



#UltraLowWest



GoUltraLow west





“We will use our European Green Capital status as a catalyst for launching a lasting switch towards electric mobility”



Contents

1. Foreword	2
2. Introduction	3
3. The potential for ULEV take up	7
4. A world-class charge point network	10
5. Exemplar multi-modal charging hubs	11
6. The UK's largest council ULEV fleet	12
7. The UK's first Ultra-Low Emissions Zone	14
8. Policy innovation	15
9. Getting business on board	16
10. ULEVs at the heart of the community	17
11. A commercially viable network	18
12. Air quality and monitoring	20



Foreword

The West of England (WoE) is proud to present this business case for the Go Ultra Low City Scheme. This business case seeks £9.8m of funding from OLEV to deliver a package of innovative and interconnected initiatives that will result in large-scale uptake of Ultra-Low Emission Vehicles (ULEVs) across the WoE and make a significant contribution to air quality for all of its residents. Appendix 5 provides a breakdown of investment for each of our proposals, giving low, medium and high scenarios throughout, as well as detailing key funding milestones.



“The West of England local authorities are fully committed to reducing the carbon impact of our transport system, and to improving the air quality within our communities. By increasing the number of low emission vehicles within our own fleets and across our communities, the Go Ultra Low City Scheme will provide a major boost to helping us meet these commitments.”

Executive Member for Transport
Brian Allinson
Chairman of the West of England
Joint Transport Board



“The West of England area is a world leader in low carbon technology, with strong public support for low carbon initiatives. This bid will build on the advances we are already making locally.”

Barbara Davies
Chief Executive, West of England
Local Enterprise Partnership



“With the eyes of the world on Bristol, the Go Ultra Low City Scheme is a fantastic opportunity for the city to become an international ambassador for ultra-low emission vehicles, showcasing its opportunity and desire to transform people’s quality of life and to build a stronger, more resilient economy.”

James Durie
Executive Director, Business West



Introduction **Ambition**

The West of England (WoE) as a city region is leading the way in testing out new technologies and developing solutions to face the challenges of a modern global city. The Local Enterprise Partnership's office at the Engine Shed typifies the approach being taken – providing space for creativity, innovation and ideas – many of these being transport related such as the driverless cars project.

Building on existing high-level investment in the area to date, this business case sets out how the WoE will combine our unique regional characteristics with an innovative approach to achieve wide spread take up of ULEVs.

We have established strong, wide-ranging partnerships with businesses, universities and health services throughout the sub-region and will build on these partnerships to deliver the proposals in this business case.

This bid was prepared in partnership with Business West and the business community, **with 35 employers stating their commitment to invest in 100 vehicles by 2020** following a business launch event at the Bristol and Bath Science Park on the 18th September.



We will use our **European Green Capital status as a catalyst for launching a lasting switch towards electric mobility** and the measures in this bid will ensure that there is a legacy for European Green Capital across the sub-region, with the West of England becoming a "laboratory for change".

The profile of electric vehicles is high. We already have a zero emission freight consolidation service and have used our Green Capital status to maximise the exposure of the public and businesses through events, demonstrations, local car dealers promotions, securing external funding for trials such as the £1m geo-fencing bus trial and through working with business to help them understand how ULEVs can benefit and support their operations.


Our **Strategic Location as the gateway to the South West and Wales** makes us uniquely placed to serve large parts of the country with our charging infrastructure, including the iconic charging hub we will build near the motorway network.

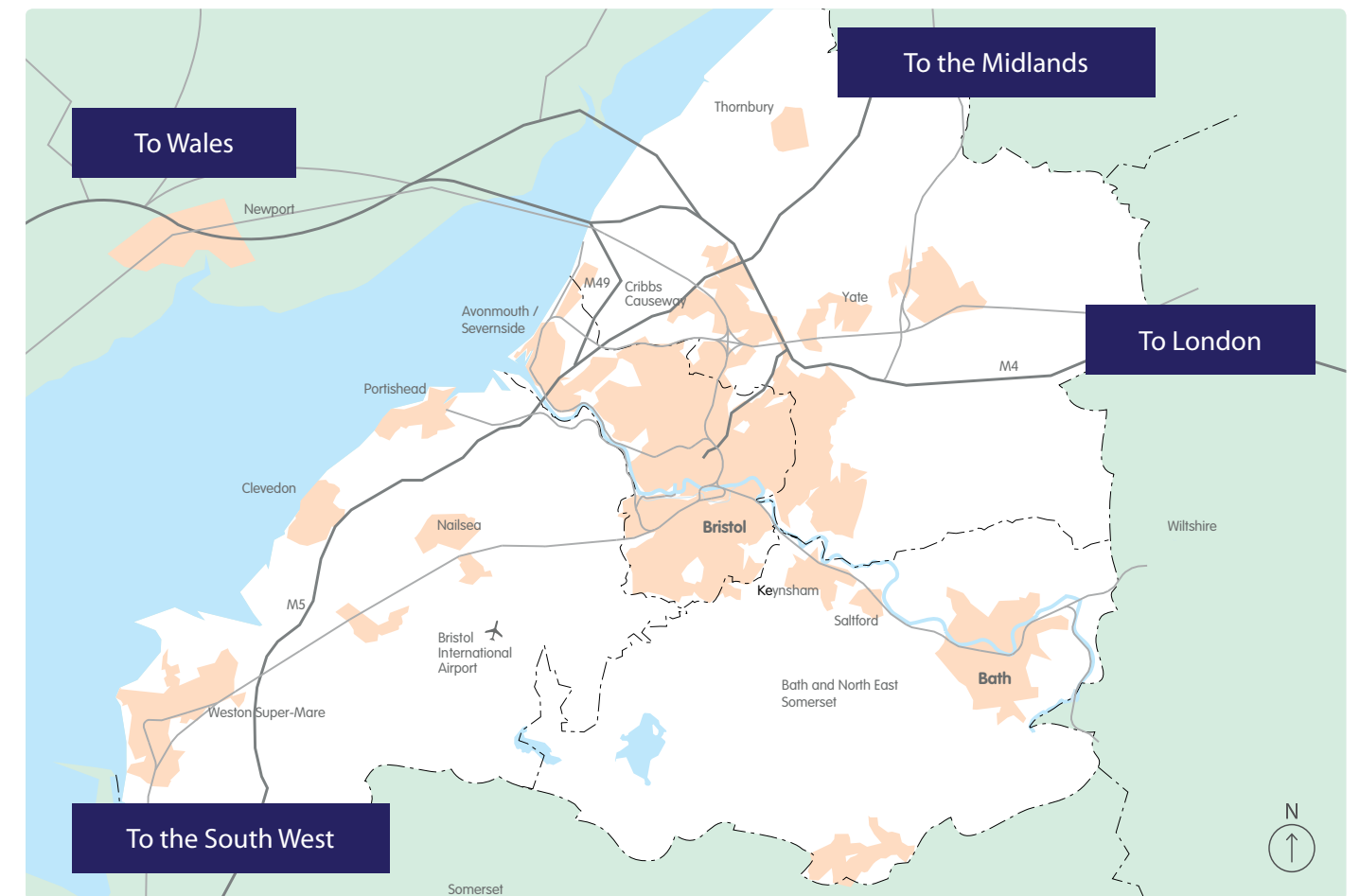
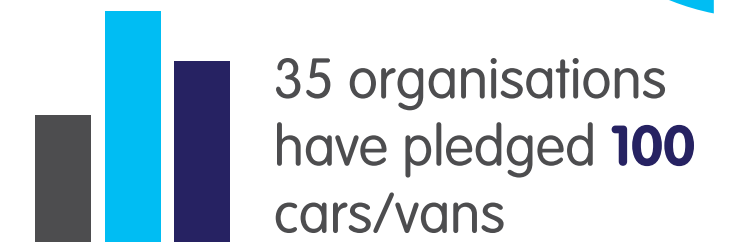


 By **2020** we can achieve **5000** new ULEVs Appendix 1



Leading the way with **100+** ULEVs

200 additional charging points to take total up to **400** across the region 





Introduction **Building on success**

We are not starting from a zero base. The WoE has already placed significant investment in ULEVs through the Local Sustainable Transport Fund and Rapid Charging Points scheme and has 200 charging points already in place.

Using the European Commission's ICT for Electric Vehicles Enhancing the User Experience Fund, the WoE developed the hugely successful Source West project which deployed new digital and communications technologies. We will look to build on the foundations of this project which has already delivered:

- The Source West website.
- Real-time charging information.
- User energy usage information – allowing users to compare costs with ICE vehicles.
- A smart phone app providing a secure payment interface.

