

Any Journey is Greener by Bus

*Passenger experiences
of modern bus services*





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Introduction

A series of reports about greener buses

The first report in this series – *The Journey of the Green Bus* – explained how the evolution that has taken place over the last 10-20 years has resulted in the introduction of greener, cleaner buses in the UK which are helping deliver on climate and air quality objectives. The second report – *A Green Bus for Every Journey* – showed how the latest buses employing a range of fuels from biodiesel and biomethane, through a wide spectrum of hybrid options to full battery electric and hydrogen fuel cells, have been embraced by operators across the UK and are gradually transforming the sector.

Benefits to bus users and society

This new study focuses on the experience of bus users and the wider benefits of the bus to society and to the cities and communities in which they operate. *Any Journey is Greener by Bus* approaches the situation from the perspective of the passenger and those most directly affected by the developments in buses.

Without the support and patronage of customers, no market is likely to thrive. This study looks at how bus usership has grown in many places that have adopted new and innovative approaches including greener buses; at how collaboration

between key stakeholders is producing positive outcomes and changing perceptions.

Passenger experiences

Through a series of individual case studies the report describes how buses can meet demand for almost every type of journey – from city centres to park and ride services and inter-city commutes; helping users travel to school, shops, work, enhancing social lives and providing efficient access to a wide range of services.

It focuses on journeys made by members of the public travelling by buses and their perceptions of the new services and green buses. Their experiences point to the range of benefits of modal shift to greener buses and how these contribute to the wider context of a more efficient, clean and sustainable transport system.

Bus benefits include – but are not limited to – reduced congestion and noise, more convenient and less stressful travel, improved access to mobility and less pressure on space and cost for parking and other uses.

Transport statistics¹ show:

In the UK there were 5.2 billion passenger journeys by local bus in 2015

Half of all bus journeys in England were made in London, where passenger bus trips have increased by nearly a third since 1995

Outside London, the greatest regional increase in passenger journeys in the last decade has been in the South East and South West

Journeys by bus in Great Britain represent 62% of all journeys by public transport and 28% of total passenger miles travelled in 2014/15

Local bus trips account for nearly two-thirds of all public transport journeys

Bus use is highest amongst those aged 17-20 and 60+ years, and decreases as household income increases. Bus travel is the most common mode of transport² for secondary school children travelling over two miles

A series of reports have been issued over recent years that highlight the links between buses and economic growth.^{3,4,5,6,7}

show exactly where buses are, evidence clearly shows the speed and reliability of services can be improved through bus priority measures and that bus use can dramatically increase when such measures are implemented.



+ Wolverhampton real-time information display

The bus contributes to a fairer and more equal society by ensuring that, regardless of background, people have the access they need to mobility.

Buses are vital particularly in larger urban areas, where research shows that as many as a third of the workforce commute by bus, with one-tenth of bus users either unable to find work, or more productive work, without access to a bus. Large numbers of secondary school and college students are frequent bus users.

Buses support business, assist in the efficiency of the labour market, enable access to education, training and better jobs, and are a facilitator of maintaining a mobile workforce with access to a wide range of community facilities.

Research shows that consumers place bus journey times and reliability high up on their agenda when considering whether to convert a car (or other) journey to one by bus. While operators have embraced information technology to

¹ DfT Transport Statistics Great Britain 2015

² DfT National Travel survey 2014: Travel to School factsheet

³ Greener Journeys 2011, A step change for Britain's buses: Maximising the economic, social and environmental potential

⁴ University of Leeds 2012, Institute of Transport Studies: Buses and Economic Growth

⁵ PTEG 2013: The case for the Urban Bus. The economic and social value of Bus Networks in Metropolitan Areas

⁶ PTEG 2014: Making the connections: The cross-sector benefits of supporting bus services

⁷ University of Leeds 2014, Institute of Transport Studies: Buses and the Economy II

Authorities with focus on green buses buck national trend in patronage

UK bus use has fallen by around 7% over the last six years according to the latest DfT statistics.⁸ However, many authorities that adopted a particular focus on bus use, including the introduction of low emission buses and related technology, have bucked the national trend.

Bristol, Reading and Milton Keynes have been star performers with bus patronage increasing 19%, 17% and 15% respectively over the last six years, while Oxfordshire is also up 12% in the same period. After an earlier dip, York too has increased bus use 7% since 2012.⁹

Bus use in London declined slightly in 2015/16 after being steady for a number of years, but there has been a longer term growth in usership in the capital (up 6% in the last ten years on a journeys-per-head basis).

While statistics collected locally do not always tally with national numbers for a variety of reasons, there are indications of a positive correlation between the introduction of greener buses and their usage by passengers. There are, no doubt, many other factors at play including the focus on reducing congestion and local pollution which are pushing in the same direction. However, it seems that in many cases green bus adoption is clearly part of a 'virtuous mix' of policy solutions.

In the UK's largest cities, more than a quarter of the working population travel to work by bus. In the UK, 91% of people are within a 13 minute walk of a bus stop with at least an hourly service; something which cannot be matched by any other form of public transport.

A recent study¹⁰ published on the value of local bus services to society continues to highlight that accessibility to bus journeys is particularly important to those unemployed, those on low incomes, children and the elderly.

The analysis shows that neighbourhoods with better local bus connectivity are more likely to have lower levels of economic, social and environmental deprivation.

Over the last six years, bus use (in terms of passenger journeys per head of population) has declined by around 7% across England, but in several leading cities - many of them featured in this publication - bus use has risen by up to 20% over the same period.

Case studies

Local authorities in England (outside of London), with some of the highest bus use include Nottingham, Reading, York, Brighton and Hove, Bristol, Greater Manchester and Oxford. Most of these have seen increases in bus use over recent years.

In many of the featured cities, the adoption of greener buses has occurred alongside increases of up to 20% in bus usership, defying the national trend.

All of these cities are notable in that they are amongst the front-runners in the introduction of innovative measures to improve bus services including the acquisition of cleaner and low emission vehicles and all have above average levels of bus use. This points to the fact that investing in modern, efficient operation of low emission bus fleets can help act as a stimulus to local bus use, and also contributes to the promotion of public transport choices that can provide significant economic and social benefits to the community.

