



Coach Route Map to Destination Zero



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the UK
forward





Coach Route Map to Destination Zero

CONFEDERATION OF PASSENGER TRANSPORT

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Foreword from the Chair of the Zero Emission Coach Taskforce

It has been an extremely productive year for the Zero Emission Coach Taskforce, one that has taken us on a journey from the near impossible and delivered us to a place where a future with zero emission coaches feels challenging but achievable. This is only the first stop of many on our long road to destination zero and this report outlines the supportive measures required to deliver a sustainable roadmap for coach operators. I am thrilled to have been at the forefront of this innovative and proactive project, which has brought together multiple industry experts to identify the measures I believe will secure a green future for our coach sector.

In July 2022, the taskforce successfully launched its first report, [What are the Challenges to Transitioning to a Zero Emission Coach Fleet?](#) which outlined the barriers facing the coach sector on its road to destination zero. Building on this work, the taskforce started phase two of the project in September and set out to identify possible solutions, establish collaborations with other key stakeholders and agree a list of commitments for both government and the sector that would ensure a workable transition to zero emission technologies.

Collaborations between the freight sector, manufacturers and technology developers, financiers and training providers, to name a few, were established and I very much look forward to further strengthening these in the future.

I am reassured by the continued level of engagement and support from members of the taskforce, those who have been with us since the beginning, and those who have joined us along the way. I would personally like to thank everyone for their unrelenting enthusiasm and participation, for providing their valuable knowledge and time. However, our work does not stop here, we have some challenging years ahead of us, but I am confident that together we will ensure that the correct supportive measures are in place that will enable the coach sector to reach destination zero.

Sincerely,

Ian Lockett
Lockett's Coaches
Chairman of the Zero Emission Coach Taskforce



About CPT

We help a dynamic bus and coach industry to provide better journeys for all, creating greener communities and delivering economic growth.

We do this by representing around 900 members from across the industry be they large or small, bus or coach, operator or supplier. We use our influence to campaign for a supportive policy environment, give our members practical advice and support to run their businesses safely, compliantly, and efficiently and bring the industry together to share ideas and best practice. We are ambitious to make things better for passengers, inclusive in seeking out different perspectives and we are always there when our members need us.

Executive Summary

Coaches provide a convenient, accessible and sustainable travel option. They help people to access education, employment and holidays and combat social exclusion. They are capable of carrying huge numbers of passengers; they transport 600,000 children to school every day and delivered 23 million visits to tourist locations in 2019, contributing £14 billion to the UK economy.¹

There are circa 2,500 coach operators in the UK, 81% of which are family or individually owned, often with multiple generations working for the business and deeply embedded in their communities. Together these businesses provide 42,000 jobs across the country.²

Coach travel is already one of the most sustainable and environmentally friendly ways to travel, with average carbon dioxide emissions per passenger per journey around 1.5 times lower than rail, 5 times lower than air and 6 times lower than car travel.³ Just one coach can remove up to 50 cars from the road which can significantly reduce congestion and the harmful nitrogen oxides emissions (NOx) created.

That being said, coach operators are dedicated to delivering a service to passengers that is continuously improving and recognise that the future of road transport is with zero emission vehicles. The sector is committed to playing a proactive role in the transition, which is why we established the Zero Emission Coach Taskforce (ZECT) in December 2021 at our *Decarbonising Coach Conference*. This brought together key stakeholders including coach

¹ CPT Research 2020

² CPT Research 2020

³ BEIS/Defra greenhouse gas conversion factors 2019



operators, manufacturers, government observers, infrastructure and finance providers⁴ all determined to deliver a workable solution for industry.

Phase 1 of this work identified the challenges facing coach operators that need to be overcome in order for them to sustainably transition to zero emission technologies.

In phase 2, the taskforce set out to explore and identify potential solutions and establish collaborations with other key stakeholders that would enable the coach sector to overcome the challenges. It then looked to outline what the sector, government and other stakeholders need to do to enable a sustainable transition to zero emission coaches. The outcomes of these discussions and our proposed next steps are the subject of this report.

To begin its journey towards destination zero, the coach sector commits to:

- Using the lowest carbon fuel practicable
- Retrofitting the existing fleet where appropriate, to enable the use of low carbon fuels, including hydrogen as a combustion fuel
- Developing a specification for a zero emission coach
- Participating in zero emission coach trials and partnering with manufacturers to develop and trial new technologies
- Providing data to demonstrate the benefits of increasing the maximum axle weights
- Providing operational data to the BluMarbl project and exploring funding options to deliver the project's objectives in their entirety to produce data on how coaches travel and make recommendations for infrastructure investment
- Providing data to develop case studies so that both government and manufacturers can better understand how zero emission coaches operate
- Developing an online toolkit to help operators transition to zero emission vehicles
- Working with CPT and training providers to develop a zero emission course for drivers
- Ensuring that local emergency services know how to safely recover passengers from a zero emission coach in the event of an accident
- Collating a map of existing and planned electric and hydrogen infrastructure that will support coaches
- Where possible, enabling vehicles owned by other operators to access recharging or refuelling infrastructure at coach depots, to help create a reliable refueling network
- Participating in a pilot to test the proposed financial interventions

⁴ Appendix 1



- Investing in zero emission vehicles as the market develops and funding is made available

In order to ensure the coach sector can sustainably decarbonise, we call on the Government to support the industry by:

- Providing clear direction over its net zero policy, including key dates and measures to support the transition of the coach sector
- Consider introducing a fuel duty incentive for low carbon fuels, based on the level of carbon savings, that will help the sector reduce the carbon emissions of the current fleet
- Ensuring that the future demand for hydrogen from coach operators is considered in the UK's Hydrogen Strategy to provide certainty over supply and ensure that coach operators can purchase green and affordable hydrogen
- Installing hydrogen and electric refuelling/recharging infrastructure across the strategic road network and at tourist locations to support coaches. The first step could be the expansion of Project Rapid which supports heavy duty vehicles
- Explore the potential to increase the allowable axle weight for coaches to offset the payload lost from the increased weight of the zero-emission power train
- Providing funding for zero emission coach trials, including both electric and hydrogen vehicles and infrastructure solutions
- Ensuring that any grant funding to help the investment in zero emission coaches and supporting infrastructure is accessible to all operators across the UK
- Exploring the potential to offer the sector residual value guarantees that will help them to secure affordable finance packages
- Using the zero emission coach certification scheme as a way of allocating available funding to support the roll out and development of zero emission vehicles
- Helping to identify funding streams which can support the BluMarbl data project which aims to
 - Collate robust data on the coach sector to support manufacturers and the development of zero emission technologies
 - Identify where coaches are travelling to make recommendations for infrastructure locations
 - Help operators identify which services can be delivered on a zero emission vehicle now and what is needed for the remaining services

We are dedicated to supporting the coach industry in its transition to zero emission vehicles and will continue to work with government and other key



stakeholders to enable the sector to play its part in meeting the country's net zero carbon targets.