As the table overleaf illustrates, the WoE's bid also shares a number of links and synergies with existing schemes. For instance the £200m MetroBus project has set a minimum standard of diesel-electric vehicles and will see over 50 new ULEV buses brought into service within the WoE. This new fleet will be 100% commercially funded without any tendering or subsidy from the four authorities and contribute toward a raised awareness of ULEVs.

Moreover, our bid has sought a number of direct connections with existing projects, such as the EV freight consolidation service and bus geo-fencing project which complements our pioneering Ultra-Low Emission Zone.

The WoE is also proud to announce that the **Bristol Council owned Bristol Energy Company will be supplying electricity to our entire charge point network ensuring a strong link with community energy projects.**

The commitment and strapline for Green Capital is that the city is "in it for good". With the momentum that is being gained throughout 2015 **there could not be better foundations on which to deliver a Go Ultra Low City Scheme** that embeds ULEVs within the fabric of the WoE.



bristolenergy
A different type of energy company

10% Higher propensity for ULEV uptake than national average

3 HOV / Bus Lanes opened to ULEVS



£ Fully considered business model to result in self sufficient charging network by 2020

50 Car Club EVs by 2020



source
WEST



Linking with other schemes

Project	Description	Link/synergy with proposals	Approximate value of project
Geo-fence bus technology	Buses with geo-fencing technology, switching to electric mode when entering areas of poor air quality	Ultra-Low Emissions Zones Air quality	£1m [live]
Metrobus	Minimum standard of 50 new low emission buses	Air quality	£10m [live] based on average bus price of £200,000
REPLICATE	Deployment of electric car club vehicles Installation of EV charge points	ULEVs at the heart of the community A world class charge point network	£3.7m [live]
Freight Consolidation Scheme	Existing scheme providing ULEV freighted goods to local businesses	Ultra-Low Emissions Zone Air quality	£1.5m [live]
Source West Project & LSTF	Charge point membership scheme and existing charge point network infrastructure Match-funded charge point scheme for businesses	A world class charge point network Getting business on board	£1.5m [complete]
West of England OLEV Bus Bid	Increasing the number of Low Emission Buses operating local bus services and improving the re-fuelling network to support these operations.	Air quality	£4-6m [bidding]

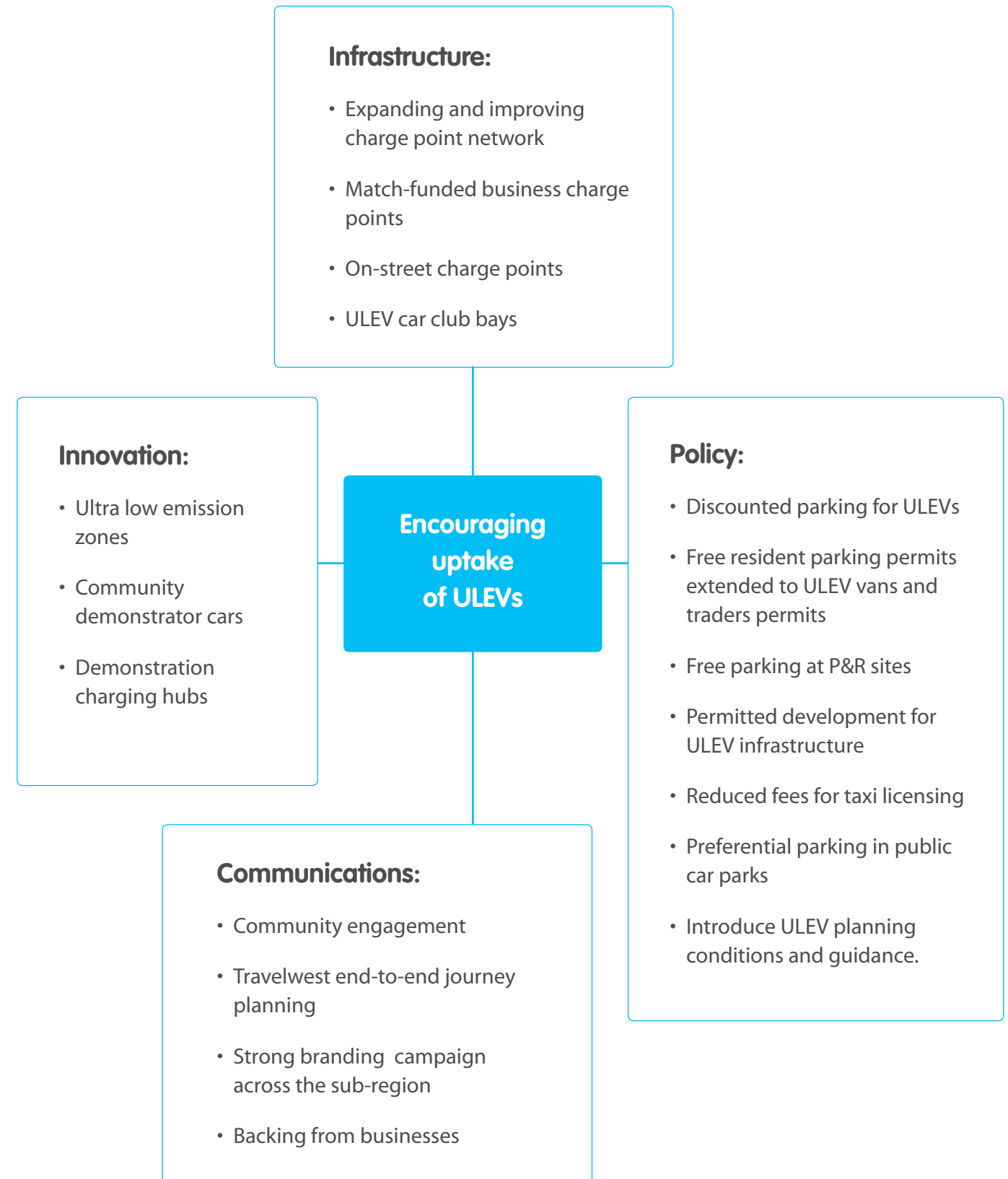
The WoE GoUltraLow West schemes are all about **scale**.

Scale of deployment, scale of take up and tipping the balance in favour of lower emissions vehicles. Whilst we weren't successful in the taxi feasibility stage we are considering a self-funded study and considering how local policy and finance could create a package for taxi operators and drivers to make the switch.

The Go Ultra Low City Bid includes a charging network and other policy measures which would encourage take up for taxis. Whilst our bus bid is still being worked on, nothing in the cities bid would conflict or discourage the take up lower emission buses.



Key Proposals





The potential for ULEV take-up Investing in the WoE

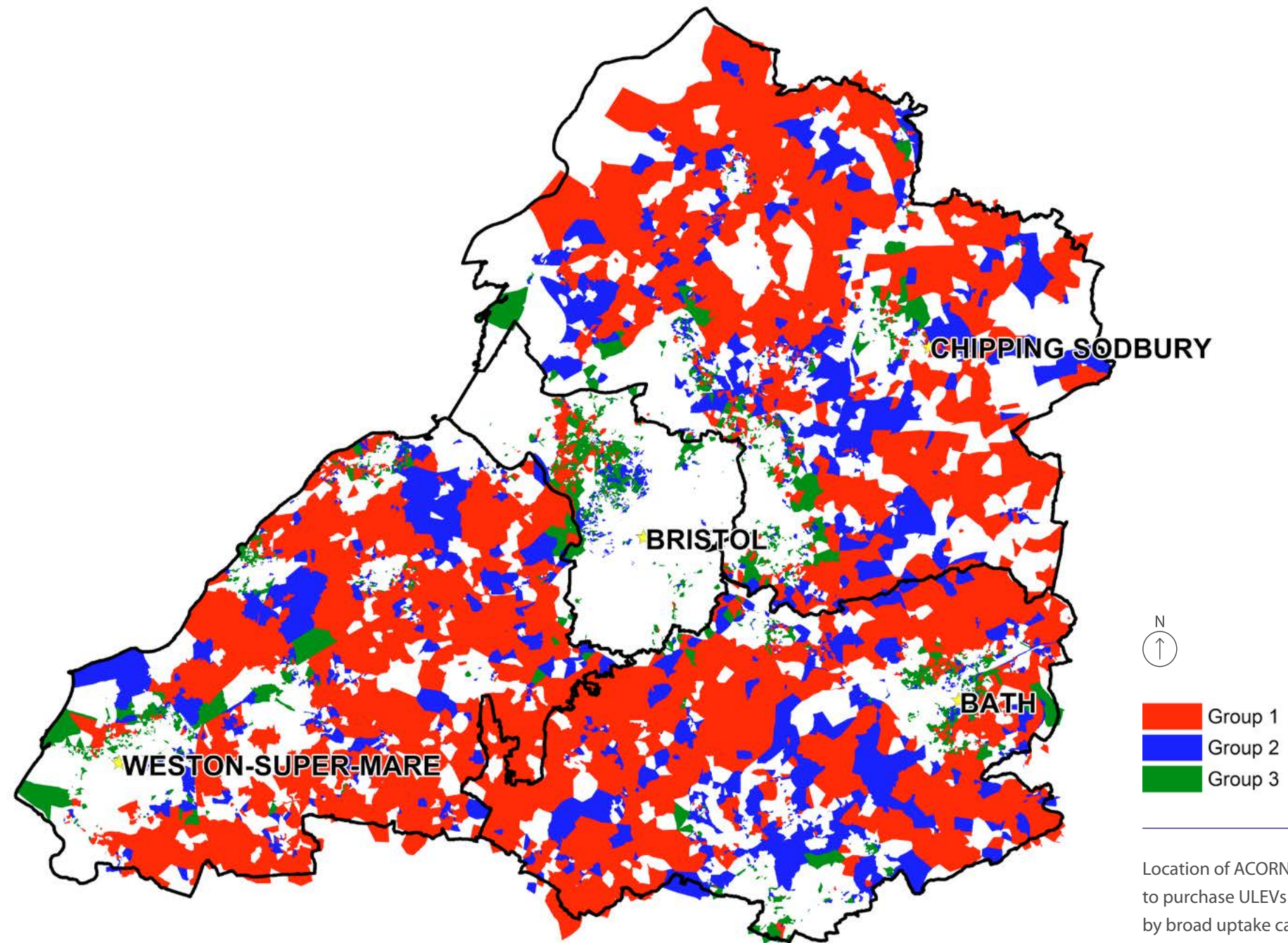
The WoE has the perfect conditions for a Go Ultra low City Scheme to really take off.

