developed in collaboration with partners within the region:

4.1 During the summer of 2019 ULEV workshops were led by Coventry CC, Energy Capital and TfWM with local authority colleagues, Warwickshire CC and a range of stakeholders from Energy and ULEV related public and private sector bodies. From these workshops a set of requirements for a ULEV Strategy have been developed and issued for consultancy support to produce a high-level strategy for the West Midlands and Warwickshire. Subject to interest the geographic scope can be expanded to include other authorities in the wider WMCA area. CENEX have been appointed and key outputs to be delivered in the commission are:

- A clearly articulated vision and implementation plan for accelerating EV adoption, including common standards for charging infrastructure
- A detailed evidenced understanding of where and what type of infrastructure is need by what point to support earlier adopting households
- An understanding of what the commercial market is likely to provide to meet the requirements and where additional support through grant or otherwise is likely to be required
- A business case for an EV incentive and take-up scheme
- An understanding of what additional demands will be placed (and where) on the energy grid, and how this overlays with existing and anticipated gaps and spare capacity

5.2 There are a range of issues that will be addressed which have been identified through development of the specification for the strategy, including:

- The market for ULEV vehicles is currently small and therefore is perceived as niche and/or risky, expensive, or inaccessible
- There remains a lack of understanding of the alternative choices to ICE (Internal Combustion Engine) vehicles and of the business case for change from ICE to ULEV
- There is limited availability of ULEV re-fuelling infrastructure and consumer accessibility, meaning anxiety over availability is a barrier to adoption

- The diversity of re-fuelling infrastructure and lack of interoperability makes current user experience poor
- Energy supply limitations on the low voltage network can make the 'nth' charging point uncommercially viable due to grid upgrade costs
- The transport system supply chain is overwhelmingly vested in skills associated with ICE across all tiers of manufacturing, vehicle servicing and sales, creating a barrier and cost overhead to change
- The West Midlands produces ~43% of the UK's GVA for automotive which is currently substantially geared towards ICE vehicles

5.3 Of particular concern is the issue of market engagement and 'land grab' deals offered by some chargepoint operators. Opportunities are being presented to local authorities (in this region and more widely) in which operators are seeking exclusivity of supply of infrastructure at key locations over a long period in return for a promise of delivery of a significant volume of upfront EV charging infrastructure from which some revenue share is proposed. Such market intent is very much welcome and indeed is already being acted upon by local partners, but as a region it is also critical to be cognisant of and open about potential issues of limited interoperability, technology resilience and under-delivery of services to marginalised areas. If our collective approach remains fragmented these issues which will inevitably be part of the future picture.

5.4 In a number of cases (based on anecdotal evidence from across the country) it appears local authorities are entering deals in which they don't retain rights to the energy supply Meter Point Administration Numbers (MPANS), control of which can ultimately give them much stronger ability to ensure that any deals entered into are fulfilled and that future roadside infrastructure upgrades are undertaken in a timely manner to ensure vehicle technology and charging requirements evolve at the required pace.

6.0 Infrastructure delivery – three scenarios

This section outlines three scenarios – different ways of delivering the charging infrastructure required to meet projected future demand in the West Midlands.

6.2 **Scenario 1** – Pursuing a largely market-led approach, wherein chargepoint delivery is primarily based on open market principles, and focused only where there is sufficient spare grid capacity and sufficient perceived immediate demand to create short term profit. Commercial providers select their preferred locations and charger type and approach individual local authorities to strike deals where this involves public land or highway. A range of revenue sharing deals and delivery rates are expected to be achieved across the area though different concession contracts with different chargepoint providers. This broadly characterises the approach adopted to date.

6.3 **Scenario 2** - An evolution of the current position is where approximately 3-4 '**Delivery Clusters**' of LAs across the WMCA area work together within their cluster to specify and engage companies to deliver roadside infrastructure across that zone/area. Each area establishes a specification for charging infrastructure, land/parking and highway allocations. A common basic set of standards for interoperability across the region would be adhered to on a 'best practice' guidance and over-arching strategy and future re-investment to support technology evolution would be established on the basis of each local cluster level deal.