Transitional Solutions

Low Carbon Fuels

Low carbon fuels have been identified as a transitional solution that will enable coach operators to significantly reduce the carbon emissions of their existing fleet, with little or no engine modifications, whilst they wait for the development of hydrogen coaches and improvements in electric battery range. Biodiesel and Hydrotreated Vegetable Oil (HVO) are the two best options for coach operators due to their similarity to diesel.

Biodiesel is already present in small percentages in regular diesel; common blend strengths include B20, B30 and B100. It is currently deployed in 8,000 buses across the UK and 300-600 trucks. Fleet operators would need confirmation from manufacturers that it would be suitable for their vehicles, and higher blends require engine modifications. The average greenhouse gas emissions reductions will vary depending on the feedstock and final blend, with B100 delivering a saving of 89% and B20 delivering 17%.

HVO is a paraffinic fuel and is classed as a drop in fuel due to its ability to be added straight into an Internal Combustion Engine (ICE) vehicle without any engine modification. HVO has been shown to reduce greenhouse gas emissions by over 90%.⁵

Case Study – HVO Trial

In 2018, Scania carried out a trial using HVO in collaboration with Lockett's and National Express, to demonstrate how much carbon could be saved if operators used HVO instead of diesel in their operations. All of Scania's engines from Euro IV onwards can be operated using HVO in the same way as diesel, without any engine modifications. The trial was carried out with 14 vehicles, 7 fuelled with diesel and 7 fuelled with HVO, which were operated across two routes – Portsmouth to London and Portsmouth to Brighton. A temporary refuelling station was set up at Lockett's Fareham depot.

Testing took place at Millbrook testing ground and found that HVO could reduce carbon emissions by over 90% when compared to diesel, with one coach saving 180 tonnes of CO₂e per annum. HVO also reduced NO_x emissions by 10-29%. The running costs for HVO were shown to be between 5-10% higher at the time of the trial, however there were reductions in the maintenance costs due to HVO burning cleaner, producing less soot and extending the period between oil changes.

⁵ Decarbonising Coaches, HVO Trial Evaluation: Scania, Lockett's Travel and Green Biofuels, October 2018



Low carbon fuels are more expensive than diesel and have a lower energy intensity meaning that more is required to cover the same distance as diesel. Introducing fiscal incentives that reduce the cost of low carbon fuels to lower than, or in line with, diesel would make the fuels more affordable and help encourage operators to switch, whilst also helping reimburse for the lower energy content. This has already been demonstrated with biomethane which receives a fuel duty discount that has been highly influential in helping long haul HGV operators switch to using biomethane in their gas trucks.⁶

We support Zemo Partnership's call for a fiscal incentive to be introduced that would offer a discount in fuel duty based on the greenhouse gas emission reductions achieved. This will improve the business case for low carbon fuel for use in heavy duty vehicles.

Hydrogen as a Combustion Fuel

Hydrogen can be used as a combustion fuel in an ICE vehicle which operates in a very similar way to diesel engines, with comparable reliability and durability. Cummins have developed solutions which use hydrogen as a combustion fuel for the freight sector, and JCB have developed such solutions for construction vehicles.

Hydrogen used as a combustion fuel could be a beneficial transitional solution for coaches. Whilst it is not completely zero emission, it is significantly greener than diesel. Engines would need to be modified to be able to run using hydrogen, but this is still expected to be a more affordable and, at present, more viable option than purchasing a new, zero emission vehicle.

Supporting the use of hydrogen as a combustion fuel could help to kickstart the demand for hydrogen from other sectors, create the necessary infrastructure and develop a sustainable supply chain for the production of green, affordable hydrogen.

Retrofit and Repower Technologies

Technology providers including Equipmake and Kleanbus have developed electric modular systems which offer a repowering solution for vehicles and enable ICE vehicles to be converted to an electric powertrain. They have already successfully integrated these systems into buses and offer solutions for trucks and heavy commercial vehicles.

⁶ Market Opportunities to Decarbonise Heavy Duty Vehicles Using High Blend Renewable Fuels, Zemo Partnership, March 2021



Retrofit and repower solutions are 50% cheaper than purchasing a new zero emission coach and could provide a more affordable option, particularly for smaller coach operators with less investment capital and operators whose vehicles are reasonably new and would not lend themselves to being scrapped. Repowering solutions also typically take less time than ordering zero emission vehicles, with the conversion of the first vehicle estimated to take 6 months and subsequent versions ready within 2 weeks. Additionally, reusing the chassis and body of existing vehicles further reduces carbon emissions.

Operators are collaborating with technology providers to further develop these repowering solutions, and we are aware of an ongoing project to repower a Van Haul coach with a repower modular solution that will deliver a greater range than the current 220 miles achieved, with no reduction in payload.