Potential for ULEV uptake is evidenced through an above average representation of socio-economic segments with characteristics which increase the likelihood of ULEV purchase and the presence of a large number of small and medium enterprises with associated above average annual rate of purchase of company cars.

These factors, in combination with the wide range of proposed measures set out in this business case to encourage uptake in the area, have the potential to generate a significant increase in the uptake of ULEVs in the short term.

Indicative estimates suggest that by 2020 uptake could be of the order of at least 5000 new electric cars per year, comprising approximately 4000 company cars and 1000 private cars - assuming total annual registrations remain at 2014/15 levels. A detailed report showing how these figures were obtained can be found in Appendix 1.

The uptake of ULEVs as a result of this business case will significantly improve air quality by reducing tailpipe emissions on key urban links. If ULEV uptake grows steadily from the current level of 300 p.a. (DfT) to the estimated 5,000 p.a. (private and company) by 2020, ULEVs could account for about 2% of the whole sub-regional fleet by 2020. If hybrids operated in electric mode in AQMAs, local pollution from cars would be reduced by a similar proportion, representing at least a 1% reduction in total emissions.



Data Source: Based on BCC and CACI Acorn, 2015. Mapping contains Ordnance Survey and National Statistics data © Crown copyright and database right (2015) and contains Royal Mail data © Royal Mail copyright and database right (2015)



- Group 1
- Group 2
- Group 3

Location of ACORN groups most likely to purchase ULEVs in the short term by broad uptake category.

Group 1 identified as 'most likely' and to Group 3 as 'least likely'



The potential for ULEV take-up **Private Cars**

Recent evidence on ULEV uptake was summarised in the August 2015 Rapid Evidence Assessment (REA) report for the DfT and suggests that the ‘typical’ ULEV purchaser is male, middle-aged, affluent and well-educated, living in an urban household with two or more vehicles and potential for off-street charging.

Based on these categories, it is clear that **the WoE has one the most significant markets for early adopters in the country.**

Comparing the proportion of the WoE population falling within the categories mentioned above with equivalent data for other cities and national figures suggests that the **WoE has a distinct advantage in terms of ULEV uptake potential.** For example, the number of people falling into this category in the WoE is:

- 10% greater than the national average
- 45% greater than Manchester
- 500% greater than Hull

The travel patterns in the WoE fit “hand in glove” with the battery range of ULEVs. The REA report sets out that ULEVs are used most extensively as the main car for commuting purposes. Over 80% of those working in the WoE live within the area – so the typical daily journeys that ULEVs will make are well within range. Moreover the expansion and improvement of existing charge point infrastructure (as proposed by this business case) will mean that the network is sufficiently dense to overcome range anxiety and transform this huge potential into actual growth. The map (insert) illustrates the location of peak morning destinations for ULEVs across the WoE as well as existing and proposed charge point locations.

The 2013 report for the Committee on Climate Change (CCC) suggests that, to achieve a high uptake pathway for ULEVs amongst private purchasers, 100% awareness of ULEVs would be required by 2021, along with significant availability of public charging infrastructure, home charging infrastructure, a wide range of EV models and equivalent value support worth £3,000 per vehicle (or £1,050 p.a.), either as a grant or other benefits (such as parking cost or time savings).

The measures proposed in this business case will support the conditions mentioned in the CCC report and encourage uptake by directly addressing the first three criteria for uptake identified, as follows.

- **Raising awareness:** multi-modal charging hubs; marketing campaigns; ULEV demonstrator cars; ULEV car clubs; council fleet conversion and the ultra- low emission zone.
- **User confidence in public charging infrastructure:** doubling charging capacity in the WoE.
- **User confidence home charging infrastructure:** provision of on-street charging points.

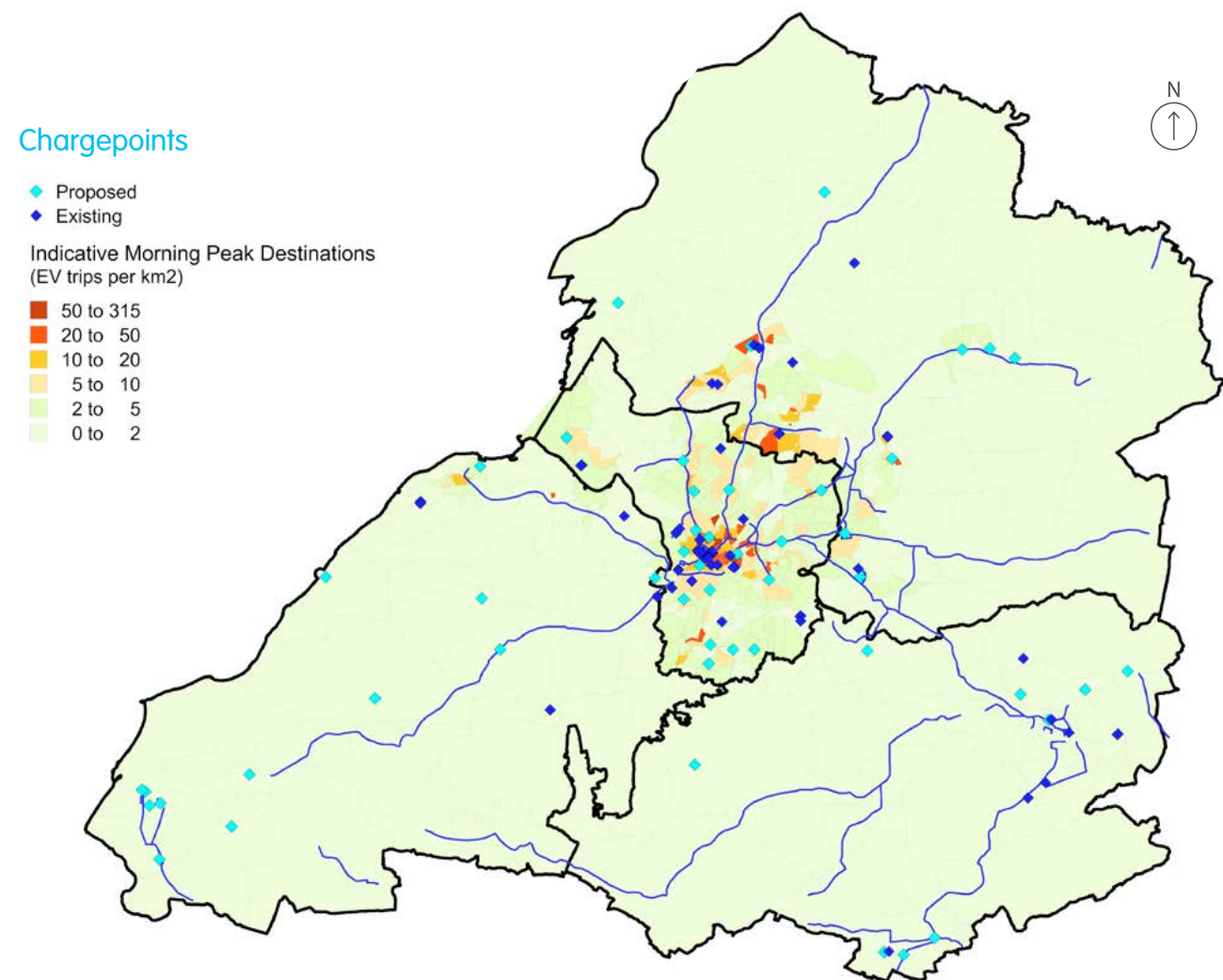
If the national Plug-in Vehicle Grant ends, the substantial equivalent value support required to achieve a high uptake pathway (equivalent to £3000 per vehicle) will be more difficult to provide. However, the measures identified in this business case will draw on local authority powers to make a significant contribution towards meeting this difference for a substantial number of drivers, as illustrated below:

- Preferential parking spaces = **potential annual**

saving of over £400 per annum.

