

NEXT STOP NET ZERO: THE ROUTE TO A DECARBONISED UK BUS MARKET



SUMMARY & RECOMMENDATIONS

The bus sector includes a variety of use cases ranging from local minibus services to long-haul excursions. Each use case will have its own unique set of requirements for service provision and charging and refuelling. **The recommendations made in this paper focus on buses provided for scheduled services.** This paper does not cover the critically important minibus sector, for which a separate position paper is being explored.

Zero emission bus registrations are increasing and represented 45% of the market in 2023. The UK is a global leader in zero emission buses and has for many years developed both ultra-low and zero emission bus technologies for the UK market and for export. With the support of government funding, some UK operators have been deploying ultra-low and zero emission buses since 2009¹, the majority being hybrid diesel and, more recently, electric and hydrogen fuel cell. Between 1990 and 2021, Greenhouse Gas emissions (GHGs) from buses decreased by 53%² and accounted for just 2% of overall transport emissions³.

Improvements in environmental performance have been delivered in the context of a recent decline in overall bus registrations. Bus journeys were greatly impacted by the Covid-19 pandemic with a decline in passenger journeys as a result of lockdown restrictions and working from home policies. Additionally, many operators delayed their purchases of new buses until Clean Air Zone (CAZ)⁴ criteria had been specified in many towns and cities. More broadly, bus ridership has been in steady decline for many years, reducing revenue for bus operators and restricting their ability to purchase new vehicles. This has increased their reliance on subsidies in the form of grants such as the Bus Services Operators Grant (BSOG), to maintain the level of service provided.

The Department for Transport (DfT) has published two consultations on ending the sale of new non-zero emission buses. The first ran from March to April 2021 seeking views on an appropriate date to end the sale of diesel buses.⁵ The outcome of this consultation was published in March 2022, accompanied by a second, more detailed consultation on ending the sale of new non-zero emission buses. Alongside

¹ <https://www.optare.com/news/general/mayor-officially-welcomes-the-first-british-built-pure-electric-buses-to-enter-service-on-londons-roads/#:~:text=The%20introduction%20of%20the%20four,Low%20Emission%20Zone%2C%20from%202020.>

² https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/932122/decarbonising-transport-setting-the-challenge.pdf

³ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1009448/decarbonising-transport-a-better-greener-britain.pdf

⁴ <https://www.gov.uk/guidance/driving-in-a-clean-air-zone>

⁵ <https://www.gov.uk/government/consultations/ending-the-sale-of-new-diesel-buses>

this were calls for evidence on the end of sale of new non-zero emission coaches and minibuses.⁶ Two years later, the government's response to the consultation and calls for evidence, including a decision on the end of sale date for new non-zero emission buses, has yet to be published.

SMMT responded to the 2022 consultation stating: **“With the appropriate supporting infrastructure, incentives and a stable policy framework for operators, the end of sale of new, non-zero emission buses is possible by 2030.** For this to be feasible, significant investment, incentives and enabling policy that will support all operators to purchase new vehicles and provide commercially viable passenger services across all areas of the UK are vital. **An end of sale date should only be set alongside a plan for the creation of a depot based charging and refuelling network ensuring sufficient electrical energy is available. Government should set a target to mandate the provision of charging infrastructure in parallel with their expectations for vehicle uptake.”**

The policy uncertainty for zero emission buses may prevent smaller operators bringing forward decarbonisation plans. Clarity on end of sale policy and requisite regulatory framework, funding and infrastructure plan is necessary to ensure full decarbonisation of the bus sector to meet UK Government's net zero commitments.

Government should provide certainty on the end of sale date for new, non-zero emission buses, identifying all appropriate enabling conditions in consultation with industry. This will give confidence to manufacturers and empower operators to develop and bring forward plans to decarbonise their fleets. Any associated regulation should support the industry as a whole and as well as ensure decarbonisation of the bus sector, secure jobs, enhance and maintain critical skills and enable growth of the supply chain.

SMMT data shows diesel bus registrations in 2019 represented 95% of the market, with the remaining 5% split between hybrid, fuel cell electric (FCEV) and battery electric (BEV). Four years on, and without additional regulation or an end of sale date, 45% of bus registrations are now FCEV and BEV. In 2019, UK government pledged funding of £5 billion for walking, cycling and buses. £3 billion of this was dedicated to buses, including a commitment to fund 4,000 buses by the end of the parliament.

Local authorities and the Big Five bus operators⁷ have committed to purchasing zero emission buses. However, without clear regulatory policy, the UK is at risk of not attracting the required investment to accelerate the transition to zero emission transportation.

⁶ <https://www.gov.uk/government/consultations/ending-the-sale-of-new-non-zero-emission-buses-coaches-and-minibuses>

⁷ Arriva UK Bus, FirstGroup, Go-Ahead, National Express, and Stagecoach

SMMT has identified a number of required interventions to achieve full decarbonisation of the bus sector:

1. **Government should, as a matter of urgency, bring forward its promised national charging and hydrogen refuelling infrastructure strategy for HDVs**, covering both depots and public locations. The strategy should include details on how operators will be supported with energy connections and a plan for shared charging and refuelling infrastructure. This strategy should review the currently available energy across the UK and highlight where additional power demand will be by 2030, setting out a plan for how this energy will be provided.
2. **Government should provide certainty on the end of sale date for new, non-zero emission buses, identifying all appropriate enabling conditions in consultation with industry**. This will give confidence to manufacturers and empower operators to develop and bring forward plans to decarbonise their fleets.
3. **Government should carry out a review of funding, including how and where it is allocated, to create a strategic, streamlined and collaborative process between central government, local authorities, bus operators and manufacturers**. This plan should include how infrastructure funding for smaller operators will be distributed.
4. **Government should commission research on charging infrastructure at bus depots to maximise space and eliminate the need for a reduction in fleet size**. Through this research, government should identify and share best practice examples of innovative depot charging solutions. This would help to ensure bus services are not reduced as a result of decarbonisation.
5. **Government should act to support consistent implementation of local planning policy to ensure a smooth and efficient process for installing infrastructure**. This could be considered as part of guidance provided within the National Planning Policy Framework.