There is no one single solution that has been adopted by these cities, but they have all begun a process of introducing low carbon, low emission buses into their fleets as part of an ambition to promote sustainable public transport across the country.

⁸ Annual bus statistics, DfT, Oct 2016

⁹ Annual bus statistics, DfT, Oct 2016. Passenger journeys on local bus services per head by local authority

¹⁰ Greener Journeys A study of the value of local bus services to society



and integrated public transport system, which has led to significant investments in the local bus network. The city has one of the largest electric bus fleets in Europe, and has been awarded Go Ultra Low City funding.

+ York became one of the first cities in the UK to introduce a new fleet of electric buses in 2014. Developing low emission bus fleets has become key to plans in York to establish the city centre as a Clean Air Zone for buses. Buses frequently entering the CAZ will be required to upgrade to electric, gas or other ultra-low emission fuels by 2018.

+ Birmingham has been introducing some state-of-the-art buses, also with low emissions, offering a wide range of passenger benefits. The 'Platinum', 'Crimson and (future) 'Sprint' bus 'brands' have been welcomed by bus users and there's already evidence of how they're encouraging modal shift in favour of the bus.

+ Milton Keynes opened the first fully electric bus route in the UK and has been one of the leading adopters of ultra-low emission vehicles and supporting initiatives, including wireless charging. As home of the Transport Systems Catapult and, with the award of both Go Ultra Low City and Low Emission Bus funding in 2016, the city aims to stay at the forefront of cleaner and smarter travel.

+ London is working towards the introduction of an Ultra Low Emission Zone, the introduction of Low Emission Bus Zones on the most polluted routes, and the operation of zero emission buses across central London by 2020, based on electric, hydrogen, and range-extended diesel-electric hybrids.

+ Aberdeen has worldwide recognition with Europe's largest fleet of ten hydrogen-powered buses, supplied by a refuelling station with on-site hydrogen production; the first fully integrated hydrogen production and bus refuelling station in Scotland.

+ Oxford was one of the first cities to introduce diesel-electric hybrids that have made an impact in the operation of the city's Low Emission Bus Zone.

+ Bristol is in the process of introducing the MetroBus Project, a low emission bus-based rapid transit network, with about 30 miles of segregated bus lanes linking an outlying park and ride site with rail hubs and the city centre.

+ Greater Manchester, where 31% of households have no access to a car, is aiming to be a world leader in investing in high quality, affordable transport connections from the most deprived areas to key employment and training locations, to tackle inequality and provide greater opportunities for all.

+ Nottingham has a vision to ensure that buses play a central role in providing a simple, affordable

Research¹¹ shows that the best-used bus services in the major urban centres may well be reducing carbon emissions by 75% or more when comparing emissions from bus operations with those from car use if the bus was not available.

The series of case studies that follow highlight how these cities, and others across the UK, are embracing the combined challenge of stimulating greater demand for fast and efficient public transport, alongside the introduction of new operations and vehicles designed to benefit from alternative low emission fuels and technologies.

¹¹ What is the environmental value of investment to increase the use of buses? (David Simmonds Consultancy 2012)

¹² The number of passenger journeys in London has increased by 27% in the 10 years to 2015/16. London's population growth has reduced the per head usage.



An easier, greener way to the city centre
Oxford

Oxford's transport strategy, which is supported by both the County and City Councils, focuses on cutting pollution and minimising climate impacts. Oxford has 17 hybrid buses running on the 300, 400 and 500 park and ride routes which take visitors into the city centre.

Oxford's transport networks have historically been developed to provide access to the centre, but future networks will need to carry people to areas of employment, and regional transport hubs. A high capacity zero emission bus rapid transit system using electric buses (or advanced hybrids with an electric drive mode) is planned to link to transport hubs, including a network of new park and ride sites with the major employment and housing growth areas around the city.

With 20% of commuting to workplace journeys taking place by bus in 2011, Oxford has one of the highest levels of bus usership for commuting in the UK. The continued promotion of policies to improve bus services has led to significant growth in bus use, and a positive level of public engagement with travel by bus.

Bus use in Oxfordshire has risen 12% since 2009/10 with 6.5 million more passenger journeys¹³

Improving the passenger experience – Oxford

- + Bus priority in city centre
- + Restricted supply and high cost of car parking in central area
- + Multi-operator ticketing
- + Bus gates to restrict other vehicles' access
- + Provision of real time bus information
- + A Quality Bus Partnership Agreement, involving an integrated smartcard ticketing system

For the future...

- + The bus to be a key component of public transport network
- + An integrated network providing high quality infrastructure
- + Development of mass rapid transit systems
- + New outer ring of park and ride sites using green buses
- + Zero (or low) emission central zone proposed

¹³ UK Bus Passenger Statistics, DfT 2016, Passenger journeys by head of population

OXFORD

Greener Bus Facts

68% of journeys within Oxford city are by sustainable methods (bus, cycle, walking); bus use comprises around a third of these journeys

In the last year, Oxford’s park and ride services covered nearly a thousand miles, carrying three million passengers

An Air Quality Management Area was declared in 2010; a Low Emission Zone in 2014. Oxford is one of the first areas considering a Zero Emission Zone

Operators Oxford Bus Company and Stagecoach received Green Bus Fund support to introduce Low Emission Buses

NOx emissions were down by over 20% (2011-14) along bus priority routes – and high pollution incidents were down sharply

A 25% increase in journeys due to population and jobs growth is expected between 2011 and 2031; over 4,500 extra return bus trips per day are anticipated



OXFORD

The passenger’s view

Julia Walker

Julia Walker chose the park and ride service as it’s cheaper than parking in the city centre. She says the bus service is both frequent and makes it quicker to get into town rather than getting the train or driving around looking for a parking space. Overall

her journey takes 35 minutes from home to the city centre.

“The service is easy to use and it drops me off two minutes’ walk from the shops.”

Although Julia doesn’t regularly use the 400 service she does sometimes use the park and ride to catch the Oxford Tube coach service into London. She said that it’s particularly important to her children that the bus should be green.