- ULEV access to A370 and A369 2+ and bus lanes = **potential annual saving of over £400 per annum.**
- Free parking at P&R sites = **potential annual saving of £500-£600 per annum.**
- Free on-street non-central parking = **potential annual saving of £700 per annum.**
- Free residential parking = **potential annual saving £25 to £70 per annum.**

The first four categories described could cover approximately 2000 drivers who would experience benefits equating to between £400 p.a. and £700 p.a. The vehicle choice modelling undertaken for the CCC report suggests that, in the context of the high levels of awareness and charging provision likely to be achieved by the other proposed WoE measures, these levels of equivalent value support would lead to uptake at a significantly higher level amongst the drivers affected than the baseline (with no value support).



Data source: GBATS 4 model zones and data and indicative estimates produced for this study mapping contains Ordnance Survey and National Statistics data © Crown copyright and database right (2015) and contains Royal Mail data © Royal Mail copyright and database right (2015)



The potential for ULEV take-up **Fleet**

The Rapid Evidence Assessment report recognises the evidence gap in terms of the market and scale of potential take up for fleet. In forming this business case we have been acutely aware of this and have placed **significant effort into strengthening our partnership with the business community.**

The REA suggests that **small and medium enterprises are particularly likely to purchase ULEVs. The WoE provides a significant potential market in this area** with 38,700 enterprises with less than 250 employees and a further 75 with between 250 and 500 employees. Society of Motor Manufacturers and Traders (SMMT) vehicle registration data shows that there were 6,355 purchases of new cars for small fleets of less than 25 vehicles in the financial year 2014/2015. In the WoE this equates to nearly 6 new vehicles per thousand of resident population, **more than triple the equivalent figure for small fleets for the UK as a whole.**

Moreover, a further 39,270 new cars were purchased for larger fleets in the WoE in 2014/15. This equates to nearly 37 per thousand of resident population, **nearly double the national average figure for the UK as a whole.**

The planned expansion of charging points and match-funded employer charge points **will overcome business concerns about range anxiety** for day to day use - including the provision of on-street charging where off-street parking (public or private) is not available. **We are confident of rapid uptake of ULEVs for business use with 4000 company ULEVs per year by 2020** and expect to significantly exceed this once the Go Ultra Low City Scheme builds momentum. Appendix 2 of this business case contains the letters of support and pledges of businesses to have 100 ULEV fleet vehicles by 2020 as generated by our Ultra Low West campaign.

The four authorities are leading by example in terms of fleet uptake by committing to 100 car/light vehicle ULEVs forming 20-25% of their fleet by 2020.



Roger Proctor MBE, Managing Director at Proctor Stevenson talking to local business about the benefits of low-emissions vehicles at the Ultra Low West business event.



A world-class charge point network

The WoE business case seeks to more than double the **capacity of the existing charge point network by installing an additional 200 charging points**, including those units in the multi modal charging hub proposal. Increased visible presence of charge point infrastructure, **eliminating range anxiety, encouraging confidence** among private and commercial vehicle owners and meeting future capacity is key to this decision. A breakdown of the cost and type of these charge points can be found in Appendix 6.

The proposed charge points will be allocated to four main areas:

- Public
- On-street
- Business
- Car Clubs bays

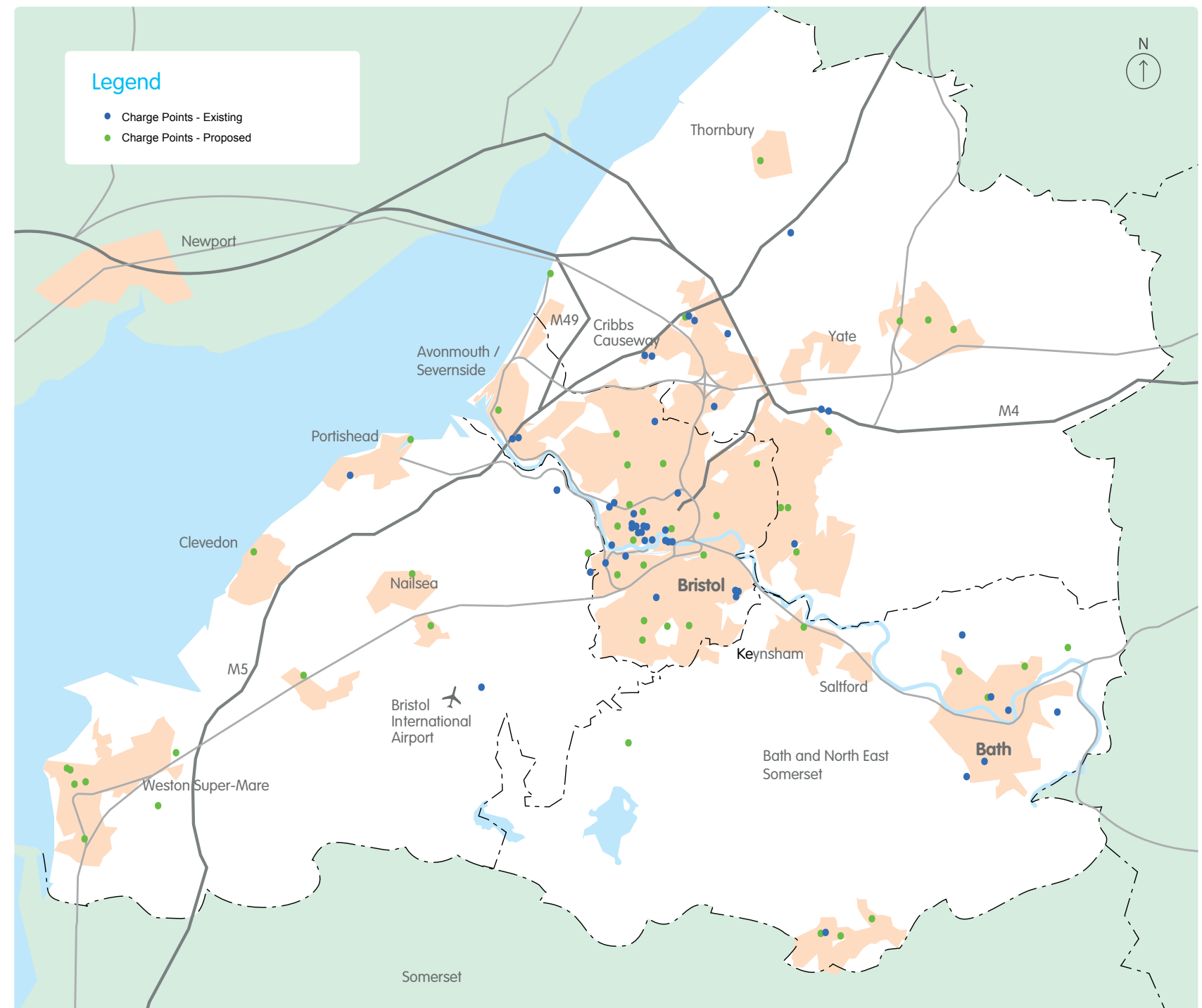
Locations for the public charge points can be seen on the map (right). Based on the findings of the REA report, the placement of these chargers have focused on destination points, plugging existing gaps in the network and looking at historic usage patterns to determine where extra capacity is needed. Moreover, given that evidence shows ULEV users prefer fast and rapid charging, we have ensured that **the number of rapids we install will bring the network to a 30% rapid composition.**

Looking at how we maintain and grow our charge point network has been an important consideration for the WoE authorities. **Our fully costed business case for the charge point network (page 18) details how this investment will support a significant uptake in ULEV purchases, as well as when the**

network can be expected to become commercially viable.

Allocation of business charge points will take place through an existing match-funded grant scheme based on the one currently used in the Local Sustainable Transport Fund project.

The impracticalities of on-street charging are a significant barrier to ULEV purchase for a number of people. The business case will look to address this through installation of on-street charge point infrastructure, looking specifically at the viability of emerging lamppost charging point technologies.