INTRODUCTION

The bus has provided an essential public service across the UK in various forms since the 1800s. The concept of allowing passengers to embark on journeys without having to book, and at a price affordable to most, allowed individuals' access to new towns and created greater opportunities for employment. Deregulation as a result of the Transport Act 1985 allowed private operators to design and deliver services, creating greater competition. Whilst this provided profitable services on popular routes, it also reduced services in smaller towns and rural communities. Today there exists a disparity in provision, with some towns and cities having greater access to services while many rural areas are left with public transport deserts.⁸

The bus provides a transport lifeline to many individuals who do not have access to a private car, particularly for those living outside London. The personal service, with a driver you can speak to, allows for an easy and safe journey for both residents and visitors. With supportive and co-ordinated policy, zero emission buses can become the core of a nationwide, sustainable, multi modal public transport service.

Zero emission buses have been in operation in the UK since 2009, mainly in London and some other major cities. Increased requirements for improving air quality, introduced through the UK plan for tackling roadside nitrogen dioxide concentrations, have led to local authorities introducing emissions-based charging via clean air zones.⁹

The Climate Change Committee's sixth carbon budget highlights the need for demand reduction of passenger car miles.¹⁰ The UK government's 2050 carbon reduction commitment relies not only on a transition to zero emission vehicles, but also a modal shift to public transport.¹¹ According to the Department for Transport, buses are the cleanest forms of road transport, representing only 3% of road transport emissions in 2019.¹² They play a key role in decarbonising road transport and providing sustainable travel options across the UK.

⁸ https://www.cpre.org.uk/wp-content/uploads/2021/03/CPRE_Every-village-every-hour_report.pdf

⁹ <https://assets.publishing.service.gov.uk/media/5a823aca40f0b6230269b873/air-quality-plan-overview.pdf>

¹⁰ <https://www.theccc.org.uk/wp-content/uploads/2020/12/Sector-summary-Surface-transport.pdf>

¹¹ <https://assets.publishing.service.gov.uk/media/6194dfa4d3bf7f0555071b1b/net-zero-strategy-beis.pdf>

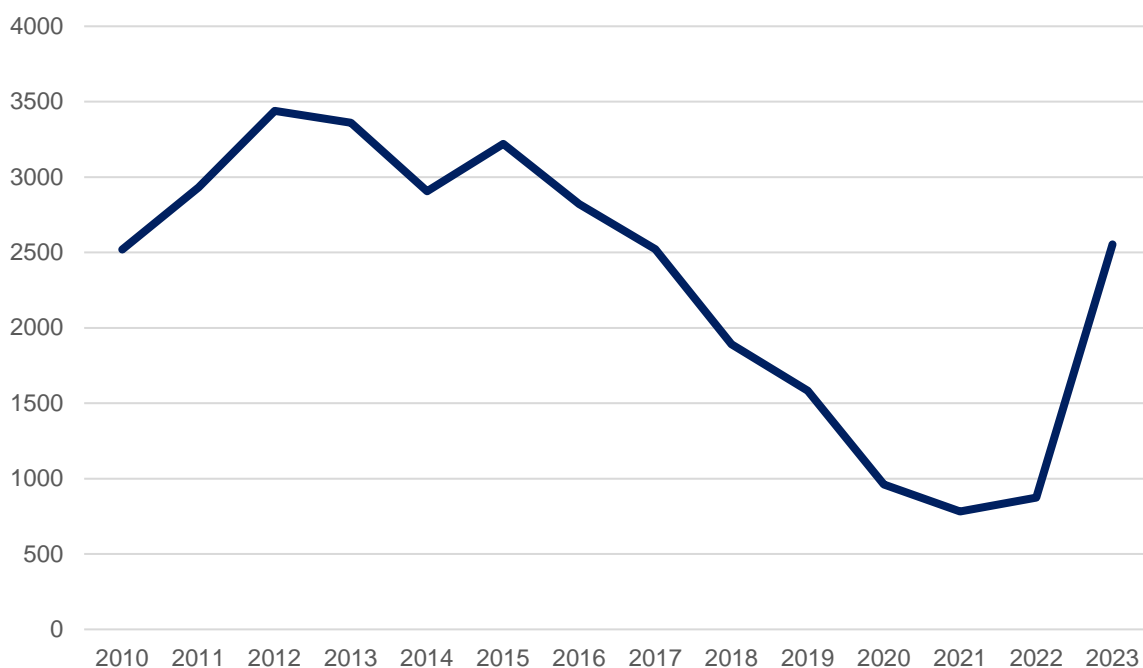
¹² <https://www.gov.uk/government/publications/zero-emission-buses-local-authority-toolkit/zero-emission-buses-local-authority-toolkit>

THE UK BUS MARKET

Demand for new buses in 2023 reached its highest level since the Covid-19 pandemic at 2,554 units. UK registrations of zero emission single and double decker buses rose to 45% in 2023, accounting for 1,153 buses and almost three times the size of the zero emission car market share. This makes the UK the biggest zero emission bus market in Europe.^{13 14}

SMMT publishes bus, coach and minibus registration data each quarter. The data shown represents single and double decker buses recorded in the Motor Vehicle Registration Information System (MVRIS). It is assumed that these bus types are used for scheduled services.

Figure 1: UK Bus Registrations 2010 to 2023¹⁵



According to the International Energy Agency (IEA), nearly 66,000 electric buses were sold globally in 2022.¹⁶ The global market is dominated by Chinese manufacturers and registrations in China, representing 54,000 electric buses.