“It’s very important to my son to be green. I’m so glad I can tell him that I travelled on a green bus today. Global warming may not have much impact in my lifetime but it will affect my children and future generations.”

JULIA WALKER BUS PASSENGER, OXFORD



The essential commute Manchester

Outside London, Greater Manchester authority has the second highest level of bus use. Manchester's population is expected to grow faster than any of England's other major cities.

Bus travel is the single most used mode of public transport in Greater Manchester; nearly 210 million bus passenger journeys take place each year across the city region.

The 'premium' Vantage routes (V1 and V2) run by First Group are part of the Bus Priority Package that TfGM has been implementing since 2012. The buses use new hybrid technology which cuts engine noise and vibrations on the bus, improving passenger comfort. The buses also have faux 'e-leather' seating with a cushioned head rest. There are two tables on the upper deck where up to four passengers can face each other and there's also free WiFi on board.

Use of the Vantage routes has grown from 28,000 to approaching 50,000 passengers a week in the first eight months of operation, leading to services being increased.

Investment in transport infrastructure is one of the key drivers of economic growth in Greater Manchester as the centre of the 'Northern Powerhouse' region. The current investment programme represents the biggest transport investment programme in the UK outside London.

4.5 mile guided busway with park and ride

The guided busway is a length of specially designed track which provides a dedicated obstruction and congestion-free route and guides the buses along using small wheels attached to the sides. The track, which runs between Leigh and Ellenbrook, was constructed on the site of what was an old railway line, so much of the route is straight. Once on the track, the bus driver maintains a steady speed between stops and doesn't have to do any steering (though keeps his/her hands on the wheel!). Travelling at a steady speed means that the bus can run efficiently and provide comfort for passengers without having to compete with vehicles on the busy East Lancashire Road.

At three stops along the guided busway there are park and ride sites enabling access to the town centre by bus.

Over 50% of the current Greater Manchester bus fleet now achieves the Euro V emissions standard or better.

MANCHESTER

Greener Bus Facts

Over 600 bus services are registered in Greater Manchester, with First, Stagecoach and Arriva being the main operators

Emissions per passenger/mile in Greater Manchester for public transport users are less than half those compared with car use (TfGM data)

The transport authority aims to improve the quality of buses to lower emissions and improve the passenger experience

Around 300 low emission buses are in operation in the city (2016)

The Greater Manchester bus fleet has already reached 50% of buses at Euro V or better



MANCHESTER

The passenger's view

Ahmed Mujtaba Khan

Twenty-five year old Ahmed is a computer science student at Salford. He takes the 192 Stagecoach bus twice a week from his home to connect with the Vantage bus in the city centre. The Vantage V1 takes him direct to Salford University campus.

Ahmed doesn't own a car and likes taking the bus as it protects him from

the weather. He says: "It's also an advantage if I study late in the library as it can get me home quickly."

He finds travelling by bus very comfortable especially as the Vantage buses offer more legroom. "There's also a good temperature on the buses, the air conditioning works

well which makes my journey more comfortable."

"The new buses are definitely quieter and the stop-start must mean they're better for the environment."

"All buses should be like this. Fossil fuels are becoming ancient and we need to embrace new technologies like these hybrids."

AHMED MUJTABA KHAN BUS PASSENGER, MANCHESTER



The essential integrated transport link Bristol

Bristol, with a population of approximately 450,000, is the largest city in the South West, and a key transport hub in the centre of the West of England. A significant port, the city is well connected to the motorway network and also has its own airport.

Public transport – and buses, in particular – are a main focus for investment aimed at improving local access and mobility as well as tackling local and national emissions targets.

The current transport plan is owned jointly by the four councils of Bath & North East Somerset, Bristol City, North Somerset and South Gloucestershire.

The Greater Bristol Bus Network is a collaboration between the four councils in partnership with the local bus operator First Bristol. The introduction of Quality Partnership Schemes (supported by Voluntary Partnership Agreements) in all ten corridors is expected to attract investment by all local bus operators and the local authorities, increasing bus use in the city.

Investment in improvements in ten 'showcase' corridors has resulted in greater reliability and shorter journey times for over 70 different bus services.

Bristol's new MetroBus initiative is a rapid public transport system designed to quickly transport large numbers of people using a combination of about 30 miles of segregated busways and bus lanes. Through integration with the Urban Traffic Control system and provision of at-stop and Smart ticketing facilities, this will ensure a fast, reliable, express service between 94 strategically placed stops and link outlying park and ride sites, rail hubs, the airport and the city centre with major educational, retail and employment areas.

MetroBus aims to provide more people with access to employment, education and leisure opportunities. It uses low emission vehicles, integrated ticketing between the different public transport modes, and sets minimum standards for frequencies, the quality of vehicles and maximum fares.

Bus use in Bristol has risen by nearly 20% since 2009-10¹⁴

¹⁴ DfT Annual Bus Statistics, Oct 2016 – earlier reference

BRISTOL

Greener Bus Facts

99 low emission buses operate in Bristol (2016); 58 low carbon-certified double-decker buses were added to the Bristol fleet in 2016 including 34 StreetDeck micro-hybrid buses

The lower and simplified fares policy of First Bus has helped to increase bus patronage

Bath Bus Company and FirstGroup have both trialled a human sewage and food waste-powered biomethane bus. A joint bid for a larger roll-out of the technology is under consideration

5,500 people per day used Travelwest's Bus Checker app in 2015, with 75,000 downloads¹⁵



BRISTOL

The passenger's view The Jacobs Family

Kelly Jacobs and her family used the Brislington park and ride service to visit Bristol's Christmas market. Kelly explained that the family particularly wanted to get the bus "because the kids really wanted to sit

upstairs on the double-decker".

She said: "It's pretty cheap for us; only £3 for an adult and child return to the park and ride. It's quite a novelty for the kids and they enjoy

everything from looking out the window to pressing the bell. It adds to the day out for the kids and makes it simple to get in and out of town."

"We jump on this service as it's just as cheap as getting any other bus. It also doesn't stop at any of the normal bus stops until it gets into town; it's like an express."