Exemplar multi-modal charging hubs

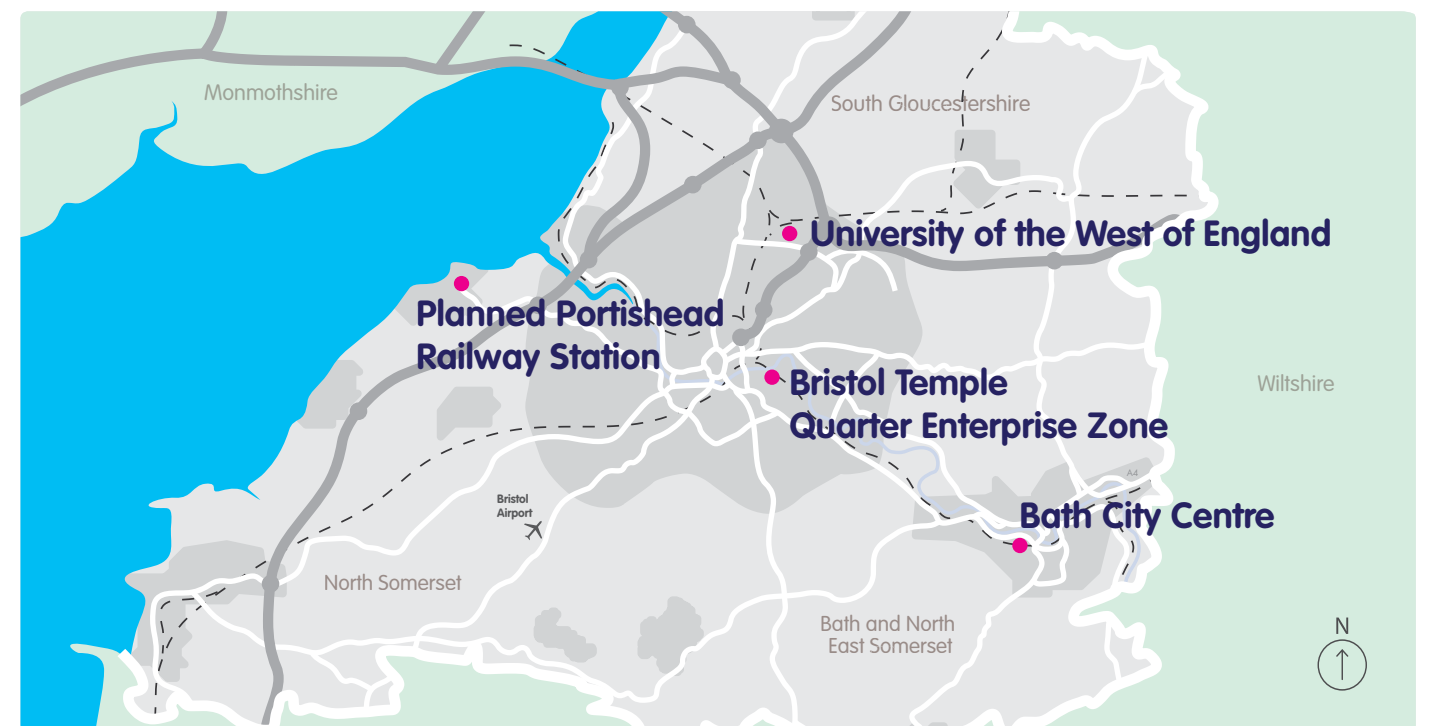
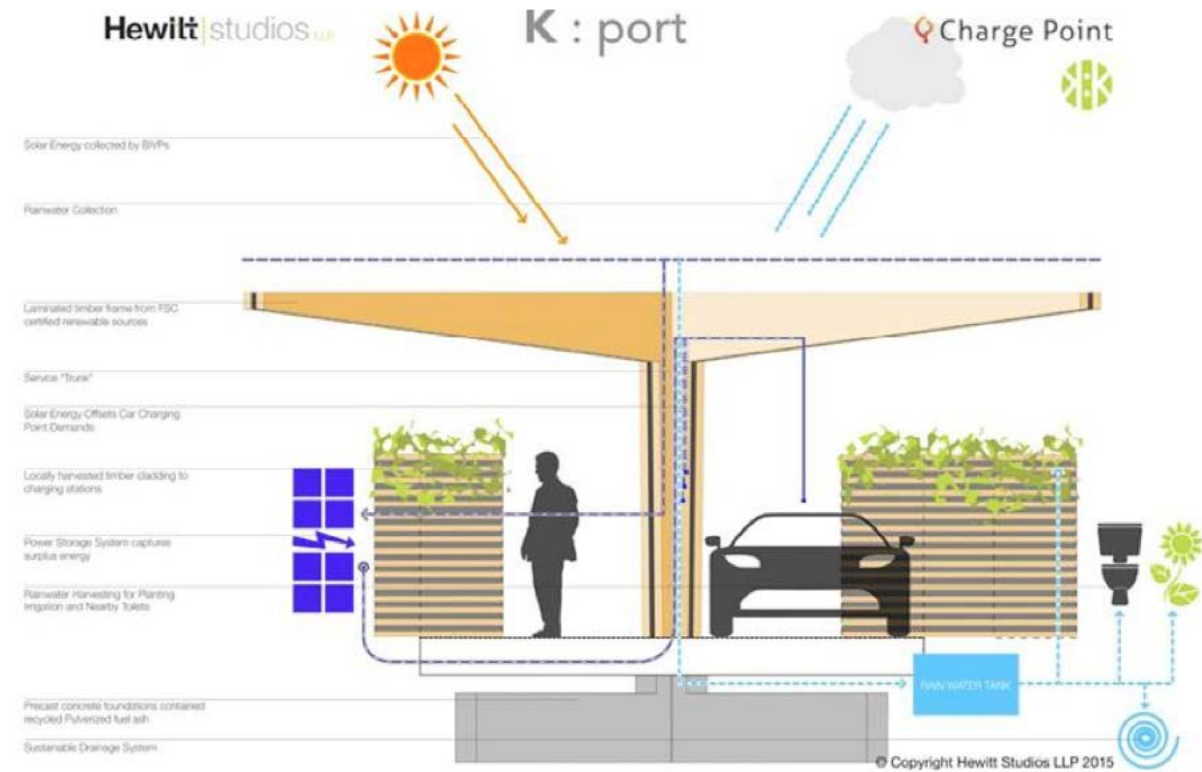
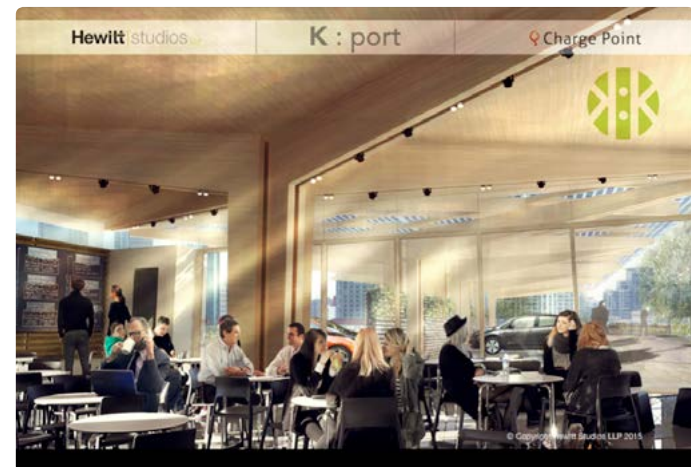
As the Climate Change Committee report finds, it is imperative to achieve 100% visibility of ULEVs to ensure high uptake. To this effect one of our core proposals is to deliver four bespoke demonstration charging hubs at key transport interchange points across the sub-region, **instantly seeing the WoE stand out among its peers as an exemplar for innovative and high-quality public charging infrastructure.** A full breakdown of our costings and vision for the hubs can be found in Appendix 4.

The WoE commissioned **Sustainability Architect of the Year 2014** John Hewitt to design a conceptual structure that is not just about exceptional functionality but will provide an integrated facility in which the ergonomics of the charge points are built into the structure itself. The hubs have been designed with input from an operator (Charge Point Services) to ensure that the **technical specifications of the site are 'future proofed' to provide an exemplar facility, which would be reliable, convenient and efficient for a variety of uses.** These hubs will act as demonstration centres for electric vehicle promotion, charging, hosting industry and local authority events and act as a fleet and manufacturer test drive facility. The strap line is "What would you do with an extra half an hour a day?" (whilst your car is charging). The answer for many people would be, have a coffee, email those reports or catch up with friends on social media. Essentially these facilities will address ULEV uptake, encouraging new users through high quality information and education facilities and first-class charging provision.