The identified solutions will:

- Provide an affordable solution, particularly for smaller operators, and enable them to reduce the emissions of their existing fleet whilst the second hand market for zero emission coaches develops
- Enable coach operators to significantly reduce the greenhouse gas emissions of their fleet now, whilst they wait for zero emission technologies and infrastructure to further develop

Commitments

Industry commits to:

- Using the lowest carbon fuel practicable
- Retrofitting vehicles where possible to enable the use of transitional technologies

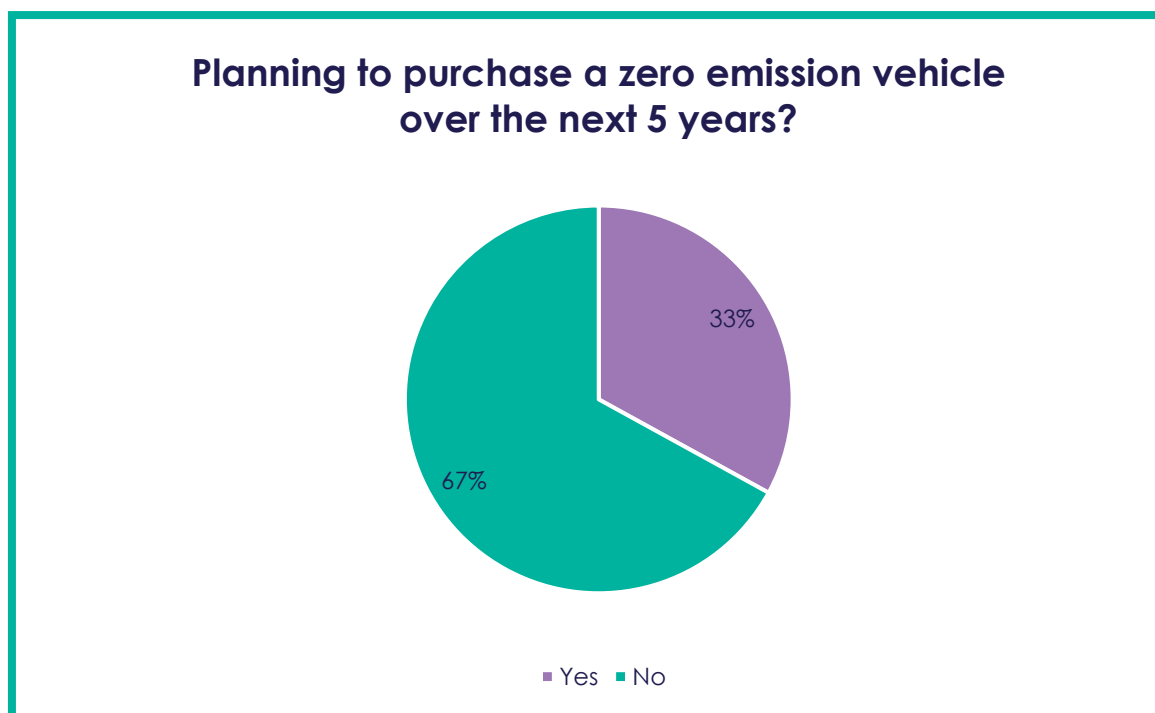
In return, we call on the Government to:

- Support the use of transitional solutions that enable operators to significantly reduce the carbon emissions of their current fleet by introducing a fuel duty incentive that rewards the greenhouse gas reductions achieved by low carbon fuels



Vehicle Solutions

The taskforce identified the high level of uncertainty regarding the performance and suitability of zero emission technology as the most significant challenge facing the sector.



Graph 1 – Operators planning to purchase a zero emission vehicle over the next 5 years.

Out of the sample of operators surveyed, only 33% said they were considering purchasing a zero emission vehicle over the next 5 years, and the uncertainty over zero emission technology was identified as the second largest barrier to growth of the industry after driver shortages.⁷

Zero Emission Vehicle Trials

Zero emission coach trials would enable operators to observe how the vehicles perform operationally in a real world setting and would help mitigate uncertainty. The trials would give them more clarity over the range achieved by the vehicles and the services that can be provided using the technology currently available. They would be able to experience how the vehicles drive, how they refuel and how passengers react to them. Trials can also help to identify where infrastructure is required and help manufacturers make improvements.

⁷ CPT Coach Operator Survey 2023



Coaches are similar to freight vehicles in that they are heavy and travel long distances, and the challenges facing them are very similar. The Government has provided £140 million to deliver trial and demonstrator projects that will help accelerate the rollout of zero emission road freight vehicles. These studies are expected to help design and develop cost effective zero emission heavy goods vehicles as well as provide essential data on the required recharging and refuelling infrastructure. For coach operators to begin investing confidently in zero emission vehicles, we need the Government to invest in a similar project for coaches.

Case Studies and Cost Information from Operators of Zero Emission Vehicles

Zemo figures estimate that, since 2019, just over 50 zero emission coaches have been ordered in the UK and almost half are in service. In addition to vehicle trials, to provide clarity to the coach sector, the taskforce will work with these operators to collate case studies which show the realities of operating a zero emission coach, including:

- The benefits of a zero emission coach, including driver and passenger reactions
- Challenges and how these were overcome
- Cost information on purchasing, maintenance and running costs so that prices can be compared between a standard diesel ICE coach and a zero emission coach
- The process of installing infrastructure