KELLY JACOBS BUS PASSENGER, BRISTOL

Park and Ride

The hybrid buses that service the Brislington and Bath Road park and ride sites offer free WiFi and USB charging, and feature a number of historic facts about Bristol's iconic locations to 'warm up' visitors coming

into the town. Visitors can top up their smart travel cards at the park and ride which can then be used on the bus network, making travel easier and quicker.

Visitors can park their cars all day and jump on the frequent express service into the town centre and also enjoy free travel on other bus routes in and around Bristol.

¹⁵ Source West of England JLTIP3, p7



Accessing essential services, work, hospitals and schools Nottingham

Nottingham, with a population of about 320,000, has been focused on encouraging sustainable and healthy travel. Smarter choices measures and travel planning are seen as keys to encouraging and increasing walking, cycling and public transport use.

Nottingham has the highest level of bus use per person of any city in the country outside London.¹⁶

Nottingham and Derby are two of the five cities in the UK, apart from London, identified as set to fail to achieve air quality objectives by 2020. They're required to develop Clean Air Zones (CAZ) and are working on plans to deliver them. Increasing bus use and introducing cleaner bus technologies are expected to be central to the plans.

"The Eco Expressway is an exciting new development that grows our commitment to low emission transport further. It will provide quicker and cleaner travel and help to improve the city's air quality. The new all-electric buses are an exciting step forward towards sustainable transport in the city."

CLLR NICK MCDONALD

Portfolio Holder for Growth and Transport, Nottingham City Council.

Construction of an 'Eco Expressway' began in October 2016 to include about 3 miles of bus (and ULEV) priority lanes.

As an added incentive for local residents and businesses to invest in cleaner vehicles, electric cars, taxis and vans will be allowed to use the bus lane along the route.

Nottingham has the second highest level of bus use in England outside of London, accounting for 75% of the public transport trips in the city.

Over £750m has been invested in Nottingham's bus and tram network over the last decade, helping to deliver significant increases in the numbers of passengers carried. Nottingham now has the second highest level of bus passenger journeys per head in England.

When tram passenger use is taken together with bus use in Greater Nottingham, there has been a combined increase of 15% of passengers between 2003 and 2015.¹⁷

¹⁶ 149.2 passenger journeys per person in 2015-16. DfT, Oct 2016, Bus Statistics

¹⁷ Source - DfT Annual Bus Statistics 2014-15

NOTTINGHAM

Greener Bus Facts

The Medilink and Localink networks are serviced by electric buses

Since 2012 Nottingham’s electric bus fleet has travelled one million miles, generated cost savings of £300,000, and has cut carbon dioxide and polluting emissions

Nottingham has 58 electric buses which are being joined by an extra 13 range-extended BYD electric vehicles; the largest electric bus fleet in Europe

53 biomethane double-decker buses are planned for introduction in early 2017

Nottingham is converting its tendered ‘Linkbus’ fleet to fully electric vehicles



NOTTINGHAM

The passenger’s view

Pauline Mercer

Pauline caught the free Nottingham Community Transport (NCT) Medilink service from the Queens Medical Centre (QMC) in Nottingham for an appointment at the City Hospital.

Pauline owns a car but chose to use the bus when coming into Nottingham: “It can sometimes be

very hard to find a parking space and as I have free bus travel on account of my youth it costs me nothing.”

“The bus is also very easy to use, I have a very short walk from home to the bus stop and I can simply hop from one bus onto the next without any fuss – it takes me

straight to the hospital.”
Pauline Mercer, bus passenger.

Pauline adds: “The journey is pleasant, it allows me to switch off and enjoy the views and I don’t have the stress of having to sit in traffic or search for a parking space.”

Improvements in Nottingham’s bus service over the last ten years

- + Bus/tram patronage: Up from 48.3 million passengers per year to 55.3 million
- + Punctuality: Up from 82% to 95%
- + Satisfaction: Up from 85% to 95%
- + Accessibility: Up from 84% to 93%.

Integrated Travel in Nottingham

Nottingham has an integrated travel system called ‘Robin Hood’ which allows users to travel on bus, tram and train services using one smart card, topping up credit at convenient points around the city.

Queens Drive Park and Ride ‘Eco Hub’

The Queens Drive Park and Ride provides quick and easy access to Nottingham city centre by bus and also hosts a multitude of other services at its ‘Eco Hub’.



Visitors can travel on the free all-electric MediLink route to either of the city’s hospitals. Visitors with electric cars can charge their vehicles and there are spaces reserved for Nottingham’s own City Car Club. There’s also the option to hire bikes from the site, which connects to several woodland walks. Visitors can even do their recycling at the location.



Bringing people to enjoy the historic city centre York

York is focusing on managing the volume of traffic in the city, promoting a shift away from private car use to alternatives including walking, cycling and low emission public transport. This includes enabling priority access for only the lowest emission buses, lorries and taxis to the areas of the city with the poorest air quality.

One of the UK's first fleets of electric buses was introduced to the city in 2014. Low emission buses are key to establishing the centre of York as a Clean Air Zone (CAZ). Buses frequently entering the CAZ will be required to upgrade to electric, gas or other ultra-low emission fuels by 2018.

There was a dip in bus use in York in 2012-13, but in the last three years there has been an encouraging increase.

In the last three years bus use per person in York has increased by over 7%, representing over 600,000 extra bus passenger journeys each year.¹⁸

"Over four million passenger journeys are made on York's park and ride every year, making this one of the most used services of its kind in the UK."

ANDREW BRADLEY
Sustainable Transport Manager, City of York Council.



Poppleton Bar Electric Bus Park and Ride

York's Poppleton Bar service was one of the UK's first all-electric park and ride routes. Six Optare buses offer a smooth, quiet, zero emission ride into the city centre. Six more electric buses began operating from the Mons Cross Park and Ride site in November 2016.