¹³ <https://www.smmt.co.uk/2024/02/next-stop-net-zero-britain-boasts-europes-biggest-new-zero-emission-bus-market/>

¹⁴ <https://www.acea.auto/cv-registrations/new-commercial-vehicle-registrations-vans-14-6-trucks-16-3-buses-19-4-in-2023/>

¹⁵ <https://www.smmt.co.uk/vehicle-data/bus-and-coach-registrations/>

¹⁶ <https://www.iea.org/energy-system/transport/trucks-and-buses>

UK commercial vehicle manufacturing consisted of 120,357 vans, trucks, taxis, buses and coaches in 2023. There has been significant investment in UK production from a number of vehicle manufacturers, both in the car and commercial vehicle sectors.¹⁷ With the easing of pandemic related challenges an overall 17% increase in all vehicle manufacturing was observed.¹⁸ Bus manufacturing, however, declined in 2023 by 36.6% when compared with 2022. As bus operators await orders from local authorities through various funding schemes this has a knock-on effect of delaying manufacturing and reducing emissions from vehicles in use for the UK market.

Figure 2: 2023 UK Bus registrations by fuel type¹⁹

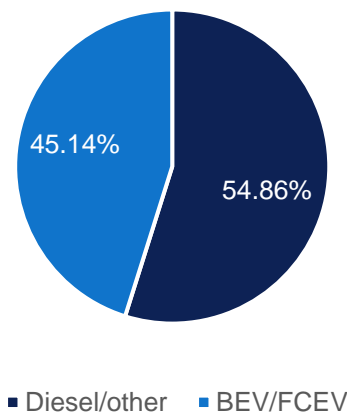
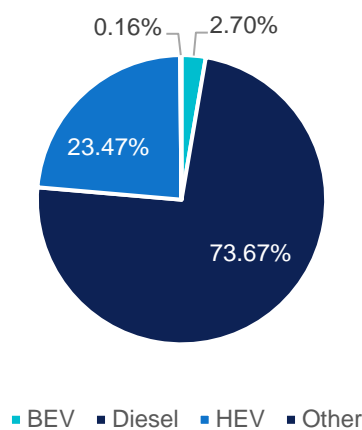


Figure 3: 2023 UK Bus and Coach parc by fuel type



¹⁷ <https://www.smmt.co.uk/2024/01/exports-drive-cv-production-in-best-year-since-2010/>

¹⁸ <https://media.smmt.co.uk/december-2023-uk-car-manufacturing/>

¹⁹ <https://www.smmt.co.uk/2024/02/next-stop-net-zero-britain-boasts-europes-biggest-new-zero-emission-bus-market/>

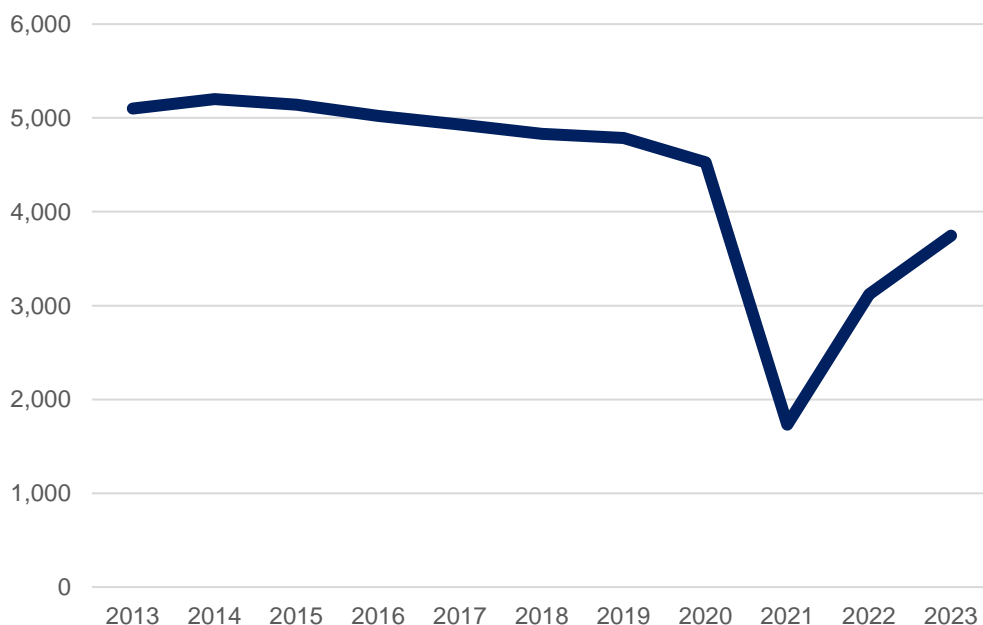
BUS OPERATIONS

Buses operate with varying use cases, including for scheduled services and on demand services, rail replacement, school, workplace, patient and airport transfer.

Scheduled bus services and associated passenger journeys have declined significantly in recent years. There has been a more gradual decline since 2015, followed by a severe drop in 2020 due to the Covid-19 pandemic. Changes in working patterns, with more people working from home, and an increase in online shopping may also have contributed to the overall decline in passenger journeys. This recent major decline in services has halted operator plans for fleet renewal, therefore stalling the new bus market and delaying the progress to achieving net zero by 2050.

One billion bus service miles were run in England during the year ending March 2023.²⁰ This is a decrease of 4.6% compared with the previous year. A greater reduction was observed outside of London at 5.1%, while in London a small decrease of 3.4% was observed compared with the previous year. Bus mileage in London has had little change since 2005 and fluctuates between 282 and 304 million miles.

Figure 4: Annual bus journeys 2010 - 2023²¹



²⁰ <https://www.gov.uk/government/statistics/annual-bus-statistics-year-ending-march-2023/annual-bus-statistics-year-ending-march-2023#:~:text=be%20interpreted%20carefully,-Bus%20Mileage,the%20year%20ending%20March%202020>.

²¹ <https://www.gov.uk/government/statistical-data-sets/bus-statistics-data-tables#local-bus-passenger-journeys-bus01>

The coronavirus pandemic severely impacted bus services as lockdown measures were implemented, businesses were closed and many people were either furloughed or worked from home. As a result, bus operators lost a significant amount of income, relying on the vital support of the Covid-19 Bus Service Support Grant (CBSSG) and, later, the Bus Recovery Grant (BRG). While these grants meant that businesses could survive, the reduction in income meant that many operators could no longer invest in new buses.