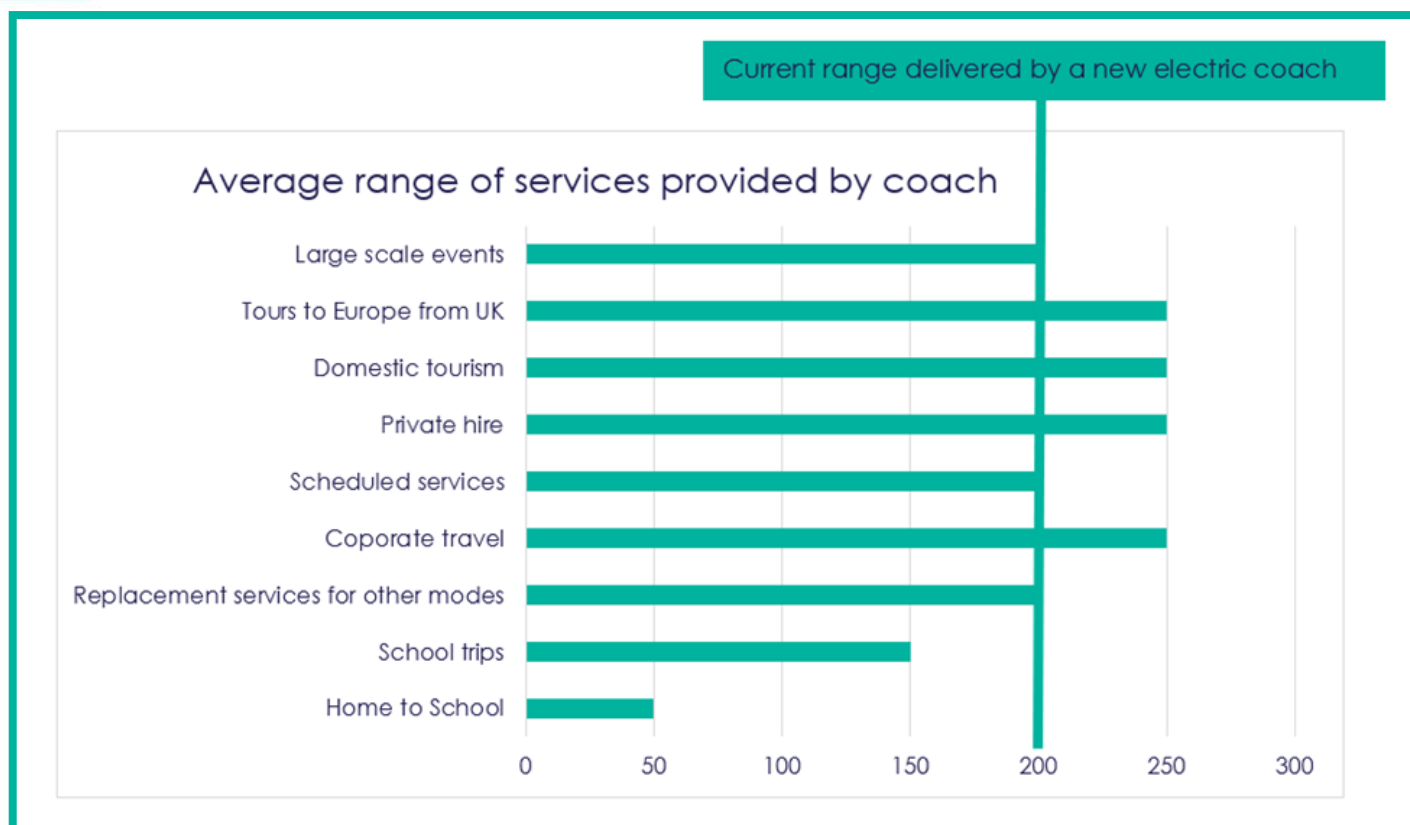
This will provide vital information on how these vehicles operate in a real world setting, the range achieved in different weather conditions, any reductions in luggage and passenger capacity, running and maintenance costs and their required infrastructure. This data is also needed to help lenders better understand the overall affordability of zero emission coaches and enable them to facilitate credit applications.

Development of Hydrogen Coaches

The only zero emission technology currently available for coaches is battery electric, with one vehicle and some electric repowering solutions available for purchase. Currently this technology can deliver an average range of 200 miles on a single charge.

Graph 2 shows the ranges for the services currently provided by coach operators, which vary between 50-250 miles.⁸

⁸ CPT Coach Operator Survey 2022



Graph 2 – Average range of services provided by coach in miles.

Whilst these electric solutions will provide a suitable zero emission option for some operations, with coach operators estimating 50% of their services could be delivered on current technology,⁹ a solution that provides a greater range is needed in order to ensure 100% of services can transition.

Hydrogen fuel cell vehicles are capable of delivering a range close to that achieved by diesel and refuel in a similar way, meaning they could provide a vital zero emission solution. This would be particularly beneficial for operators who provide longer distance services and those that operate in more rural areas where the range of an electric vehicle is currently a barrier.

⁹ CPT Coach Operator Survey 2023

Operator Example

Hydrogen is expected to play a vital role for scheduled coach operations, which on average cover 200-250 miles per service, with multiple services completed in a day, making the required range closer to 500 miles. These services will have limited opportunities to charge in between services as drivers are swapped out in order to keep the vehicles moving, meaning the option to charge whilst the driver takes a break is not suitable for these operations .

However, there currently is not a hydrogen fuel cell coach available for operators to purchase. Sustainable and green hydrogen is expensive to produce and is difficult to transport after production. A reliable supply chain of hydrogen must be developed before we see a demand for these vehicles and manufacturers look to develop a solution.

We support the ambitions set out in the Government's UK Hydrogen Strategy¹⁰ which recognises that low carbon hydrogen is going to be essential for achieving net zero. A whole system approach is needed which provides a long term and sustainable hydrogen supply chain that includes coaches and considers the future demand from other sectors including aviation and maritime.

Specification for a Zero Emission Coach

One of the main challenges facing coach manufacturers is the lack of robust data on the coach sector and how it operates. Coaches deliver a multitude of services, of which the range covered, passengers carried and luggage requirements all vary. Our recent coach operator survey found that 72%⁴ of operators' fleets will deliver a combination of two or more services. For example a coach could deliver home to school services and then go on to deliver private hire services.

Manufacturers must therefore develop a zero emission coach that is flexible and suitable for as many services as possible as well as meeting the needs of a global market with varying legislation.

Currently, there is only one zero emission coach available on the market for operators to purchase. Whilst a few operators have successfully integrated this into their fleets, the range capacity of the vehicles is not currently sufficient for all services, and the reductions in passenger and luggage capacity is making it difficult for most coach operators to invest.

¹⁰ [UK Hydrogen Strategy \(publishing.service.gov.uk\)](https://publishing.service.gov.uk)



The taskforce will therefore develop a specification that will outline what a zero emission coach needs to deliver in order to be a viable investment. This specification will then be shared with manufacturers to help them to further develop their zero emission offerings.

The specification will provide clarification over:

- Required range
- Required passenger capacity
- Required luggage capacity
- PSVAR considerations

BluMarbl Data Project

BluMarbl, in collaboration with Zenobe, has designed a project which uses coach operators' tachograph and telematics data to collate operational information on the coach sector. There is currently very limited up to date information available on the coach sector and how it operates and this will be a vital project to informing the sector's decarbonisation journey.