¹⁸ Source: DfT, Bus Statistics, Oct 2016

YORK

Greener Bus Facts

York was selected by the Government as one of eight cities chosen for 'Go Ultra Low' status to promote low emission vehicle uptake

First York has operated 12 Optare Versa electric buses since 2014

A 50 kW rapid charger has been installed at each park and ride site to top up bus batteries during daily operation

Six sightseeing double-decker buses have been converted from diesel to electric power

A York City Council study found 80% of all city buses could theoretically go electric, which would result in a 70% reduction in road transport NOx emissions

28 school buses in York are to be fitted with selective catalytic reduction technology to cut nitrogen oxide emissions



YORK

The passenger's view

Mr & Mrs Hustwit

Mr & Mrs Hustwit used the Poppleton Bar Park and Ride service for the first time to return from York's city centre where they had been sightseeing. Taking full advantage of the free parking and £1 bus service, the Hustwits had visited the York Museum and famous Clifton Tower.

Mr Hustwit said the park and ride was easier and cheaper than driving into town. "We didn't have to watch the clock as we would have done in a parking spot elsewhere... taking the bus removes the stress from travelling and it feels too dangerous to cycle."

Mrs Hustwit added: "It's probably safer than driving at times."

The Hustwits' journey took around 20 minutes. They said: "We're all in favour of reducing the impact our travel has on the environment; if this bus is more efficient and will help contribute, then we are all for that."

"We hadn't realised it was an electric bus. It seems to work just like a normal one and it could even be slightly quieter than your standard bus."

MR HUSTWIT BUS PASSENGER, YORK



Serving the student community

Reading

Reading is in the heart of the Thames Valley and has a population of 315,000 (with Wokingham included) and a thriving local economy. Reading Buses operates the majority of bus services in the district, together with First Berkshire, Arriva South East, and Thames Travel.

Reading Buses has adopted a 'colour-coding' scheme for each route and this, combined with a determined customer focus and the active promotion of low emission fleets, has helped to encourage bus use in the town.

Reading has seen a very impressive 17% increase in bus use in the last six years¹⁹.

The development of a network of Premier Routes through a voluntary bus partnership combines service improvements with improved infrastructure, bus priority, real-time passenger information and static information. These initiatives have resulted in higher bus usership than that observed on other routes.

The provision of a high quality bus service across Reading has encouraged a move away from private car use in the central area.

Lower emission buses, bus priority and real-time information have led to increased passenger numbers on priority routes in Reading.

Recent annual bus statistics²⁰ show Reading is ranked as the local authority with the third highest level of bus passenger use per head in England (outside of London).

Reading Buses – Leopard Route

The number 3 "Leopard" route typically runs from Reading rail station to Wokingham via Shinfield and Arborfield, which used to be home to a large army barracks.

The route enables rural commuters to travel into Reading Town to catch the train, visit the Royal Berkshire Hospital or the high street and shopping centre. The Leopard route also has a number of stops which are 'get off only', to ensure that the bus is not held up in areas of the town which have large numbers of pedestrians and that it is not contributing to congestion.

¹⁹ Source: DfT, Oct 2016, Bus Statistics

²⁰ DfT, Oct 2016

READING

Greener Bus Facts

Reading Buses is one of the few bus operators in the UK to be fully owned by the local council

Increasing public transport trips is seen as a key solution to pollution and congestion

Reading will soon have 50 gas and 31 diesel-electric hybrid buses making 50% of its fleet low emission buses

In 2015 Reading Buses won four of the prestigious UK Bus Awards



READING

The passenger's view

Carol Westland

Carol Westland travels weekly to visit her son in a village near Aborfield, around 40 minutes outside Reading centre. As she lives in Didcot and does not own a car, she travels

first to Reading by train, and then catches the Leopard bus from the station. "The journey can take up to an hour and a half and it's one I simply couldn't afford to do by taxi" Carol says.

"Public transport has the benefit of more interaction than driving, I don't have to worry about the next turn or the cars around me. I only have to listen out for my stop".

"It can be very pleasant on the bus, to switch off and look through the window at life going by."

CAROL WESTLAND BUS PASSENGER, READING

Buses serving the student community

Students mainly use the 21 & 21a buses which run very frequent services (every 7 minutes) between the University campus and the town centre all day and night.

The buses have a claret livery and are designed specifically with university students and staff in mind. They are ultra-clean Euro VI emission standard vehicles and all run directly onto the University campus, so there's no chance of getting the wrong bus. They have three upstairs zones including an honesty library, free WiFi, USB charging points, games and a jukebox.

Students can avoid the hassle of needing the exact

money (drivers don't carry change) by getting a 'simplyUni' smartcard which can save them 40p on every journey. They can download the Reading Buses app to their phone to buy mobile tickets, plan journeys and get live information on the bus.

Reading Buses student communication:

"Our claret 21s are equipped with an honesty library, USB charging points, games and a jukebox. They have superfast free WiFi so you can send snaps and watch funny cat videos on your way to Uni!"



Essential everything; buses for commuting, shopping, leisure, sightseeing... and more

London

By 2030 the population of Greater London is forecast to rise by a further 1.5 million to reach 10 million which means that there will be an extra 750,000 jobs all requiring additional transport journeys.

There were around 2.29 billion journeys by bus in the capital in 2015/16. Around 20% of people living in Greater London commute by bus; a far higher proportion than for most other parts of the country. 40% of bus passengers use the services three or more times a week, compared to only 20% outside of London.

Over one fifth of those living in Greater London commute by bus... over half of the bus use in England takes place there.

To support the introduction of an Ultra Low Emission Zone (ULEZ) from 2019, London will have twelve Low Emission Bus Zones on key radial corridors in inner London. All double-decker buses operating in the Congestion Charge zone will be hybrid-electric vehicles, and all single-deckers in the zone will have no tailpipe emissions (i.e. they will be fully electric or hydrogen models).

London will have one of the world's largest zero-emission capable fleets.

The largest group of bus users in London are 25-34 year olds (26%), followed by 35-44 year olds (19%).