The majority of bus routes in the UK are operated by five operators: Arriva UK Bus, FirstGroup, Go-Ahead, National Express, and Stagecoach. Each has committed to decarbonise their fleet and is actively working towards delivery of this. Decarbonisation is, however, a greater challenge for smaller operators who may not have the resources to apply for funding or invest in charging and refuelling infrastructure.

Planning for bus services generally sits with local authorities and regional transport authorities.

Promotion of bus services should be done alongside other transport planning initiatives to place the bus at the heart of local transport strategies. This would complement other initiatives such as reducing congestion, encouraging modal shift and ensuring school and commuter services are adequately catered for.

LOCAL AIR QUALITY

The provision of zero emission bus services in local areas has had a significant impact on local air quality. In 2016 the Mayor of London announced 12 low emission bus zones that were to be put in place across the city, the first of which was introduced in Putney High Street.²²

Residents in Putney had long complained of poor air quality²³, with annual mean nitrogen dioxide (NO₂) concentrations measuring more than 150µg/m³ and more than 2,000 exceedances of the 200µg/m³ hourly limit. A study of local air quality found buses to be the main contributor. Hybrid buses were introduced into the local fleet from 2012 and, while this made a difference to measured concentrations between 2011 and 2012, a significant reduction in (NO₂) was not observed until 2017 when the full rollout of the low emission bus zone was implemented.

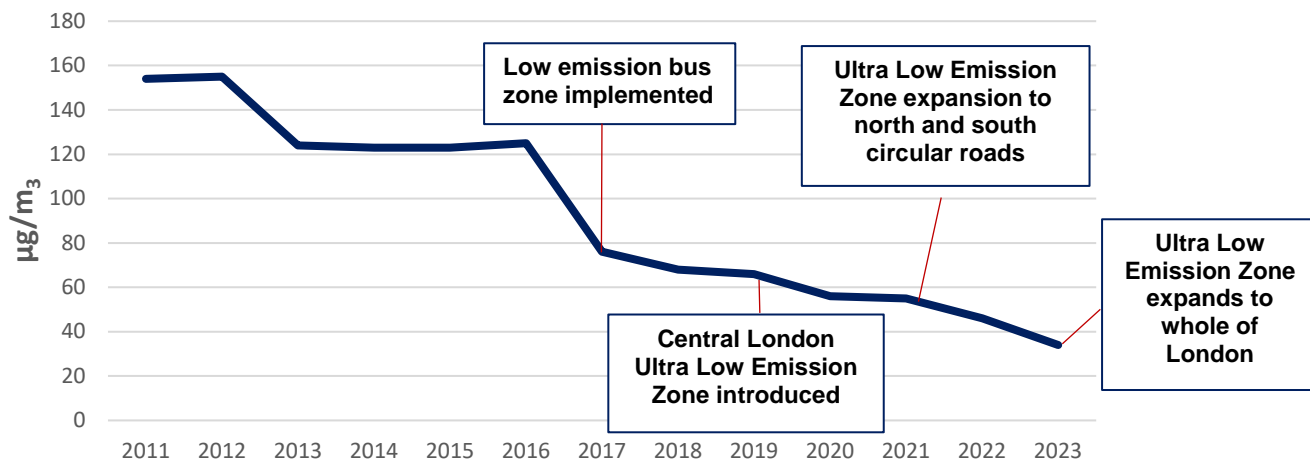
²² https://www.london.gov.uk/sites/default/files/lebz-evaluation-report-final_april_2019.pdf

²³ <https://www.hammersmithtoday.co.uk/#!/pages/putneysw15:info:issuepollutionb023>

The introduction of the low emission bus zone led to a reduction in the annual mean (NO₂) concentration from 125µg/m³ in 2016 to 76µg/m³ in 2017. The number of hourly exceedances of 200µg/m³ reduced from 1,272 in 2016 down to 76 in 2017. These levels still remained above the objective limit as prescribed in the air quality standards regulations of 40µg/m³ annual mean and 200µg/m³ hourly mean exceedance of no more than 18 times per year. However, the gradual introduction of new vehicles of all types through fleet renewal, coupled with the introduction of the ultra low emission zone (ULEZ)²⁴, has led subsequently to NO₂ concentrations falling below the objective limit for the first time since monitoring began.

In August 2023 London had more than 1,000 buses and is still on track to meet the ambition of having a fully zero emission bus fleet by 2034.²⁵ The fleet audit conducted in March 2023 shows a total of 8,643 buses in operation with the last diesel bus having been registered in 2020.²⁶

Figure 5: Putney High Street nitrogen dioxide annual mean concentrations 2011 to 2023

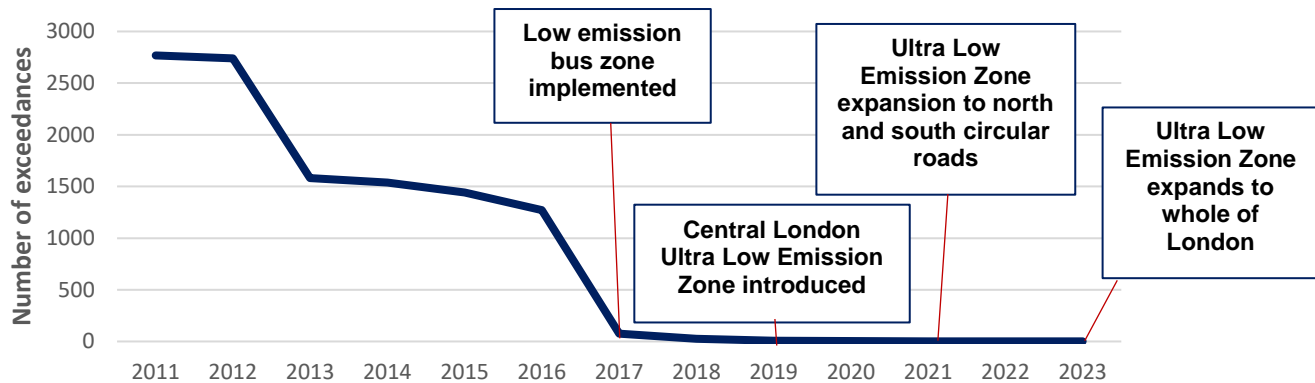


²⁴ <https://tfl.gov.uk/modes/driving/ultra-low-emission-zone>

²⁵ <https://tfl.gov.uk/info-for/media/press-releases/2023/august/london-reaches-major-milestone-with-more-than-1-000-zero-emission-buses>