BluMarbl has kickstarted the project by developing an interface that will enable them to collect operator telematics data from multiple telematic providers. Additionally, they have processed data from 14 operators so far to determine a baseline, and give a basic overview of which journeys could be completed with the current zero emission vehicle available.

The project aims to;

- Collect robust and up to date operational information on the coach sector which will help manufacturers develop zero emission technologies. This data will also provide a valuable insight for policy makers into how the coach sector operates and the services delivered
- Develop a complete map of where coaches are travelling to and the ranges of these journeys to assist recommendations for future infrastructure investments, such as Project Rapid and to incentivise attractions across the UK to install charging infrastructure
- Identify which services can be delivered on a zero emission coach, and what is needed in order for the remaining journeys to transition
- Assess the benefits of increasing the axle weight and transitional solutions such as low carbon fuels
- Provide a toolset that operators of all sizes can use to analyse their work patterns and work requirements, compare the use of zero emission vehicles with their diesel equivalents including capital and operational costs and calculate return on investment



- This data will also provide a valuable insight for policy makers into establishing a fair subsidy that incentivises operators whilst also providing value to the tax payer

In order for the project to deliver these objectives, it will require further funding of £120,000.

We will continue to engage with key stakeholders including manufacturers and, finance and infrastructure providers to secure funding that can ensure this valuable data project is delivered.

Zero Emission Coach Certification Scheme

Zemo Partnership has developed an environmental certification scheme for zero emission coaches aimed at providing operators with the certainty that these coaches will achieve the emission savings stated by manufacturers in a real world setting.

Vehicles can be assessed across motorway, urban and rural drive phases. Varying vehicle speeds and driver behaviours are assessed to determine the range of the vehicles, their energy performance and the greenhouse gas emissions across each of the driving test cycles. From this, a standard is developed against which future vehicles can be assessed in order to gain a certificate.

Any manufacturers developing a new zero emission technology would have it tested at the Millbrook test centre and if it meets the specified standard it would gain a certificate confirming its environmental credentials. Manufacturers would then be able to continue producing vehicles to this standard without the need for further testing. This is expected to generate competition within the zero emission coach market. Zemo has developed a similar scheme for buses which has delivered incremental improvements in technology. It has been used as a way for government to allocate funding made available for zero emission vehicles, and is a key requirement for the ScotZEB Challenge Fund.

Zemo has yet to receive any funding to develop the scheme and is therefore pursuing this voluntarily. However with only one zero emission coach available on the market there is currently little demand from manufacturers to submit vehicles for testing.



Increasing the Axle Weight for Zero Emission Coaches

Zero emission powertrains are significantly heavier and require more space than standard diesel engines, causing a reduction in passenger and luggage capacity. Whilst the maximum gross vehicle weight for coaches was recently increased from 18 tonnes to 19 tonnes, the limits set for the axle weights remained the same, so that the front axle is limited to 8 tonnes and the rear axle is limited to 11.5 tonnes. This makes it difficult for manufacturers to ensure that the weight of the vehicle is equally distributed. Increasing the rear axle weight to 12.5 tonnes would make it easier for manufacturers to achieve a safe, balanced vehicle and help mitigate some of the reduction in payload.

Operator example

The TCe12 has a 50 seat capacity in England compared to 55 in Europe. This is due to regulations in England which enforce a lower axle weight than European regulations. If this was increased by 1 tonne, this could enable operators to carry an additional 5 passengers.

The identified solutions will:

- Reduce operator uncertainty over on how zero emission coaches operate and enable them to confidently make informed decisions on future vehicle investments
- Provide vital information to vehicle manufacturers on what a zero emission coach needs to deliver for operators and lead to further technological developments
- Provide information on how zero emission vehicles operate for finance providers that will enable them to develop affordable business cases for zero emission vehicles based on robust, operational data
- Identify strategic locations where infrastructure is needed to inform future investment
- Lead to the development of zero emission vehicles with greater range that will enable all the coach sector to transition to zero emission alternatives
- Help mitigate the reduction in payload caused by the increased weight of the powertrain



Commitments

Industry commits to:

- Participating in zero emission trials
- Providing data to demonstrate the benefits of increasing the maximum axle weights
- Developing a specification for a zero emission vehicle to be shared with manufacturers
- Providing operational data to the BluMarbl project and exploring funding options to deliver the project's objectives in their entirety to provide data on how coaches travel and make recommendations for infrastructure investment
- Providing data to develop case studies so that both government and manufacturers can better understand how coaches operate

In return, we call on the Government to:

- Explore the potential to increase the maximum axle weight for coaches to offset the payload lost from the increased weight of zero emission power train
- Expand zero emission freight trials to include coaches, enabling coach operators to trial both electric and hydrogen vehicles as well as the required infrastructure solutions. We believe that c.£50m would deliver this
- Ensure that the future demand for hydrogen from coach operators is considered in the UK's Hydrogen Strategy to provide certainty over the supply of hydrogen and ensure that coach operators can purchase green and affordable hydrogen
- Commit to using the zero emission coach certification scheme as a method to allocate available funding to support the roll out and development of zero emission vehicles
- Help to identify funding streams which can support the Blumarbl data project which aims to
 - Collate robust data on the coach sector to support manufacturers and the development of zero emission technologies
 - Identify where coaches are travelling to make recommendations for infrastructure locations
 - Help operators identify which services can be delivered on a zero emission vehicle now and what is needed for the remaining services



Infrastructure Solutions

Range anxiety when travelling away from depot was identified as the most significant infrastructure challenge. To operate their fleet confidently and efficiently, operators need a reliable network of charging infrastructure across the strategic road network. In a recent survey, operators confirmed that they would need recharging points installed no more than 160 miles apart in order to operate electric coaches confidently.¹¹

Additionally, operators will require depot recharging solutions. However, available space at their depots is often limited and not all operators own their depots. The inequality in grid supply across the UK will also make connections more problematic for operators in rural areas.

Investment in Hydrogen Refuelling Infrastructure

Whilst there are depot based solutions for hydrogen available, due to space limitations and many operators leasing their depots, we expect that most operators will be dependent upon public hydrogen refuelling infrastructure. We are aware that some buses are already running on hydrogen and that hydrogen trucks are expected to be available on the market from 2027. It is essential that refuelling stations are installed at strategic locations for all stakeholders.