Most London bus users are in full-time employment and over half of journeys are for the commute to and from work. A significant number of passengers also use the bus for shopping, to visit friends or relations or for other leisure activities, or to travel to school and other education services.²¹

Bus user facts²² – London

- + Per person bus use in London has increased 6% in the last 10 years; a 27% increase in the total number of bus journeys
- + Over a fifth of bus users say they chose to use the bus instead of their car
- + Most bus travellers use an Oyster Travelcard, Pay As You Go or other Oyster variants for their journeys
- + More bus users in London during the day are women but men are significantly more numerous on night buses
- + In 2013-14 nearly 40% of bus users in London were from medium or high-level management jobs (an increase from 36% in 2008)
- + Transport for London plans to maximise the number of households within a 5 minute walk from a bus service.

²¹ TfL Bus User Survey 2014

²² TfL Bus User Survey 2014; DfT Annual Bus Statistics, England 2014-15

LONDON

Greener Bus Facts

London has around 2,000 diesel-electric hybrid buses out of a fleet of 9,300 buses (end-2016)

Only hybrid or zero-emission double-decker buses are to be bought from 2018 and all buses will meet the Euro VI standard by 2020

Inductive charging trials are taking place to allow up to 80% running in electric mode

World's first all-electric double-decker on route 98 (followed by routes 507 & 521 in 2017)

Selective Catalytic Reduction systems fitted to 2,300 buses to cut NOx

Eight zero emission hydrogen fuel cell buses run on route RV1 between Covent Garden and Tower Gateway

NOx emissions from London's bus fleet halved in 2016 vs 2008

Around 800 of the New Routemaster buses (replacing the iconic double-decker London bus) now operate in the city with more due to enter service in 2017.

According to a recent survey by TfL, user satisfaction has increased on the routes where the new vehicles have been introduced. The survey revealed that overall satisfaction

was higher among customers travelling on the New Routemasters than among those travelling on standard buses (87% versus 84% respectively).

Research shows that the diesel-electric hybrid New Routemasters give customers a sense of progress and innovation around bus travel.²³



LONDON

The passenger's view

Dóra Máté

Dóra Máté was travelling from work on the 98 which runs from Russell Square to Willesden bus garage, through the heart of London's Oxford Street, heading for the Science Museum in South Kensington.

Dóra used the route planner app on her smart phone to find out the

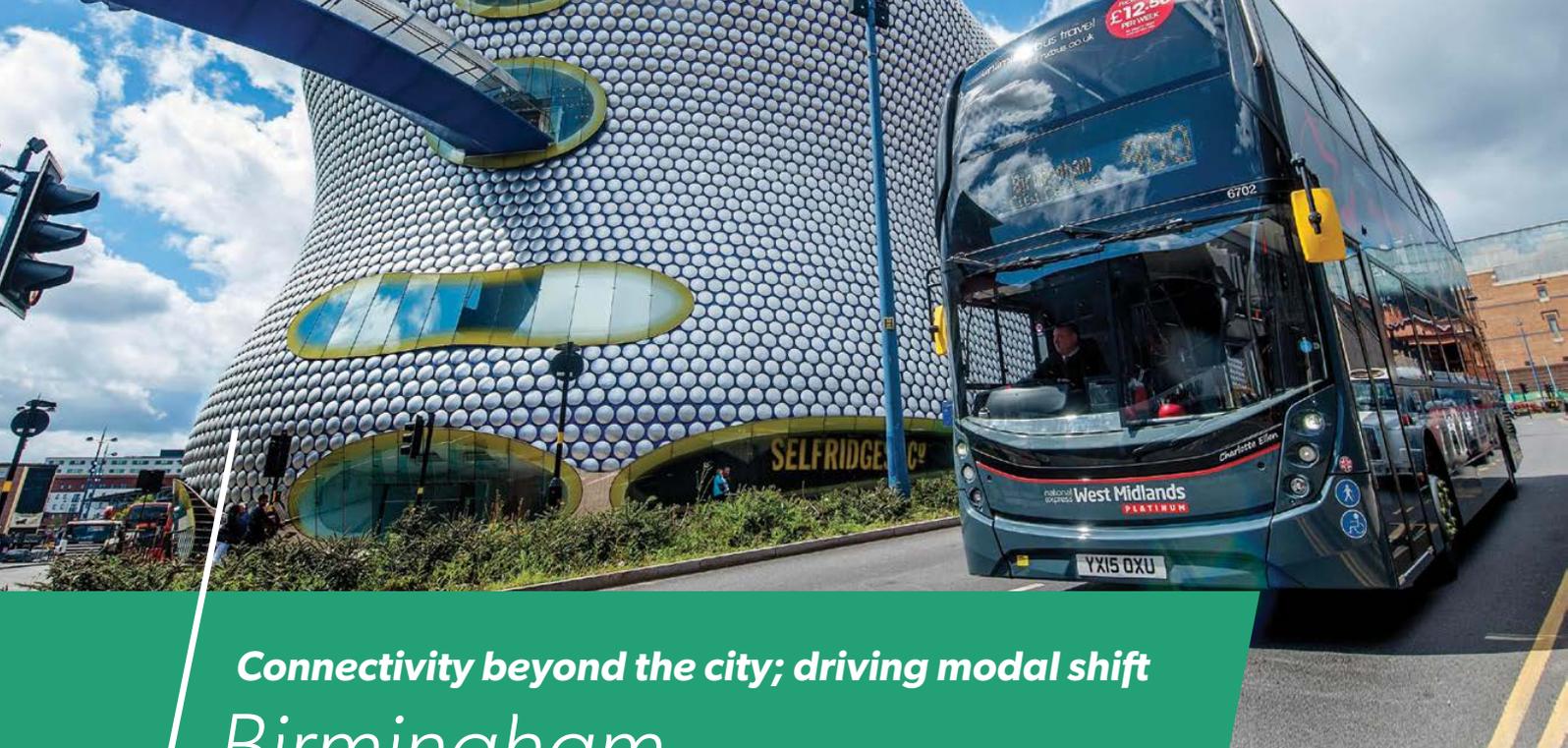
quickest route to her destination. She doesn't own a car and says she uses the bus because it's "direct and much cheaper".

She uses her Oyster travelcard every day to get around. She said: "I didn't realise this was an electric bus but getting the bus is generally better

for the environment than taking a car anyway."