²⁶ <https://content.tfl.gov.uk/fleet-annual-audit-report-31-march-2023.pdf>

Figure 6: Putney High Street nitrogen dioxide hourly exceedances 2011 to 2023



Source: London Air Quality Network

SUPPORTING THE COST OF ZERO EMISSION BUSES

In March 2021, the government published the Bus Back Better Strategy, in which they committed to £3 billion in funding.²⁷ The strategy also committed to a reform of UK bus services, moving away from the deregulated services put in place in 1986²⁸ towards a national bus service. The proposed new national approach borrows heavily from the existing London model, promoting enhanced partnerships and franchising through Mayoral authorities.

Bus operators have had access to funding for zero emission buses, plus charging and refuelling infrastructure, since 2009 through the Green Bus Fund²⁹, then subsequently through the Ultra Low Emission Bus Fund and now the Zero Emission Bus Regional Area fund (ZEBRA). In addition, the bus service operators grant (BSOG) and bus service improvement plan funding (BSIP) provides operators with further incentives for providing community services by allowing operators to recover some of their fuel costs. Tables 1 and 2 below show the funding awarded for buses in England and Scotland. It should be noted that the figure shown for the number of vehicles funded reflects what was proposed by government, and may be slightly different to the actual number of buses delivered through each scheme.

²⁷ <https://www.gov.uk/government/publications/bus-back-better>

²⁸ <https://researchbriefings.files.parliament.uk/documents/SN01534/SN01534.pdf>

²⁹ <https://www.gov.uk/government/speeches/green-bus-fund>

In 2019, the government committed to funding 4,000 zero emission buses. Progress has been made towards this target but the process requires simplification to support operators and local authorities in their deployment of zero emission buses as soon as possible. 4,000 buses represents 8% of the volume for scheduled services. This is a good start, but smaller operators will still require support for infrastructure at least.

The majority of zero emission buses in operation have been purchased with the support of government incentives and have been taken up by the Big Five operators. The ZEBRA funding programme is welcome. However, the first round saw delays to the allocation of this funding, which has resulted in older buses being on the road for longer than necessary. The second phase of the ZEBRA funding programme is now underway and we expect to see a more streamlined and efficient process that supports zero emission buses being deployed as quickly as possible.

Table 1 England bus funding

Funding Scheme	Funding Period	Total Funding Award	Total No. of Vehicles Funded
Green Bus Fund	2009 - 2015	£90 million	1240
Low Emission Bus Scheme (LEBS)	2015 – 2017	£43 million	484
Ultra Low Emission Bus Scheme (ULEBS)	2017 – 2020	£50 million	309
All Electric Bus Town	2020	£50 million	300 (ZEB only)
ZEBRA 1 Fast Track	2021 - 2022	£71 million	335 (ZEB only)
ZEBRA 1 Standard Track	2021 – 2022	£198 million	819 (ZEB only)
ZEBRA 1 Scope Extension	2023	£25 million	135 (ZEB only)
ZEBRA 2	2023	£129 million (TBC – March 2024)	955 (ZEB only)

Table 2 Scotland Bus funding

Funding Scheme	Funding Period	Total Funding Award	Total No. of Vehicles Funded
Scottish Green Bus Fund 1-8	2011 - 2018	£17 million	347
Scottish Ultra Low Emission Bus Scheme (SULEBS) 1	2020	£10 million	57
Scottish Ultra Low Emission Bus Scheme (SULEBS) 2	2021	£40.5 million	215
ScotZEB Challenge Fund Phase I	2023	£62 million	276
ScotZEB Challenge Fund Phase II	2023 – 2024	£58 million (TBC – February 2024)	TBC – February 2024

Contracts awarded to bus operators are often short and do not allow sufficient time to ensure a return on investment for transitioning to zero emission buses. A holistic funding mechanism which considers incentives for vehicles, infrastructure and also the overall business plan should be in place. A five year funding framework to secure bus services and support decarbonisation will bolster confidence in the UK bus industry and allow manufacturers and operators to plan resources and scale up as necessary.