We have chosen the sites for the hubs based on a number of conditions:

- Sites that are highly visible and have natural foot and vehicle traffic
- Sites that are next to key transport interchange sites
- Sites that make use of brown field land
- Sites that score highly under ULEV trip destination data

Signed agreement (Appendix 4) from partners and relevant council teams show that there is a **firm commitment in place to deliver the hubs.** The map (inset) shows the locations for the multi-modal charging hubs. These hub sites have been carefully selected to ensure they are placed at destinations where they are most useful to potential or current ULEV drivers. Please refer to the map on page 8 showing ULEV morning peak destinations.





The UK's largest council ULEV fleet

As part of the business case the WoE councils are keen to set an example to employers and other authorities across the UK by converting 20-25% of their 446 collective light fleet vehicles to ULEVs by 2020.

This substantial uptake of ULEVs will build on the investment in pilot vehicles already in operation in each authority and make a significant contribution to improving local air quality by converting existing ICE vehicles that are currently used on a day to day basis around the city.

Already the four authorities have:

- Introduced ULEVs into their fleets (16 to date).
- Conducted extensive ULEV vehicle demonstrations over the last 18 months, including an aspiration to expand the M4 'Hydrogen Highway' in the future.
- Introduced environmentally friendly vehicle procurement policies – bringing ULEVs into contracts procured by the four authorities
- Introduced robust travel plans reducing travel and tackling the 'grey fleet' issue.
- Undertaken Energy Saving Trust reviews of fleet to identify further efficiency gains.

The primary ambition of our fleet managers is to provide high quality vehicles in conjunction with the service stakeholders, whilst operating the fleets at maximum efficiency, thereby minimising operational costs and maximising environmental sustainability. Our respective fleet managers have developed a conjoined action plan going forward in support of the aspirations of the WoE business case and the Bristol City Green Capital status stating that;

“The West of England authorities will transform at least 20-25% of its light van and car fleet to Ultra Low emission Vehicles to create one of the largest electric fleets in the country by 2020.”

This represents circa £1 million in investment across the fleets equating to 100 electric vehicles which all fleet managers have already committed to in writing – see Appendix 9.





The UK's largest council ULEV fleet

A breakdown of investment by each council can be seen in the table below.

Authority	Total Light Vehicle Fleet (excl. ULEV's?)	ULEV Transfer	ULEV Transfer %	Match amount from LA's
Bath & North East Somerset	108	27	25%	25%
Bristol City Council	171	35	20%	20%
North Somerset Council	61	16	25%	25%
South Gloucestershire Council	106	22	20%	20%
Total fleet in West of England	446	100		

As part of a joint action plan, the fleet managers of the four authorities have committed to the following actions:

- Making the majority of the fleet conversion to ULEVs in the first 12-18 months
- Collaborative procurement by aggregating higher purchase volumes to help maximise discounts and vehicle support.
- Specialist local tenders to help maximise purchase and ongoing support from manufacturers.
- Bristol City Council will maximise training and development of its vehicle technicians by offering apprentice schemes on ULEV vehicles within the authorities workshops, this will support the neighbouring fleets where required.
- Co-ordinate any future infrastructure implementations to ensure maximum use by the fleets to reduce vehicle down time.
- Monitor and share intelligence from the industry to ensure maximum efficiency, promote the area to manufacturers as a suitable test bed for new technologies and vehicle trials, with minimised risk to the authorities.
- Offer publicity and exposure to manufacturers.
- In conjunction with procurement develop and offer affinity schemes to local business and staff.



The UK's first Ultra-Low Emissions Zone

The bidding guidance states that **being an exemplar and innovation** are key criteria in a successful bid and the WoE hope to demonstrate both of these points with our Ultra-Low Emissions Zones proposal. Our pioneering Ultra-Low Emission Zones forms part of two electric zones which will bring the spotlight to electro mobility; improve local air quality and **act as an example to the rest of the UK**. Two locations have been identified as part of our proposal:

- Bristol's Old City
- Bristol Temple Quarter Enterprise Zone

The concept is all about **visibility of electric mobility and encouraging people to try it out**. The measures when combined provide clean, ultra-low emission havens where **electro mobility is the dominant form of transport, not the exception**.

The Ultra-Low Emissions Zones package is broken down into five components:

- Electric Zones in the Bristol Temple Quarter Enterprise Zone
- Low-emission freight consolidation
- Geo-fencing
- Electric cycle hire points
- Ultra Low Emission Zone in the Old City

Since 2004, businesses in Bristol and Bath have been using freight consolidation to manage their deliveries more effectively, save staff time and optimise storage space. **Significantly, since 2012 these freight consolidation vehicles have been electric, providing a high profile 'moving advertisement' for electro mobility across the WoE,**

while improving air quality and easing congestion on roads.

The freight consolidation service is a partnership between courier DHL and the unitary authorities of Bristol and Bath. Bath aims to reduce traffic in the historic core of the city and has introduced new traffic restrictions, prohibiting vehicles on select roads between 10am and 6pm. Because freight consolidation contributes towards the objective of reducing vehicle numbers, the service has been exempted from the restrictions – meaning that customers in this area can still receive their deliveries throughout the day. **Building on the tried and tested foundations of this scheme** the WoE business case would see this model expanded to include South Gloucestershire and utilising 'micro' consolidation in the form of small electric vans (such as the NV200) and electric cycles. These consolidation vehicles would be proudly branded and make business-to-business deliveries with **benefits to business and smaller local traders**.

The Ultra-Low Emissions Zone in Bristol's Old City would (combined with the freight consolidation scheme) give traders excellent delivery facilities, but allow the city's historic core to breathe.

The final element of the scheme would be to encourage use of electric bikes through cycle hire points. The 'try before you buy' model with electric vehicles is not unique to cars and vans and we believe that once people have tried an electric bike, they will want to go the step further and try an electric car. Connecting within and between Bristol's Ultra-Low Emissions Zones, the electric bike hire scheme will ensure that electro-mobility is ubiquitous.



● Bristol Old City Ultra Low Emission Zone



Policy Innovation

Planning, parking and other areas of policy is where the WoE business case can have a big influence on the uptake of ULEVs as evidenced in the initial chapters. The development of a Low Emission Vehicle Strategy within 6 months of the announcement will put in place many of the measures outlined in the table to the right, ensuring consistency across the WoE and **rapid delivery of policy changes**. The policies would be reviewed every three years to see what else could be done and ensure that measures are still achieving the desired outcomes.

A key measure will be the production of a 'Planning Policy Document' to be used by the respective WoE authorities. This will include:

- Policies on the **inclusion of ULEV charging points at all new commercial and retail developments**, stipulating numbers and standards
- Inclusion of **residential charging points at all new flatted residential units** and ensuring that all new dwellings with drive ways have charge points installed
- **Permitted development for charging infrastructure** in nearly all cases (with listed buildings and conservation areas requiring special attention)

Measure	Outcome	Impact
Discounted parking for ULEVs in some P&D on-street bays	£0 in non-city centre locations	High
Discount Parking Permits	£0 for residents parking permits	High
Reduces fees for taxi licensing	£0 for ULEV licences	High
Taxi licensing caps	Cap does not apply to ULEVs	High
Dedicated parking to ULEV car club vehicles	50 dedicated car club ULEV bays	High
Trial access to selected bus lanes and high occupancy vehicle lanes	Time savings for ULEV drivers	High
Free parking at Park & Ride sites	£0 at Park & Rides	Moderate
Travel plans and business engagement	All travel plans to include a ULEV element	Moderate
Planning conditions and guidance	All developments to include ULEV element	Moderate
Discounted residents parking permits for traders using ULEV vans (local companies with EV Vans)	Discounted trader permits for ULEV vans	Moderate
Permitted development for ULEV infrastructure	Permitted development for ULEV infrastructure	Low
Preferential parking in multi-storey car parks	Parking near entrances and on ground floors of car parks	Low



Getting business on board

Having the backing of the business community and partners is a key element of this business case and we have been encouraged by what employers are already doing in the sub-region as well as what they have pledged to do in support of this business case.

Extending the **match-funded charge point scheme** is essential in encouraging uptake of ULEVs among businesses and is a continuation of the work we started using Local Sustainable Transport Fund money. Under this scheme 30 businesses elected to install a match-funded charge point.

The bid team has been in negotiations with ULEV manufacturers across the UK (including Mitsubishi, Nissan, KIA and BMW) to ensure that those partner relationships are in place and vehicles discounts of up to 40% can be counted on to make the offer more attractive to businesses. Businesses would secure these discounts through a WoE-wide electric vehicle club, which would be advertised to employers through a strong marketing campaign. This will help establish the link between a business receiving a match-funded charge point and the subsequent conversation about ULEV purchase and achieve considerable savings for the end user without the need for additional public funding or breaching state aid implications.