6.4 The scenarios painted above will provide specific benefits to particular areas, and Members may well choose to pursue these options. But there are good reasons to believe they are sub-optimal solutions to the commercial, environmental and inclusive growth goals set out above. To wit:

- Negotiating independent contracts with EV charge point suppliers without a mechanism to address investment in the energy supply network is likely to produce a poorer financial result. Whilst the first movers may release some additional value from Operators keen to gain a market foothold in the region for expansion, this could have a negative effect on others bringing forward opportunities later as spare energy grid capacity will have been taken up (including at detriment to housing and industrial network users requiring network connections).
- First mover operators will tend to make an initial investment in the highest return sites which do not require investment in the distribution network, establishing a position which gives them A) benefits of scale they can apply to make the area less attractive to competitors; and B) cherry picking the most lucrative sites without the local authority having significant leverage ensure investment in the energy supply grid or future road side infrastructure upgrade. In addition, a valuable opportunity could be lost for consumers to link into one easily understood network of charging provision.
- A further lost benefit would be an inability to work with one joined-up group of Operators to influence and plan the electricity supply network. It is easy to see how the latter could have a negative effect over the long term.
- Areas that do not offer an immediate return to Operators, with lower perceived future EV use and/or areas that require significant infrastructure investment to increase grid capacity, could remain “dark” without the public sector investing. This problem may be particularly exacerbated in less affluent areas – which would run contrary to our aims of inclusive growth.

Scenario 3 – Working in Collaboration at Scale

6.5 The third scenario (developed through early dialogue with regional transport officers and some soft market testing) would enable a joined up, high private investment approach wherein the funding and delivery of charging infrastructure is managed across the West Midlands region, working closely with Energy Capital to integrate with wider energy solutions. In this scenario, an investor backed mechanism would secure chargepoint provider(s) to work collaboratively with the region to deliver at scale over a sustained period, re-investing directly to a jointly held plan in both roadside infrastructure and the low voltage distribution network.

6.6 Whilst the Model needs to be further explored with investors and developed in close collaboration with Members, there would appear to be greater financial advantage in working together, as well as the undoubted benefit to the environment in doing so. At root, this is about realising the value of collaboration and the economy of scale that a WM-wide model provides. The WMCA does not need to lead. And regional partners have already established Energy Capital as a collaborative body to advance its collective ambitions around energy devolution and infrastructure development.

7.0 Recommended way forward

This section shows how our recommended model could be taken forward in practice – and what the benefits would be to the region.

- 7.1 Acting together under a West Midlands framework to provide for chargepoints at scale would have the following potential benefits:

Public Users would benefit from the knowledge that chargepoints are ubiquitous and as they are available through one Operator arrangement, they are accessible and suitable for their vehicle. Use of chargepoints away from home is particularly important in the West Midlands where some of the housing stock is of such an age that many houses only have on street parking. Switching to EVs needs a confidence boost that comes from the availability of chargepoints.

Commercial Users are ready to discuss a region wide connected network. Many organisations that use commercial vehicles are keen to explore how they can move to EV fleets with clear environmental advantages to the Region. In order to progress, they require easy access to a comprehensive network of chargepoints region wide. This may carry economic benefit to a Framework Model.

Operators benefit from scaling up quickly. There is real efficiency in negotiating one big contract, albeit a complex one. A network can be properly planned with the right charging point in the right location, with a focus on providing a comprehensive network without gaps in provision that adversely impact on some communities. Duplication in chargepoints will be avoided and a roll out sensibly and economically introduced which caters for technological development in vehicle batteries. Operators can struggle to find investors. Despite their delivery ability they are short of opportunities at such scale as to propel them into an arena where the returns are attractive to upper tier investors.