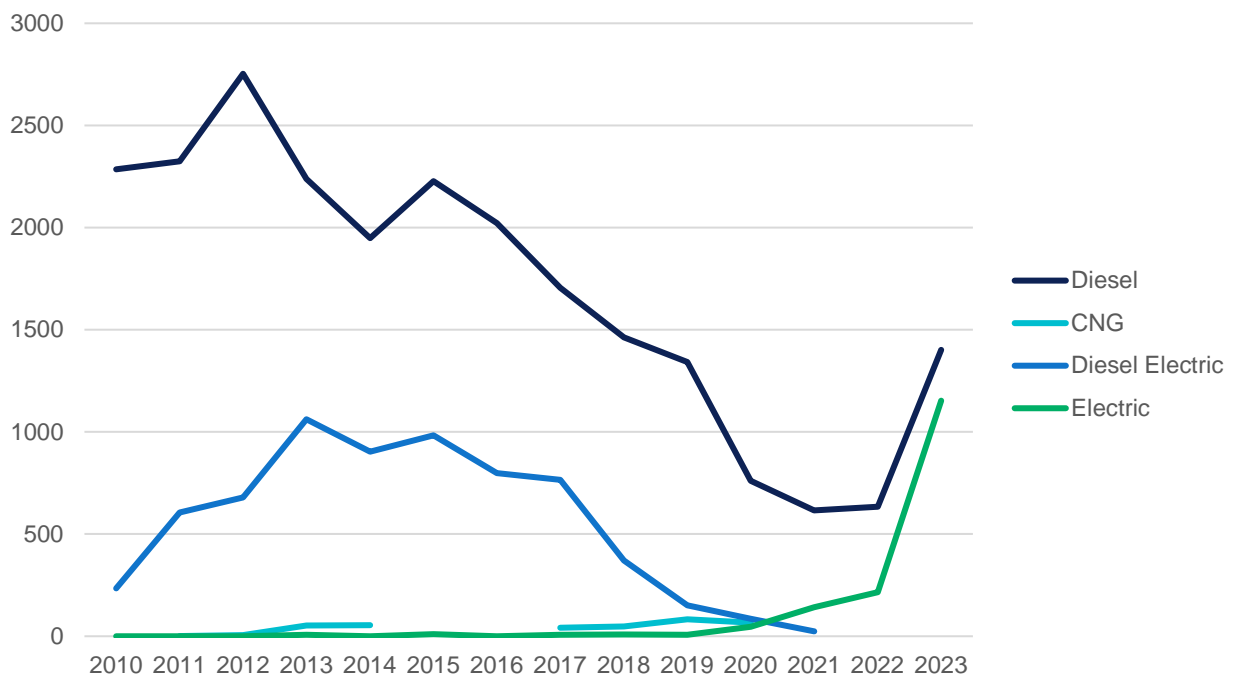
Government should carry out a review of funding, including how and where it is allocated, to create a strategic, streamlined and collaborative process between central government, local authorities, bus operators and manufacturers. This plan should include how infrastructure funding for smaller operators will be distributed.

Registration data shows a clear link between funding and alternative powertrain investment. The introduction of funding led to a clear decline in diesel registrations and a preference for hybrid and, subsequently, zero emission vehicle technologies. Hybrid registrations ceased once funding was provided only for zero emission vehicles.

Supportive policy, alongside funding, is vital to ensure all our bus services are not only zero emission but commercially viable, ensuring the bus is the first choice for public transport. The short term nature of local authority contracts for procuring bus services, do not provide for creating a robust business plan to support operator investment into zero emission buses. Smaller operators will require more support to ensure they are able to remain competitive as the sector decarbonises. These smaller operators are more likely to buy second hand vehicles, but will still require funding for charging and refuelling infrastructure at the depot.

Government should provide certainty on the end of sale date for new, non-zero emission buses, identifying all appropriate enabling conditions in consultation with industry. This will give confidence to manufacturers and empower operators to develop and bring forward plans to decarbonise their fleets.

Figure 7: Bus registrations by fuel type 2008 to 2023



SUPPORTING THE ROLLOUT OF CHARGING AND REFUELLING INFRASTRUCTURE

SMMT welcomes the financial support provided to operators to cover 75% of the cost of installing their charging and refuelling infrastructure. Larger operators able to apply to the funding schemes and make the additional investment themselves will accelerate their fleet renewal to zero emission buses.

However, smaller bus operators do not have the resources to be able to renew their fleet as quickly or install charging in the same way. Even in areas where there are sub-regional transport boards, the funding mechanisms do not exist in the same way as they do in London.

Charging and refuelling infrastructure remains a challenge for decarbonising all vehicle types. In the bus sector, the primary point of charging and hydrogen refuelling is likely to be in the depot, requiring significant investment to install the necessary infrastructure. Zero emission bus operation in some areas of the UK is hampered by the limitations of the local electricity grid and the high cost of upgrades where necessary.

Using data provided by the traffic commissioner, SMMT estimates there to be 1,206 depots in the UK utilised by scheduled bus services, covering 45,868 buses. The installation of infrastructure at depots remains challenging in many cases, hampered by a lack of access to energy and unhelpful local planning policy.

Table 3: Depots and buses used for scheduled services

Traffic Area	No of depots	No of buses
Scotland	203	6,120
North West of England	191	6,088
North East of England	182	4,393
West of England	173	6,815
East of England	152	5,416
Wales	111	3,316
West Midlands	103	3,755
London and the South-East	91	9,965
TOTAL	1,206	45,868

The process for securing additional grid capacity at depots varies, depending on which DNO is responsible for the upgrade. The cost of connections varies across the country but is often significant. To support operators with the installation of charging and refuelling infrastructure, a standard process for installing charging infrastructure at depots should be developed in partnership with industry, DNOs, local authorities and transport authorities when relevant.

Furthermore, installing charging infrastructure at depots requires significant space. This has led to a reduction in vehicles that may be parked within the site of approximately 15%. This has a great impact on services and may restrict the operator from fulfilling the public transport needs of the area.

Government should act to support consistent implementation of local planning policy to ensure smooth and efficient processes for installing infrastructure. This could be considered as part of guidance provided within the National Planning Policy Framework.

Government should commission research on charging infrastructure at bus depots to maximise space and eliminate the need for a reduction in fleet size. Through this research, government should identify and share best practice examples of innovative depot charging solutions. This would help to ensure bus services are not reduced as a result of decarbonisation.

SUPPORTING A TECHNOLOGY NEUTRAL APPROACH TO DIFFERENT USE-CASES

Charging solutions for buses should have some degree of flexibility and not be limited to set use cases. Many buses are used for excursions and private hire and will require a different charging solution to a bus operating a scheduled service. Charging for scheduled services will mostly use depot based infrastructure.

For longer and rural routes, hydrogen buses may be the best solution. However, the number of public hydrogen refuelling stations in the UK remains inadequate, with only nine to support a growing fleet of zero emission HDVs. Like their EV counterparts, hydrogen buses will also require depot refuelling to maintain a reliable public transport service. Barriers to installing infrastructure for hydrogen continue to present significant challenges for operators and are, in many cases, only deemed appropriate based on the location of the depot.