Investment in Electric Recharging Infrastructure

The range achieved by existing electric battery solutions is not sufficient to deliver all services currently provided by coach operators. This is further impacted by the current lack of recharging infrastructure, making it impossible at present to deliver longer range services by an electric coach.

In order for the industry to confidently invest in and operate electric coaches, operators need a reliable and robust network of recharging infrastructure across the strategic road network and at end of destination sites, including popular tourist locations, hotels and sport stadiums.

Expansion of the Rapid Charging Fund

In 2020 the Government confirmed a £950 million Rapid Charging Fund to install a reliable network of rapid charging infrastructure across motorways and major A roads that will support electric cars and vans.

¹¹ CPT Coach Operator Survey 2023



National Grid conducted a feasibility study which showed that the £950 million combined with funding already committed to the Zero Emission Road Freight Trials would be sufficient to expand the scheme to include infrastructure to support heavy duty vehicles at the same time.

Installing infrastructure is an expensive and time-consuming process and therefore it would be beneficial, where possible, to 'touch the network once' and ensure that the infrastructure is future proofed for when heavier electric vehicles become available.

We are aware that, in the short term, there will be a need for operators to create a shared network of infrastructure whilst the public network develops. Shared sites where funding has been provided could be made available for other operators, including freight, buses and waste refuse vehicles where practical and safe to do so.

Map of Recharging and Refuelling Infrastructure

Operators of electric coaches who have attempted to use public electric charge points have reported this often results in annoyance from other road users due to the lack of space provided for larger vehicles. In order for coach operators to confidently invest and operate zero emission coaches it is important they can access charge points that can support their vehicles and that they know where they are located.

Online interactive maps already exist for cars and vans that show the locations of electric charge points. It is important that the same is provided for coach operators so that they can plan their routes and mitigate range anxiety. The Zero Emission Coach Taskforce will work to create a map which plots existing infrastructure for coaches and is regularly updated as more infrastructure is developed.

Online Toolkit for Operators

Installing infrastructure at an operator's depot is a complex, time-consuming and expensive process and involves operators engaging with multiple stakeholders.

For electric vehicles, operators would need to speak to their Distribution Network Operator to determine if there is sufficient electricity capacity within their area and potentially reinforce their electricity supply. Operators also need to consider how many vehicles need to be charged at a given time to be able to determine the right solution for their operations.



For hydrogen vehicles, there are a number of infrastructure solutions depending on the size of the operation, including hydrogen trailers for smaller operations, and gaseous and liquid solutions for larger operations, however these require significant depot space. Operators would also need to ensure they had a sustainable and affordable supply of hydrogen.

Due to the complexity and multiple moving parts involved in the process it will be important for operators to be able access the correct information in one place. We will therefore develop an online toolkit which will bring together best practise guidance documents, case studies and contact information to ensure operators can successfully and efficiently navigate the process.

The identified solutions will:

- Reduce range anxiety and enable more operators to invest in zero emission vehicles, particularly those who operate longer distance services
- Enable operators to confidently navigate the process of installing depot recharging solutions

Commitments

Industry commits to:

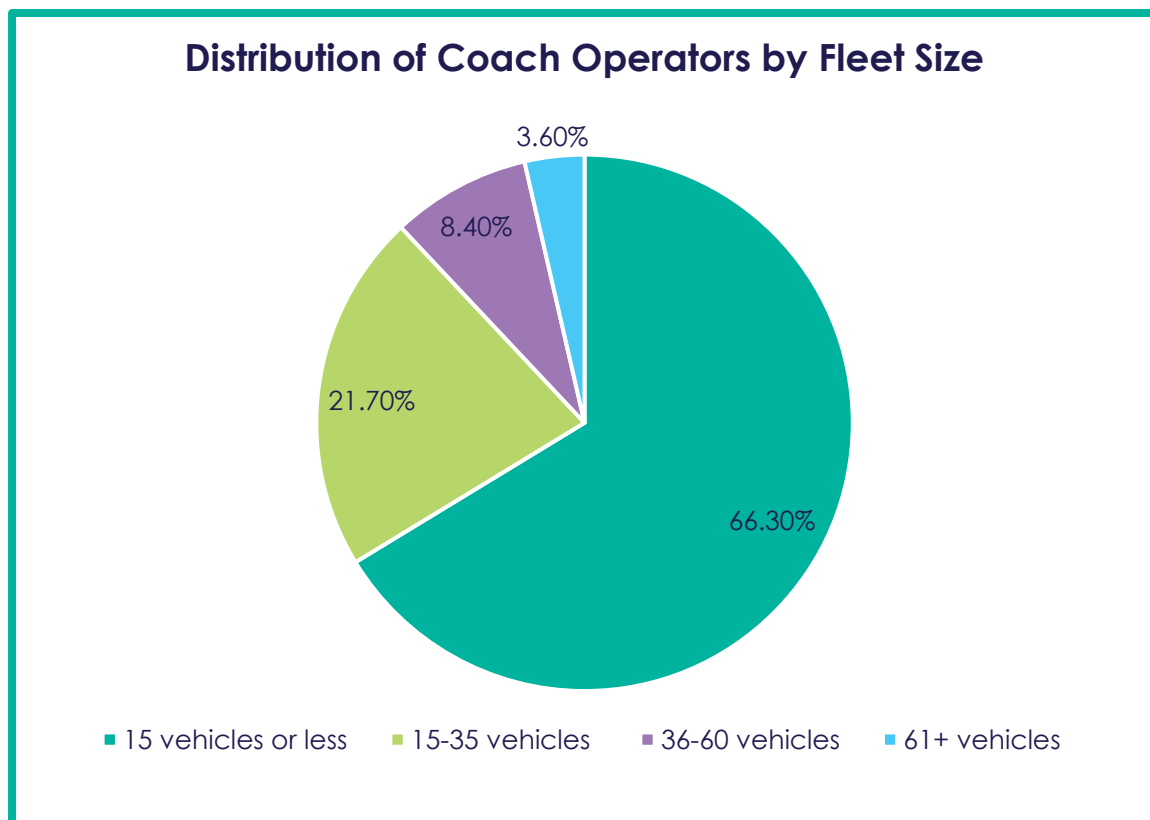
- Where possible, enabling vehicles owned by other operators to access recharging or refuelling infrastructure at coach depots, to create a reliable refueling network
- Collating a map of electric and hydrogen infrastructure that will support coaches
- Developing an online toolkit to help operators transition to zero emission vehicles

In return, we call on the Government to:

- Install hydrogen and electric refuelling/recharging infrastructure across the strategic road network and at tourist locations to support coaches. The first step could be to expand Project Rapid.