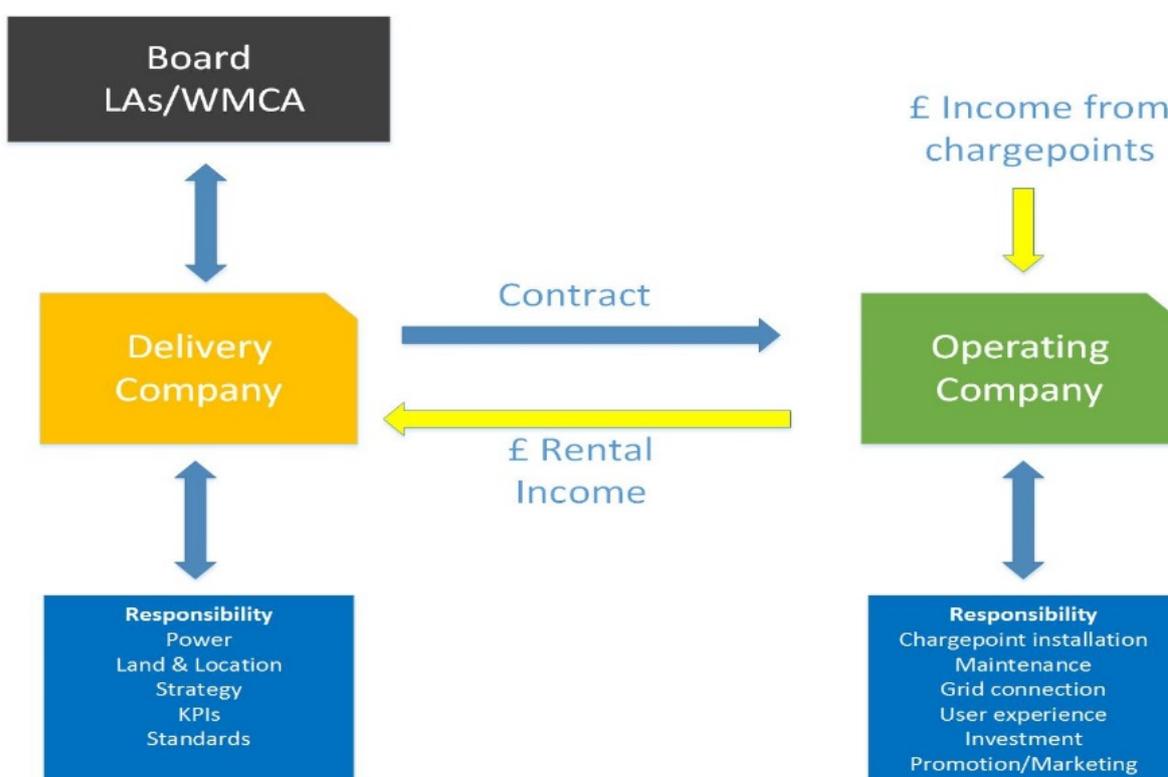
Investors will see an opportunity here. At scale there will be many more serious investors in the market. Because of their organisation's financial muscle and the scale of opportunity, they will be able to leverage debt. The ability to lever finance will increase the "price" they are likely to pay as well as Investors having a mind on market domination and the benefits this could bring when negotiating with other regions.

Local Authorities and TfWM could be real beneficiaries, both in terms of speed of at-scale roll out for their population and in financial terms. Investors interested in this sector are likely to put a much higher forward looking Enterprise Value on the opportunity of buying into an operating concept with scale. This future potential is often priced at greater multiples of the value of those smaller companies in the market.

- 7.2 In this scenario, the conceptual model would provide the creation of a collectively owned Delivery Company (DelCo) that contracts with a private sector Operating Company (OpCo), which would deliver the charging infrastructure on-street and in publicly controlled off-street parking and other locations. The DelCo would own the energy supply rights and make the investment in the energy infrastructure. The DelCo would take responsibility for setting the re-investment strategy to ensure re-investment in roadside infrastructure keeps pace with technological development.

- 7.3 The collective bargaining power that would result from the DelCo and the opportunity to bid at scale for those interested in the OpCo is likely to achieve the best financial result (for the region as a whole). It also means because the contract with the OpCo will need renewing in the future, every time a renewal takes place the bids are likely to be more advantageous to the region as a whole than acting independently. As EV take-up grows, the future value of OpCo can be captured by DelCo as it will retain sufficient control over both the electricity supply and physical space.
- 7.4 Further benefits of a DelCo are that skills and expertise are accessible in one place and a cohesive strategy can be developed with the Energy providers. Retaining long term ownership of the rights to draw power puts the DelCo in a strong position. A diagram of the proposed structure is shown below. We would be happy to discuss with Environment Board colleagues how the commercial model outlined below would work in practice.

Diagram of Delivery Company/Operating Company structure



8.0 Stakeholder Map

- 8.1 There are a range of stakeholders that will need to be engaged through any infrastructure delivery programme, as set out in Table B below:-

Table B – Stakeholder and delivery framework

	LA WMCA Shires	Government	National Grid	WPD Landlord/ Developer	Charge Point Provider	Taxi/ Ride share	Business	Car Club	Investor	Home Energy Provider	OEM & Car Retailer
Strategy	✓	✓	✓	✓					✓		
Funding	✓	✓		✓	✓	✓	✓		✓		
Land	✓		✓	✓	✓		✓				
EV Demand Assessment	✓	✓		✓		✓			✓		✓
Energy Grid Capacity Assessment		✓	✓	✓	✓						
EV User	✓	✓			✓		✓	✓		✓	✓
Chargepoint					✓					✓	✓
Energy Grid Connection	✓			✓	✓		✓			✓	
Enforcement	✓				✓		✓				
Promotion & Comms	✓	✓			✓	✓	✓	✓		✓	✓
EV supply						✓		✓		✓	✓
Chargepoint Standards		✓		✓	✓						☐
Energy Grid Resilience		✓	✓	✓							