With the opportunities available for sharing infrastructure at bus depots, the depot itself could act as a transport hub and allow other commercial operators the opportunity to refuel.

Government should commit more funding to and speed up the commencement of multiple hydrogen transport hubs across the UK. It should map out a foundation network of national hydrogen refuelling infrastructure and develop a rollout strategy, taking into account transmission requirements and options. Alongside this, the national planning process for the hydrogen refuelling station network must be improved and streamlined.

A STRATEGIC AND SHARED APPROACH TO INFRASTRUCTURE

The government's infrastructure strategy published in March 2022 does not address the needs of buses or other HDVs. In October 2023, it launched a call for evidence on infrastructure for zero emission heavy goods vehicles and coaches and committed to publishing this strategy in Spring 2024. This strategy should also consider buses and include a plan for providing charging and refuelling infrastructure at bus depots. The plan should review the current available energy across the UK and highlight where additional power demand will be by 2030 and set out a plan for how this energy will be provided.

Government should, as a matter of urgency, bring forward its promised national charging infrastructure strategy for HDVs, covering both depots and public locations. The strategy should include details on how operators will be supported with energy connections and a plan for shared charging and refuelling infrastructure. This strategy should review the currently available energy across the UK and highlight where additional power demand will be by 2030, setting out a plan for how this energy will be provided.

Locations of bus depots are spread throughout the country in all towns and cities and provide an ideal location for charging and refuelling of other commercial vehicles. SMMT's position paper on charging and refuelling for heavy duty vehicles published in April 2023³⁰ makes a recommendation for a **mechanism for shared charging to be in place**. Upgrading grid connections for every single depot across the country may not be feasible but sharing charging facilities can provide a cost effective solution for commercial fleets. This is already taking place in some locations.³¹

The maps below show the locations of bus depots in each traffic area as defined by the traffic commissioner³². **A detailed review of locations that may be suitable for sharing charging and refuelling facilities should be undertaken to determine accessibility for HGVs and other commercial vehicles.** The location of bus depots in many cases is ideally located to support other commercial vehicles.

A mix of charging and refuelling solutions will be required to support all bus use cases. Opportunity charging may be required in the public realm for some services and providing this requires significant consultation with local authorities, highways authorities, DNOs and local residents and businesses.

³⁰ <https://www.smmt.co.uk/2023/04/zero-emission-hgv-market-shackled-by-absence-of-infrastructure-and-lack-of-plan/>

³¹ <https://news.firstbus.co.uk/news/first-bus-and-openreach-announce-powerful-new-electric-vehicle-charging-partnership>

³² <https://www.gov.uk/government/organisations/traffic-commissioners>

This will require guidance and a streamlined planning and highway licensing process that is consistent across the UK.