"...getting the bus is generally better for the environment than taking a car." Dóra Máté, bus passenger

²³ Passenger Transport, 3 June 2015



Connectivity beyond the city; driving modal shift Birmingham

National Express, the leading operator in Birmingham and the Black Country, has formed a 'Bus Alliance' with the local city and county councils through Transport for the West Midlands and Centro to improve bus services and connectivity throughout the region. The long term aim is to create the 'Birmingham Tube' to connect surrounding towns to the UK's second largest city through a network of bus routes.

New 'Platinum', 'Crimson' and 'Sprint' brands

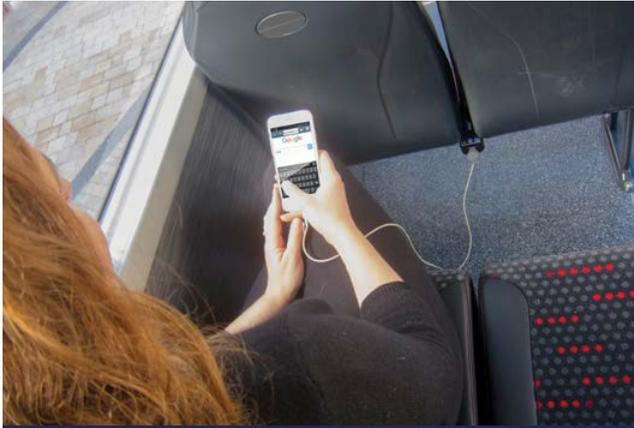
Three new bus brands are being introduced by the Bus Alliance, serving different purposes in the region. 'Platinum' and 'Crimson' services are already in operation and 'Sprint' will enter service in 2017.

The new state-of-the-art 'Platinum' buses come with 'e-leather' seating, extra legroom, free WiFi and USB charging to make passenger journeys more pleasant, and allowing them to stay connected on the move.

After six months in service, Centro surveyed passengers' experiences of the Platinum buses and found 94% overall customer satisfaction.

The Bus Alliance plans to invest £150m by 2021 and pledges to:

- + Increase bus patronage by 5%
- + Improve peak-time journey speeds
- + Limit fare rises and offer discounted youth travel, daily fare capping
- + Have 80% Euro V and VI buses within three years and stop-start technology, resulting in less pollution and lower carbon emissions
- + Maintain customer satisfaction levels at or above 85%
- + Introduce integrated ticketless travel, using mobiles, credit cards, or even people's watches
- + Ensure increased investment in highways to aid journey times and reliability
- + Improve seating, next-stop announcements and WiFi.



“The USB ports are a great idea - the kids of Wolverhampton will be getting even better school marks - because now they can do their homework on the bus!”

DICKY DODD

Signal 107 DJ, speaking at Platinum Bus launch event

‘Happy passengers’ feelings are reflected in patronage statistics since launch: the X51 (Birmingham to Walsall) has seen 25% growth and there has also been 10% growth on services to Birmingham airport. 27% of the people questioned in the survey were new users of buses, demonstrating their attractiveness to new customers and ability to encourage modal shift.

Built in Britain by Alexander Dennis Ltd (ADL), Platinums are lighter and more fuel efficient than conventional buses. They were first introduced in May 2015 across Birmingham, Solihull, Coventry and Walsall - on the 900, 957, X51, 997, 934, 935, 936 and 937 routes.

National Express Managing Director Peter Coates:
“These beautiful Platinum buses are our pledge as part of the West Midlands Bus Alliance to increase the amount of people taking the bus, to keep our customers happy and to keep the air clean across the West Midlands.”



BIRMINGHAM

The passenger's view

Mr and Mrs Davies

Mr and Mrs Davies travelled on the 126 between Birmingham and Wolverhampton to visit a friend. Mrs Davies said: “We’ve jumped on this bus having taken the 97 bus into town. We enjoy travelling on the bus, especially as it’s free! We use the bus services regularly as they take us directly where we want to go.”

“We enjoy the journey as we get to enjoy the views, sit together and chat as the journey rolls by. We often do our shopping and the bus helps us get out and about, which keeps us fit and healthy. We like the voice which tells you where you are, especially when we’re on a bus we aren’t familiar with.”

“It’s good to see buses like this which are modern and clean - we hope

they stay that way. The new bus station in Coventry is good for the local community. It will help bring standards up and hopefully people will take more pride in their local area, as outside Birmingham there isn’t as much money.”

“It’s good to see buses like this which are modern and clean.”



National Express Platinum drivers wear a special Platinum uniform. Wolverhampton driver Nigel Matthews whose bus is named after his late mother-in-law said: “I drove the Platinum ‘Carol Ann’ for four hours last week and was really pleased with the way it drove - and the way it looked. Many of my passengers made positive comments.”

As well as stop-start technology, the new buses have ‘smart accessories’ that reduce the power drain from the engine and weight saving technology, such as the alloy wheels, which save the weight of an average man.



From school to social life via shopping! *Milton Keynes*

At 50 years old, the 'new' town of Milton Keynes is built around a grid road system – with its infamous roundabouts - designed for the car. Milton Keynes now, though, is a town embracing bus travel.

One of this town's new residents showed how the use of the latest technology provides seamless travel across the bus network.

Hannah uses a school bus every day for the 19 mile journey to Aylesbury, so is very familiar with bus travel. But to access all her extra-curricular activities like street dance and self-defence, she finds the 'live map' via an app on her mobile phone ideal, as well as mobile ticketing provided in Milton Keynes. "The buses run every 15 minutes so I can get into the CMK shopping centre whenever I want or, actually, whenever I have any money!"

"All the buses seem to go to the shopping centre and to the station, so it's very easy to get all over Milton Keynes to my friends and other activities, and with my flute lessons in Wolverton I even get to ride on the electric ones and see where they charge up! I even had to show my dad how to use the buses and all the apps. He'll be fine as long as he keeps his phone charged!"

Milton Keynes is still the fastest growing town in the UK and the bus routes are constantly evolving and extending into the new residential areas. And even for a town built around the car, the new park and ride with free parking and just 10 minutes into the centre is proving very popular, as parking at the shops gets more and more difficult and expensive (unless you drive an electric car!).