We believe the market for business ULEV uptake in the WoE is unparalleled with our fleet analysis identifying take up of at least 4000 ULEVs per year by 2020. Moreover, the team have already secured a number of pledges from employers across the sub-region amounting to 100 vehicles over the next 5 years following the inclusion of a pledge form on our WoE travel website: TravelWest www./travelwest.info/projects/goultralowwest

These pledges were secured via a launch event on the 18th September at the Bristol and Bath Science Park. The event drew a crowd of over 50 businesses and partners and included presentations from a number of industry experts and business already employing large numbers of ULEVs in their fleet. More information about this event and wider campaign can be found in Appendix 2 and 2ax.



Dale Enyon Head of Fleet Services at the Environment Agency.



From left to right. Roger Proctor MBE, Managing Director at Proctor and Stevenson Ltd; Councillor Brian Allinson; James Durie, Director of Business West; Dale Enyon, Head of Fleet Services at the Environment Agency.



Businesses showing their support for the Ultra-low West bid at the Bristol and Bath Science Park



ULEVs at the heart of the community

The WoE business case recognises that it is vital to work with local residents to understand and reduce the barriers to purchasing electric vehicles, in order to create an environment that supports and encourages the adoption of ULEVs. The community element of the business case seeks to:

- Increase visibility of ULEVs and ULEV public charging infrastructure among all residents. [see appendix 10 for more details]
- Help those residents without the means to purchase a ULEV to join a car club
- Build upon the expertise of local colleges and universities to develop opportunities to learn at both entry and graduate level about ULEV technology and the “Bristol Method.”

The high-level approach of our community package can be seen below.

As OLEV’s own recently-released research outlines in detail, the socio-demographic profiles of the majority of current ULEV owners are:

- Male
- Aged 40-69
- Likely to be educated to degree level
- Affluent (annual income of at least £35,000)
- Have access to two or more cars

This group is categorised by the DfT as “Educated suburban families”, who currently make up just under 1 in 5 of the UK’s households (17%).

Early adopters of new technologies however tend to be younger than the current ULEV owner age range. However coupled with lower incomes and usually access to only one car (which is needed to sometimes drive longer distances than a ULEV would allow without charging mid-journey), it is more difficult for this socio-demographic group to commit to a ULEV by purchasing one outright. **Instead, the Communities work package will promote the development of Car Clubs, which will allow early adopters and residents on lower incomes access to a ULEV when they don’t have the means to purchase one.**

This business case has already secured the commitment of Car Club operators to achieve 50 new ULEVs over the lifetime of the project (see Appendix 2 for letters of support) using a mixture of existing high profile bays alongside newly created ones.

In support of this the business case also proposes a series of **demonstrator cars which will operate in neighbourhoods across the sub-region**. Advice from industry experts is that these cars could be secured at no cost to the project and will be available to residents and businesses on a long-term lease option from 2-4 weeks, allowing residents to take advantage of a **‘try before you buy model’**. These cars will also help to increase the visibility of ULEVs and generate a ‘buzz’ from peer to peer engagement.

Finally, our communities proposal will also see the WoE councils work with Bristol Energy and Western Power to develop a pilot scheme to tackle energy demand and mitigate impact on the electricity grid.

Bristol has a wealth of experience deploying and managing Smart Metering and Smart Grid projects in the community. Moreover, the multi-modal hubs proposal will be a test bed for developing vehicle to grid technology. More information can be found in Appendix 11.

Community package:





A commercially viable network

To support its ambitious plan the WoE has undertaken the development of a separate business case for its charging network, providing decision makers, stakeholders and the public with a management tool for evidence based and transparent decision making and a framework for the delivery, management and performance monitoring of the expansion of the network.

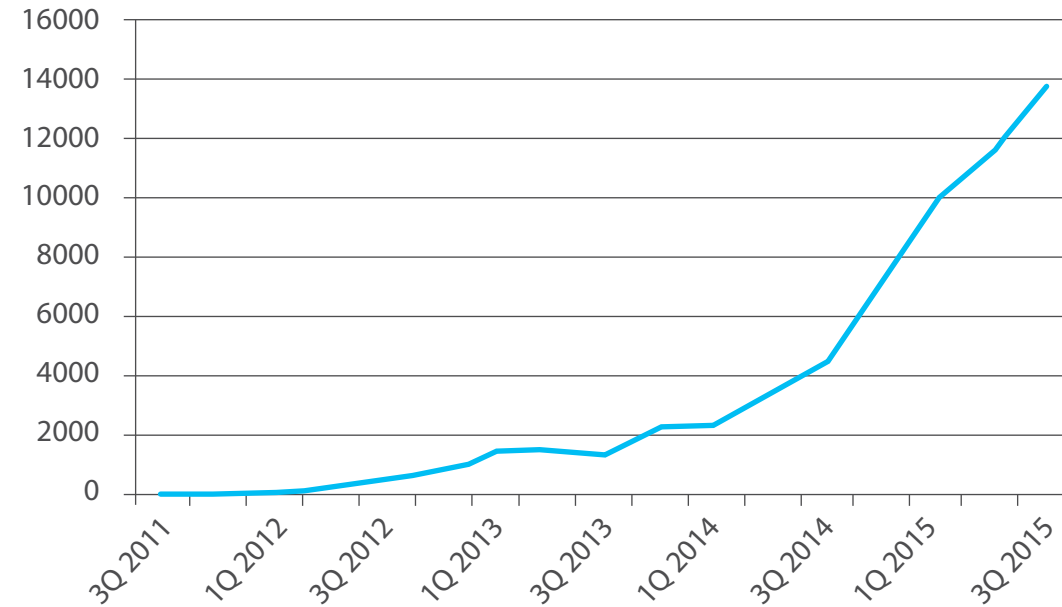
In developing this business case we have investigated the historical usage and performance of the network and found the consumption growth to be similar to the growth in the cumulative number of ULEVs in the UK. **From a strategic point of view, the expansion of the network also aims to serve users passing through Bristol taking advantage of its geographical location in the South West.**

To accurately calculate revenues, the business case developed a consumption forecast up to 2025 based on two figures: OLEVs aspiration of having 1.2M ULEVs nationally by 2020 and the current market trends as determined by industry experts who were consulted during the bid writing process. Both show a 5th order polynomial growth. **If the number of additional ULEV drivers matches OLEVs aspiration, the current network capacity will not be able to meet demand in 2020.**

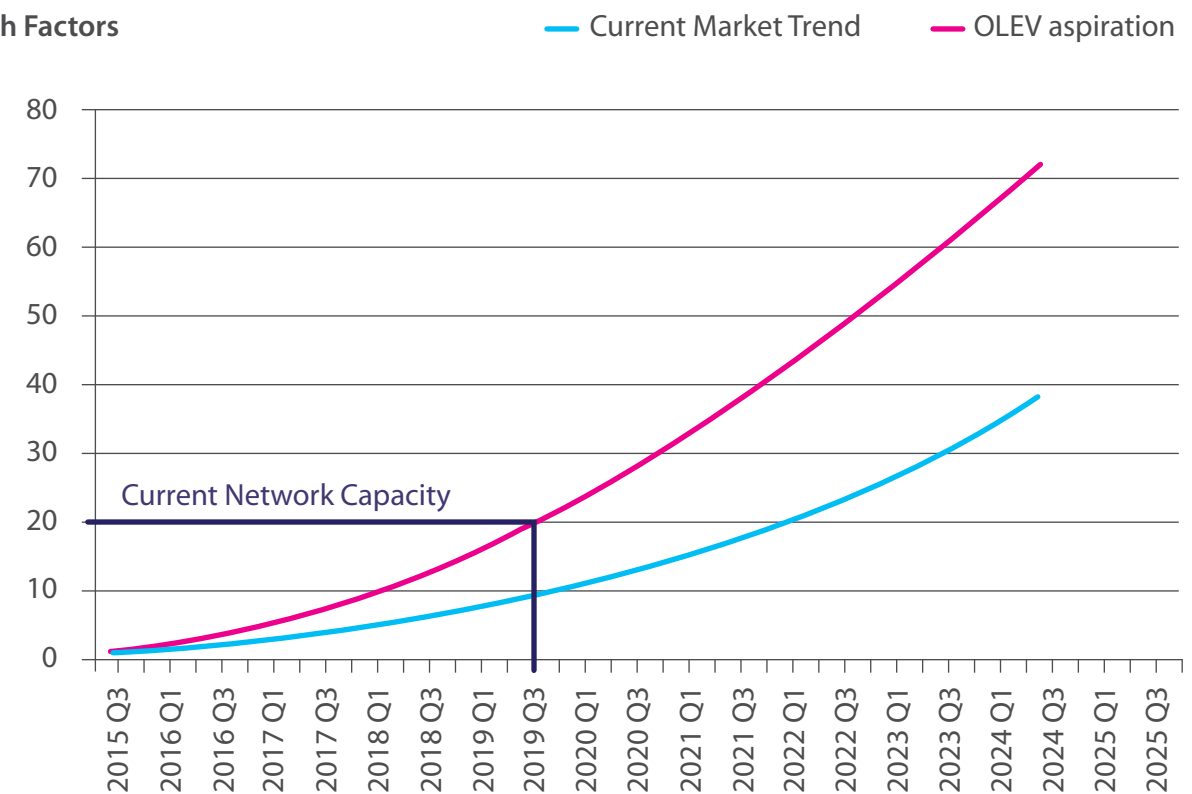
A market analysis has been conducted to analyse consumer behaviour in terms of charger type preference, session duration and frequency of usage, preferred charging time and location. These findings were then integrated into the financial model to optimise the number of each charger type and achieve the best value for money. Further sensitivity analyses have been conducted on different parameters as well.