Financial Solutions

Zero emission coaches are significantly more expensive than standard diesel vehicles, with electric battery vehicles typically costing around 70% more and hydrogen powered vehicles estimated to be 120% more expensive than diesel. These vehicles also need recharging or refuelling infrastructure, the installation of which is also expensive. Operators have been quoted £40,000 to install the required cabling, £20,000 per charger unit and over £100,000 to reinforce their electric supply.



Graph 3 – Distribution of Coach Operators by Fleet Size¹²

Most coach companies are small, with 81%¹³ of coach operators being family run or individually owned and 66% of coach operators having 15 vehicles or less. Their size means it is difficult for them to be able to afford the significant upfront purchase cost of the vehicles.

Additionally, whilst some coach operators own their depots, many lease their depots with contracts typically lasting for 3-5 years. This makes justifying the significant investment in infrastructure hard when they do not own the land.

¹² CPT Coach Operator Survey 2020

¹³ CPT Coach Operator Survey 2020



Funding to Support the Purchase of Zero Emission Vehicles and Infrastructure

For coach operators to confidently invest in zero emission vehicles the Government must develop a long term strategy for how it will support the transition to zero emission coaches which includes financial support for the coach sector to purchase zero emission vehicles and the supporting infrastructure. The strategy must provide certainty over the amount of funding available, how operators can apply for it and the timescales for allocation.

Scottish Zero Emission Bus Challenge Fund – Transport Scotland launched the ScotZEB challenge fund in 2021, which allocated £62 million across nine bus operators and local authorities to support the delivery of 276 zero emission buses and the required infrastructure. Transport Scotland are now in the process of designing phase two for the scheme which will be opened to coach operators. The next phase is expected to provide funding across 2023 to 2025 with bids expected to open in Spring 2023.¹¹

Zero Emission Bus Regional Areas Funding (ZEBRA) – In February 2020 the UK Government committed to delivering 4000 Zero Emission Buses over this Parliament and has so far provided £525 million to support the introduction of zero emission buses and the supporting infrastructure. The ZEBRA scheme was launched in 2021, and funding covers 75% of the cost differential between a zero emission bus and standard diesel bus, as well as 75% of the cost to install infrastructure. We believe this funding will deliver 2548 zero emission buses.¹²

Plug in Grant for Trucks – Provides a 20% discount on the purchase of trucks that can deliver a saving in greenhouse gas emissions of at least 50% compared to a standard diesel vehicle and can achieve at least 60 miles of zero emission travel. This discount is capped at £16,000 per vehicle for small trucks, and £25,000 for larger trucks.¹³

¹¹ [Scottish Zero Emission Bus challenge fund | Transport Scotland](#)

¹² Zemo Partnership analysis

¹³ [Low-emission vehicles eligible for a plug-in grant: Trucks - GOV.UK \(www.gov.uk\)](#)

Shared Risk Model

The taskforce, in collaboration with the Green Finance Initiative, held a workshop with finance providers and coach operators to identify what was needed to make the business case for zero emission coaches more affordable.



Zero emission technology is still very new and there is limited data on how much these vehicles will be worth at their end of life. The chassis of the vehicle is expected to have a longer life than the battery, which is expected to achieve 75% of its charge capacity after 8 years. Additionally, there are risks relating to technological obsolescence and the viability of other technologies which is causing a lot of uncertainty over the residual value of the vehicle.

At the workshop the group identified the potential for a shared risk model to be explored which could provide a funding option and deliver an affordable business case for zero emission coaches. In the past, new technologies have been funded by investments from banks, who shoulder the risks. Lack of certainty over zero emission vehicles and their residual value in 5-10 years time means many lenders are currently reluctant to offer financing options for zero emission coaches.

A shared risk model of finance, which would distribute the risk between the manufacturer, operator, lender and contracting party, could be explored. This would lower the risk for banks and incentivise them to lend more. The agreement would dictate the level of losses borne by each counterparty in the event of a loss at the end of the lease period. The payment mechanics would need to be set and agreed between the contracting parties.

Residual Value Guarantee

Residual value guarantees provided by the Government would provide more certainty over the value of the vehicle at the end of the finance agreement, enable lenders to provide financial agreements to a wider consumer base and reduce the cost for operators.

A small pilot could be run to test the proposed shared risk finance model and residual value guarantee before a wider scale adoption is rolled out. This could also help provide the necessary data points to inform other financial models.

The identified solutions will:

- Help finance providers develop affordable business cases for operators by providing certainty over the residual value
- Help operators, particularly smaller ones, to invest in new zero emission vehicles



Commitments

Industry commits to:

- Participate in a pilot to assess the impact of a shared risk model and residual value guarantee to determine if they provide beneficial solutions for the sector
- Invest in zero emission vehicles, as the market develops and funding is made available

In return, we call on the Government to:

- Ensure that any grant funding to help the investment in zero emission coaches and supporting infrastructure is accessible to all operators across the UK
- Explore the potential to offer the sector residual value guarantees that will help enable them to secure affordable finance packages



Operational Solutions

Like standard diesel and petrol vehicles, the range achieved by a battery electric vehicle is greatly dependent on driving style. Eliminating inefficient driving behaviours such as harsh braking and accelerating will ensure that the maximum range possible is achieved whilst also prolonging the health of the battery. Whilst these courses exist for standard vehicles, there is not currently an efficient driving style course for electric coaches.

Zero Emission Training

The taskforce agreed that a training course must be available for when zero emission vehicles become more common place and has agreed to work with training providers to develop a module.