Sitting almost equidistant between Oxford and Cambridge, Milton Keynes is well served by Cross Country

bus routes and links to neighbouring towns and to Luton airport. In 2014 Milton Keynes was the first to operate a route entirely with electric buses, adopting an innovative combination of charging opportunities; both overnight, at the depot, and by wireless 'top-up' at the end of each route. After the success of this project, the council has committed further funding and, in 2016, was also awarded £1.75m of central Government Low Emission Bus funding to bring more electric buses to the city.

Milton Keynes has also been selected as one of the eight 'Go Ultra Low'²⁴ City schemes to demonstrate electric vehicle adoption, building on its buses and charge points, with further initiatives for taxis and EV drivers.



"The nearest bus stop is only 5 minutes' walk and with the 'live map' I can see exactly where my bus is and whether it's running on time, so I can time it perfectly!"

HANNAH
Bus passenger, Milton Keynes

²⁴ <http://www.mkgoultralowcity.com/linking-with-other-mk-initiatives>



Reviving bus use with cleaner technology Aberdeen

Aberdeen's recent history has been dominated by the fortunes of businesses connected to the oil and gas industry.

Public transport has been a relatively low priority, with Aberdeen showing the lowest rate of bus patronage of Scotland's four major cities. However the City Council's master plan seeks to redress the balance away from a focus on access for private vehicles.

Aberdeen's policy has recently been driven by the city's failure to meet air quality objectives. The 2011 Air Quality Action Plan highlighted the need to improve the commercial bus fleet, and bus services have been identified as being at the heart of the process for delivering a sustainable, integrated and accessible transport system for the city.

As well as expanding the numbers of electric buses, Aberdeen has also developed a Strategy & Action Plan for Hydrogen (2015-2025).

Aberdeen's Hydrogen Bus Project, with a £19m budget, has achieved worldwide recognition with Europe's largest fleet of hydrogen fuel cell buses.

Two main bus operators, Stagecoach and First, run a fleet of ten vehicles fuelled by hydrogen supplied by a state-of-the-art refuelling station, including on-site hydrogen production from electrolysis.

The Local Transport Strategy Action Plan (September 2016) set several specific objectives, including increasing bus patronage and making bus travel a more attractive option. This involves working with the voluntary bus operators' forum to promote bus priority measures, improvements in transport management and the enforcement of bus lanes. Overall, since 2012, Aberdeen has invested in 56 new low emission vehicles introduced to key corridors.

"Using the bus allows me to see my mum more... it helps people get to work on time and it's better for the environment."

LOUISA MCGUINNESS
Aberdeen, bus traveller (travelling with two children)



The way forward

As the examples in this report show, effective collaboration between local authorities, bus operators, manufacturers and other key stakeholders to introduce innovative technologies and cleaner vehicles is helping to revitalise bus use in a number of Britain's cities.

Driven by the imperative to improve air quality and reduce carbon emissions, many local authorities have realised that buses represent a key part of the solution. Innovative manufacturers and proactive operators have reacted to this opportunity, providing new products and services that – in several examples – are being embraced by bus users.

Though overall bus use has been in slow decline for some time, there are signs of a renaissance in some cities and regions where operators have introduced not just cleaner vehicle technology but also a host of other innovative features – for example real-time travel information, integrated ticketing, free WiFi and charging, improved seating, shorter journey times, better routing and bus priority measures – which are attracting people back to buses, and even out of their cars in some places.

In the South of England, where average bus use has, for some time, been lower than in other parts of the country, there are signs of a revival too. Over the last ten years, bus use has grown in the South West and South East of England, suggesting that the balance between private and shared travel for those living in the wealthiest, most congested, parts of the country may be gradually shifting in favour of the bus. 'Peak car' may not yet be widespread, but there could be signs of its emergence here.

It's clear that buses can be part of a modern, integrated transport solution. As well as reducing pollution, they also help cut congestion and meet targets around equality of access, providing a 'win-win' for policy makers and the public in many settings.²⁵

The case studies in this report provide exemplars for other authorities and

operators seeking to tackle environmental and social challenges. But transport and related information technologies are evolving very fast, provoking rapid changes in the way people are moving and how they will move about in the future. Key actors must continue to keep a close eye on these evolving technologies, embracing the opportunities while guarding against potential threats.

Bus use will not be driven by the on-board vehicle technologies alone. While it's critical to the continued success of the bus industry to be continually adopting the latest, cleanest engines and power sources, how operators react to and embrace the revolution in communications and associated technologies which are enabling the emergence of 'mobility as a service' will also be vital.

Even with these innovations, without solutions to the ever-increasing problems caused by traffic congestion, the appeal of these services to potential passengers may never be fully realised.

Central and local policy makers must keep their eyes on this as well as on the opportunities, continuing to provide a supportive environment for operators, with a long-term vision to help encourage the most effective and efficient use of the bus.

"The electric buses have proved extremely popular with 3% year-on-year increases in patronage on Route 7. The original forecast was for 700,000 passengers but they are now carrying one million per year and there may be a need to put more buses on the route."

BRIAN MATTHEWS
Head of Transport Innovation, Milton Keynes Council

²⁵ A study of the value of local bus services to society' KPMG, 2016, for Greener Journeys



REPORT PRODUCED BY THE LOW CARBON VEHICLE PARTNERSHIP FOR GREENER JOURNEYS

Greener Journeys is a campaign dedicated to encouraging people to make more sustainable travel choices. It is a coalition of the UK's leading public transport organisations, user groups and supporters. It aims to reduce CO₂ emissions from transport by encouraging people to switch some of their car journeys to bus or coach instead. Switching from car to bus for just one journey a month would mean one billion fewer car journeys on our roads and would save two million tonnes of CO₂ every year. For more information visit www.greenerjourneys.com



The LowCVP was established in 2003 as a public-private partnership working to accelerate a sustainable shift to lower carbon vehicles and fuels and create opportunities for UK business. Around 200 organisations are engaged from diverse backgrounds including automotive and fuel supply chains, vehicle users, academics, environmental groups and others.

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