Figure 8: Bus depots - North

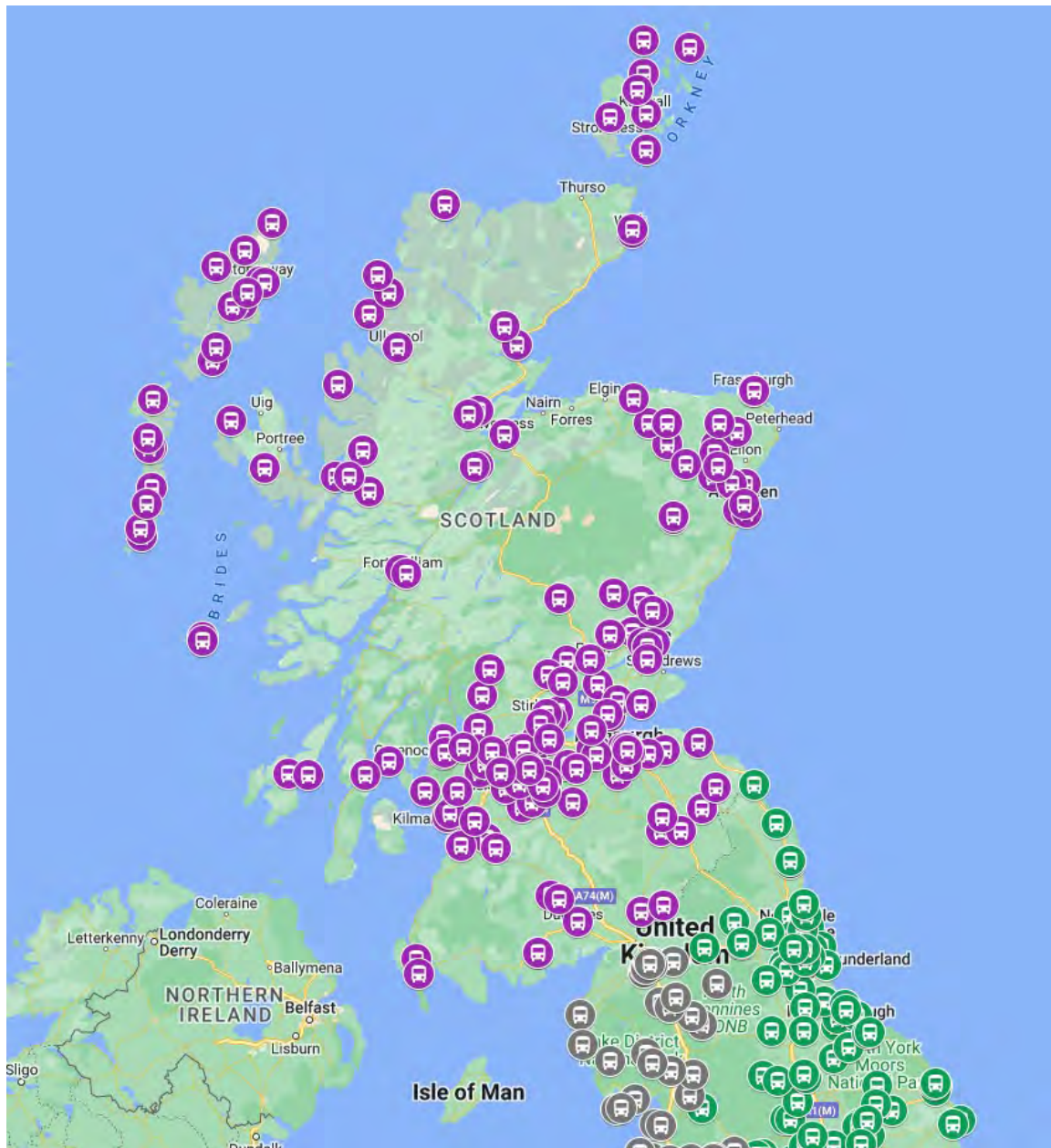
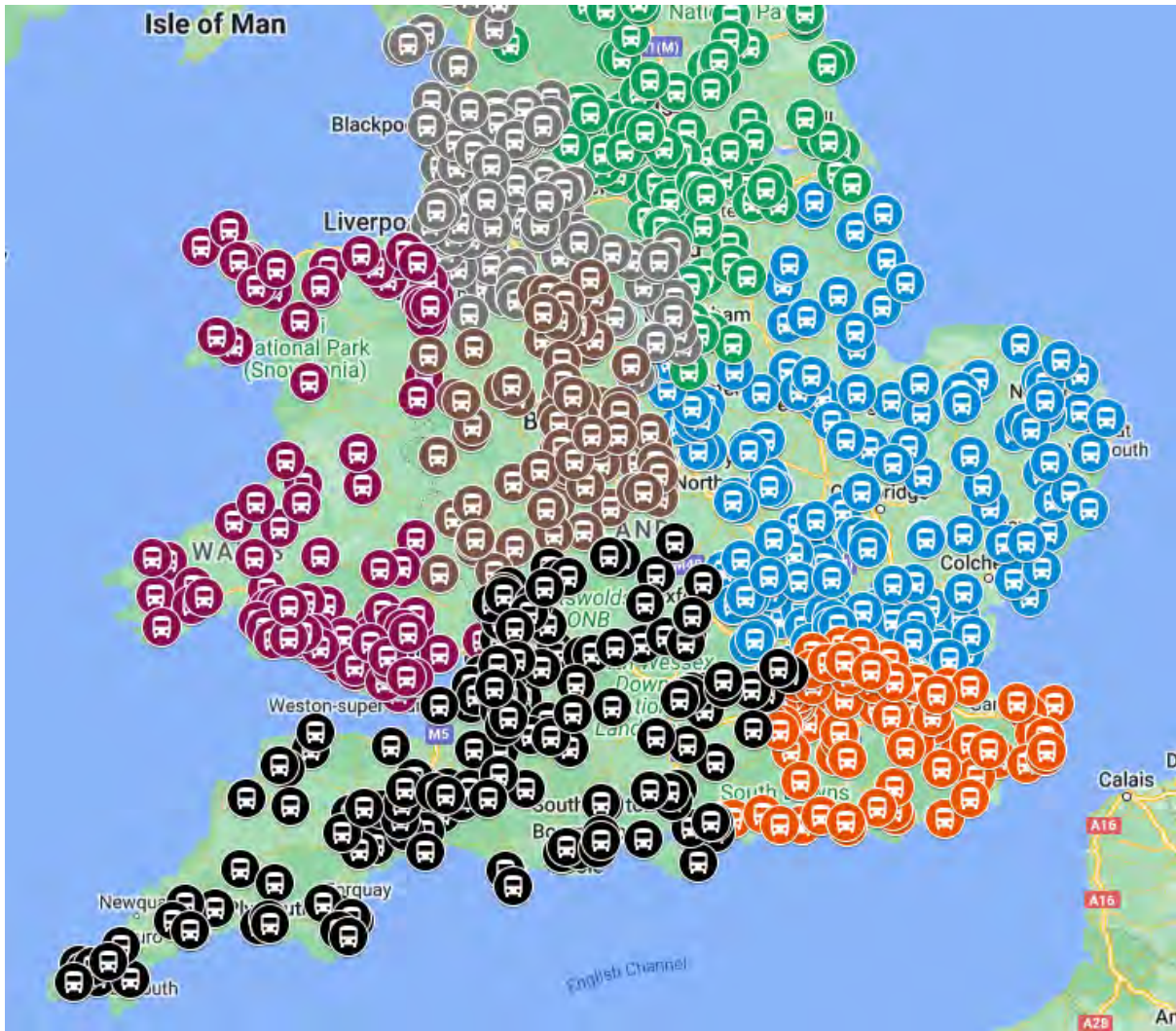


Figure 9: Bus depots - South



CONCLUSION

The bus provides essential services for both leisure travellers and commuters and is the backbone of the UK's public transport network across the majority of towns and cities. In order to achieve the ambition of transport decarbonisation by 2050, the bus should be recognised as a vital part of sustainable mobility.

Bus patronage has declined significantly in recent years for various reasons, including the Covid-19 pandemic. This has led to operators having to delay decarbonisation plans. While these plans are now progressing, there remain challenges for smaller operators.

Bus manufacturers are continually improving their product for bespoke local authority requirements and provide a comfortable zero emission transport solution that will contribute significantly to meeting environmental ambitions by 2050. For operators to be able to invest in new vehicles and associated infrastructure, long term, commercially viable contracts must be in place.

Incentives provided for both vehicles and infrastructure have supported the growth of the zero emission bus market to 45% of new registrations. Learning from the deployment of zero emission buses and installing infrastructure should be applied to the remainder of the commercial vehicle sector.

Infrastructure for charging and refuelling remains a challenge but for bus operators there is greater potential to share facilities with other commercial vehicle operators. **The geographically widespread locations of bus depots close to urban and populated rural areas allows for collaboration with the freight sector and this should be explored further to develop a business model for operators to provide access to charging and refuelling infrastructure.**