9.0 Energy Infrastructure

This section outlines the energy requirements of any material expansion of EV Charging infrastructure across the region:

- 9.1 It is important to note that the underlying Low Voltage (LV) electricity supply network is used by domestic and industrial customers as well as any potential public- or privately-sponsored EV charging points. The costs of network reinforcement in order to accommodate any new EV charging infrastructure may range from £0 to £1m+ per site depending on the location and the range of competing uses. A modest cost estimate for the whole region in aggregate over the next 10 years could be £200M-£800M.
- 9.2 Under current energy market regulations, these costs will *at best* be shared across all network users (including the fuel poor and industry) and *at worst* be met in full by the next-coming user of the network local to a given charge point (e.g., a housing developer or potential inward investor).
- 9.3 For these reasons, alongside any initiative taken by the region in EV charging, it is important that the region acquires the capacity and competence to engage at strategic planning level with the energy network providers - specifically having the ability to bring together and optimise planned energy demands covering transport, housing and industry across the region and in any given proposed investment location.

9.4 Regional energy infrastructure financing mechanisms to share the risks and rewards of such investment in ways that reflect local political priorities also need to be developed. The work to develop these competences and mechanisms has been taken forward separately by the WMCA and partners, led by Energy Capital, and this will need to be further supported and accelerated in parallel with any investments in EV infrastructure alone.

10.0 Financial implications

10.1 There are no immediate financial implications flowing as a direct result of this report. The availability of Grants to fund future development of the proposal needs to be assessed, with one option through the Government Charging Infrastructure Investment Fund (£400m), made up of £200m provided by Government and £200m by Private Sector investors, the first tranche (£75m) of which was formally launched in September 2019. This commercially focussed fund is aimed at developing charging infrastructure for electric vehicles, and will enable businesses to access the finances they need to build more charging points, making it easier and more viable for the public to make the switcher to cleaner, ultra-low emission cars. A quantification of financial risks will need to be evaluated in developing the proposal.

11.0 Legal implications

11.1 There are no immediate legal implications flowing from the contents of this report. However, Legal Advice will be sought at the appropriate stage and in a timely manner, in order to facilitate the required mobilisation between authorities including the incorporation of the relevant delivery organisations and over delivery structure.

12.0 Equalities implications

12.1 The strategy is likely to directly positively impact electric car vehicle owners who are more likely to be from more affluent backgrounds. However, the positive environmental impact of the strategy is likely to positively impact people from lower socio-economic backgrounds, ethnic minority groups, older people and people with disabilities as air pollution disproportionately impacts people from these groups. Direct equalities implications are likely to will rise from any bids or infrastructure proposals which will be assessed on a case by case basis. Activity such as car clubs has potential to benefit the inclusion agenda which will need to be balanced against a natural bias in the early market adoption of ULEV technologies to the more affluent demographics.

13.0 Inclusive Growth implications

13.1 The development of ultra low emission vehicles and associated infrastructure contributes to the improvement air quality and reduces harmful particulates in the environment. The propositions made in this paper will be factored into the Climate Action Plan which is being developed for publication/consultation at November 2019 WMCA Board. Air quality and the extent to which the benefits of working at scale – such as those portrayed in this paper – are shared by all of our communities, are central elements of the WMCA's inclusive growth framework. Any decision to proceed with ULEV at-scale in the region would be underpinned by a business case which scrutinises inclusive growth impact as part of the strategic case.

14.0 Geographical Area of Report's Implications

14.1 This report relates primarily to the metropolitan West Midlands and Warwickshire as these areas have engaged in the initial workshops. However, there is potential to work region-wide depending on appetite from WMCA Members.

15.0 Schedule of background papers

- ULEV Adoption and re-fuelling report to STOG, 16 April 2018
- ULEV Update report to STOG August 2018
- Electric Vehicles and Air Quality briefing note, 3rd June 2019
- WM ULEV Strategy Workshop Update 6th July 2019
- Low Emissions and ULEV Strategy report, STOG 7th October 2019