The charging points are expected to last for 10 years, and different scenarios were constructed based on various assumptions, including the level of award/funding and expected demand growth. This analysis of the network has generated graphs for net profit/loss and calculated the net present value over the life of the project discounted at 3.5% per annum. Breakeven point, maximum operational deficit, and a breakdown of costs and revenues have also been identified and can be found in Appendix 6.

Historical Consumption / kWh per Quarter



Growth Factors





A commercially viable network

Starting from the financial year 16/17 revenues will be achieved through advertising and charging fees. To cover the operational expenses and generate income for further expansion of the network, two tariffs may apply:

- Annual membership of £20 and charging 30p/KwH on electricity consumption
- No annual membership and charging 35p/KwH on electricity consumption

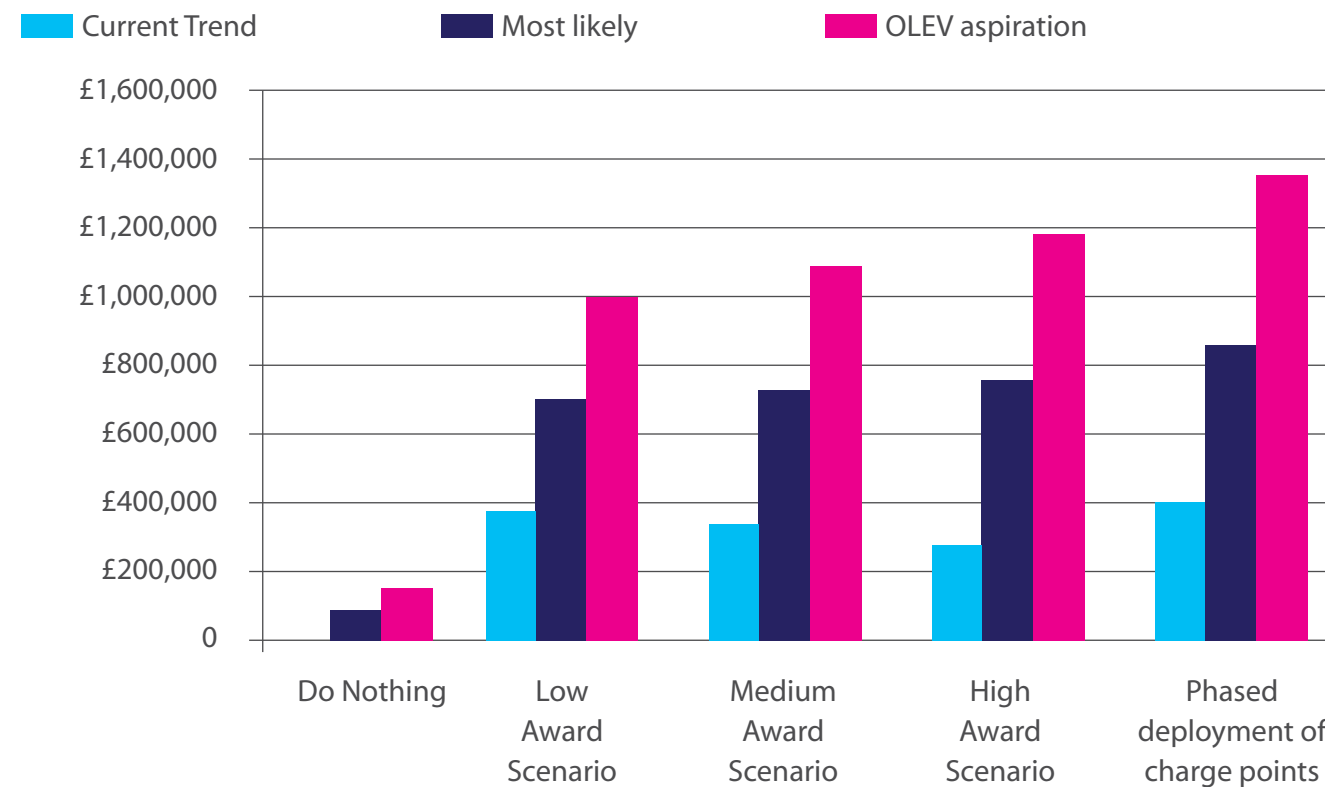
Both options are well below the current market prices for access to charge points and this will act as an incentive for users to favour our network.

The 'do nothing' scenario has the lowest net present value and cannot generate enough cash to expand and meet further demand. **The three funding/award scenarios would generate an average income of £720,000 that would fund ongoing expansion and renewal of the network to 2025 and beyond.** Optimum net income is achieved when the expansion is implemented in phases in parallel with demand growth. The phased scenario was constructed based on the assumption that 60% of chargers will be installed in 2017 and 40% in 2020 showing an extra £150,000 in discounted profits.

The breakeven point for all the scenarios is expected to be in 2020, after which positive net income will be realised which will support the ongoing renewal and expansion of the network.

A risk assessment and mitigation plan can be found in Appendix 6. Overall, the business case is positive and proves the commercial viability of the expansion of the network across the sub- region.

Net Present Value of Cumulative Profits





Air Quality and Monitoring

It is estimated that there are approximately 480 early deaths annually attributable to emissions of particulate matter across the WoE authority areas (Public Health England - Estimating Local Mortality Burdens Associated with Particulate Air Pollution). This figure is likely to be an underestimate given the emerging evidence of the contribution of nitrogen dioxide to early deaths (WHO, Review of Evidence on Health Aspects of Air Pollution 2013).

There are seven Air Quality Management Areas across the sub-region - including the UNESCO World Heritage City of Bath and most of the centre of Bristol - where measured concentrations of nitrogen dioxide exceed the National Air Quality Objective limit of 40 micrograms per cubic metre. A reduction in road traffic emissions is vital to reduce the health effects on the residents and visitors of the sub-region.

The uptake of ULEVs as a result of this business case will significantly improve air quality by reducing tailpipe emissions on key urban links. If ULEV uptake grows steadily from the current level of 300 p.a. (DfT) to the estimated 5,000 p.a. (private and company) by 2020, ULEVs could account for about 2% of the fleet by 2020. If hybrids operated in electric mode in AQMAs, local pollution from cars would be reduced by a similar proportion, representing at least a 1% reduction in total emissions by 2020.

The WoE area has an extensive air quality monitoring network including 15 automatic monitors measuring particulate matter and nitrogen oxides and 300 nitrogen dioxide diffusion tubes. In North Somerset, live air quality monitoring units are being installed on public bus stops to actively demonstrate local air quality levels to the public.

The annual reports of the data are published online and live data is also presented on each of the authority's websites. The status of live air quality data is shown in accordance with the daily air pollution index.

A technical note on air quality and monitoring systems can be found in Appendix 3 alongside a table showing emissions savings as a result of this business case. The headline figure is that the proposals herein will amount to savings of 230,000 tCO₂e over 10 years. In monetary terms this equates to £2.4m as a direct impact of our measures.

Understanding that the success of any investment will be judged on an increase in uptake of ULEVs, the WoE business case proposes to use classified traffic counts using ANPR camera technology at a number of cordons, enabling identification of the composition of traffic, including vehicle type and specification.

The registration numbers collected by the ANPR cameras can be sent to Driver and Vehicle Standards Agency who hold data on vehicle specs and enable calculation of estimated emissions from each vehicle, as well as provide an accurate proportion of traffic constituted by ULEVs and thus trends in uptake.

Emission factors are available from the National Atmospheric Emissions Inventory and when applied to the data from the DVSA can provide an accurate calculation of the emissions from road traffic observed during the annual ANPR surveys.

AQMA	Number of monitoring locations exceeding the annual mean NO ₂ objective in each AQMA	Highest measured annual mean NO ₂ in 2013 and 2014 (micrograms per cubic metre)
Bath	27	67
Bristol	58	89
Cribbs Causeway	1	72
Keynsham	2	44
Kingswood	10	52
Saltford	1	44
Staple Hill	9	53