Lloyd Morgan currently provides courses to ensure personnel operating with electric and hybrid vehicles know how to maintain and service them safely. We will ensure links to this information, and courses from other training providers, are included on our online guidance toolkit.

Additionally, there is a need to develop an equivalent hydrogen course as this technology becomes available. Lloyd Morgan have already had discussions with leading industry bodies including the Institute of Motor Industry who currently offer a level 1 general awareness course for hydrogen vehicles. We will continue to engage with training providers to ensure these courses are available to operators when required.

Training for Emergency Services

The taskforce identified that coach operators regularly engage with their local emergency services so that, in the event of an emergency, everyone on board is rescued safely and efficiently. There is a need to ensure that all local emergency services are able to do the same for zero emission vehicles.

The identified solutions will:

- Ensure that operators can operate the new vehicles confidently, so that the maximum range is achieved by the battery whilst keeping degradation to a minimum
- Ensure all that operating staff that come into contact with the vehicles know how to maintain, service and work around the vehicles safely



Commitments

Industry commits to:

- Working with CPT and training providers to develop a zero emission course for drivers
- Ensuring that local emergency services know how safely recover passengers from a zero emission coach in the event of an accident



Conclusions and Next Steps

Strategy from Government

The Transport Decarbonisation Plan set a commitment to phase out the sale of all new non zero emission road vehicles by 2040, without specifying where the coach sector sits on the timeline.

It is essential that the Government sets out a clear strategy which includes key dates and commitments for long term funding, vehicle trials and infrastructure installation and which sends clear signals to the sector on what is required of them and when.

This will need to be developed with special consideration given to the challenges facing the sector and allow sufficient time for the required supportive measures to be put in place.

We will continue to engage with the Government and ensure they have the data needed to make future policy decisions that will deliver the required support for the coach sector.

Collaborations

It is clear from our discussions that the industry is not going to be able to transition to zero emission technologies by itself. It is going to take a collaborative approach to ensure we all successfully and sustainably reach destination zero. During our taskforce meetings, we established multiple collaborations with essential stakeholders which we look forward to progressing over the coming years.

Further Meetings of the Taskforce

It has been an insightful and proactive year for the taskforce, but our work is far from done. The time for talk is over and we must now start to put into action the solutions identified in this report. The taskforce will continue to meet quarterly to share progress and ensure that coach is a key part of the net zero strategy as we move towards 2040.



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Appendix 1

Zero Emission Coach Taskforce – List of Members

Company	Contact	Position
Luckett's Travel Group	Ian Luckett	Taskforce Chairman Passenger Transport Consultant
Ryse	Buta Atwal	CEO, managing director
Yutong	Ian Downie	Head of Yutong Bus UK
ADL	Mark Ballam	Commercial Manager
ADL	Debbie McCreath	Marketing Communication and Public Affairs Manager
National Express	Richard Ball	New Vehicles Director
National Express	Dharel Patel	Environment Strategy Manager
Alpine Travel	Chris Owens	Managing Director
Alpine Travel	Joe Lewis	
Flixbus	James Carroll	Senior Operations Manager
Flixbus	Niclas Bohn	Project Manager
Flixbus	Sarah Bartlett	Senior PR Manager
Watts Way Travel	Mark Watts	Owner
Coach Commission	Duncan Aspinall	Chair of Coach Commission, Director of Holmeswood Coaches Ltd
Zenobe	Ben Hinchliffe	Senior Business Development Associate
SMMT	Sukky Choong	Environmental Manager – Air Quality and Ultra Low Emission Vehicles
SMMT	Peter Lawton	Senior Section Manager
SMMT	Will Reeves	Commercial Vehicle & Bus and Coach Section Manager
UKCOA	Stephen Telling	Chairman, UKCOA
UKCOA	Peter Bradley	Managing Director
Logistics UK	Denise Beedell	Public Policy Manager
CPT	Alison Edwards Rebecca Kite Phil Smith John Taylor	Director of Policy Policy Manager Coach Manager Operational Technical Executive
DfT (observer)	Victor Rushton	Head of Zero Emission Bus and Coach Policy
DfT (observer)	Prabhjeet Rai	Senior Policy advisor – Zero Emission Bus and Coach policy
DfT (observer)	Bob Moran	Head of environment strategy
DfT (observer)	Livia Higgins	Zero Emission Coach and Bus
DfT (observer)	Matthew Bentley	
DfT (observer)	Yann Holzapfel	Senior Policy Adviser



Welsh Government (observer)	Robin Beckmann	Head of Transport Environment and Climate Change
Mistral Group	Steve Low	Group Managing Director
Zemo Partnership	Daniel Hayes	Programme Manager
Zemo Partnership	Timothy Griffin	Project Officer
National Grid	Russell Fowler	Senior Project Manager
National Grid	Stuart Rickerby	Project Manager
Transport Scotland (observer)	Sara Grainger	Head of Accelerator Unit
Transport Scotland (observer)	James Goodall	Policy Official – Decarbonisation Accelerator Unit
Irizar	Julie Hartley	Sales Director
Stanley Travel	Andrew Scott	Director
Barnes Coaches	Luke Barnes	Director
Coatham Coaches	Mark Hodgson	Managing Director
Zeelo	Hafsa Ameen	Senior Manager – Strategy & Partnerships
Radical Travel	Graeme Ward	Managing Director
Daimler Buses	Jonathan Prime	Sales Director
Daimler Buses	Adrian Felton	Electro-mobility Manager
Equipmake	Jasmine Bishop	Head of Sales and Marketing
Kleanbus	Joe Tighe	Co-founder and CEO
Kleanbus	Lucy Parkin	Director of Environmental, Social & Governance
BluMarbl	Andrew Luckett	Director
Scania	Katerina Michailidou	Sustainability Coordinator
Arcadis	Theo Panayi	Associate Technical Director
Visit Britain	Janet Uttley	Head of Business Support Transformation
Air Products	Jon Roper	Mobility Marketing Manger
Air Products	Hector Wilson	Operations and Sustainability Lead
Air Products	Shahid Sheikh	Business Development Manager