

Red buses going green for London

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Around one in five journeys in London are made on a bus – making it the most used form of public transport in the capital. London Buses carry more than 2.3 billion passengers anually and bus ridership in the city is at its highest level since records began in the late-1950s. We recently saw an estimated 49.5 million passenger journeys made in a single week – as many as were made in the whole of England in the same period.

Since the creation of Transport for London (TfL) in 2000 there has been a 40% growth in bus kilometres operated and a 60% increase in passengers – as a result we now operate the largest bus fleet in Europe, made up of more than 8,500 vehicles. We are very aware of the impact such a large fleet has on air quality and the environment and we work closely with the Mayor of London, Boris Johnson, to help deliver his Air Quality Strategy which was published in 2010.

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Despite the significant increases in both vehicle numbers and the distances they travel in passenger service, emissions of Particulate Matter (PM) from London's buses have actually reduced from 200 tonnes a year in 1997 to 18 tonnes today – however, buses still account for 20% of all NOx emissions from road transport in London.

With this in mind, and in response to the Mayor of London's Air Quality Strategy, we have delivered (or are delivering) a number of aspects, including:

- Maintaining the youngest bus fleet of any major European or world city – our buses have an average age of six years and are modern and cleaner to operate
- We have Europe's largest hybrid bus fleet operating more than 420 hybrid buses throughout the capital – this number will increase to more than 1,700 by 2016 – representing 20% of the total bus fleet
- Developed and designed the cleanest diesel hybrid bus in the world – the New Bus for London
- Installed filters on all older buses in the fleet to reduce PM emissions
- Trialled new innovative technologies such as hydrogen, pure-electric and opportunity charging of diesel electric hybrid buses
- Developed and trialled Selective Catalytic Reduction (SCR) equipment to reduce NOx by 88% – which will be fitted to 900 of the oldest buses in the fleet.

Looking ahead, we will continue to build on this success with a specific focus on the following areas.

Hybrid

TfL was an early-adopter of diesel hybrid technology, introducing a mix of 56 single and double-deck buses back in 2006. At that time the concept was very new but we set about putting the technology, from various maufacturers, through its paces in a busy urban enviroment. Working closely with the manufacturers it gave both us and the bus industry confidence in the technology and we now operate the largest fleet of hybrid buses in Europe. This has been achieved in no small part with the support of the Department of Transport's (DFT's) Green Bus Fund which was intended to encourage early adoption and now to increase the uptake of such vehicles. TfL was awarded £5 million in 2009, £8 million in 2010 and £5 million in 2011 and 2012 with an additional £5 million in 2013. The number of hybrid buses has also been boosted by specifying this type of bus when route contracts came up for competative

tendering. This year's Green Bus funding will help deliver 90 hybrid buses which will join the exsiting fleet.

Hybrid buses provide a smoother and more comfortable ride for passengers while delivering a 30% fuel efficiency saving and reductions in NOx emissions – benefitting both the operator and the enviroment.

We will continue to grow our hybrid fleet which is set to reach 1,700 buses in passenger service by 2016.

New Bus for London

In 2008, the Mayor of London pledged to introduce a Routemaster-inspired vehicle fit for 21st century London that would resurrect the iconic hop-on, hop-off rear platform and make the best use of available hybrid technology. This would be the first time a bus had been specifically designed for London in more than 50 years – the last being the iconic Routemaster.

British designer Thomas Heatherwick, who designed the 2012 Olympic Couldron, was responsible for the pioneering design, which makes use of light weight materials, with glass highlighting key features and producing a light and airy feel inside the bus. An impressive glass 'swoop' at the rear and offside pick out the two staircases and provide a dramatic visual effect. An asymmetric design for the front-end completes the futuristic look.



TfL began trialling zero-emission hydrogen buses in 2010 – emitting only water, these state-of-the-art vehicles will begin to help improve London's air quality in late-2013

The New Bus for London not only looks good but is also the cleanest hybrid diesel bus in the world. Tests have found it to emit a quarter of the NOx and PM of a hybrid bus and 20% less CO_2.

We have ordered the first 600 production vehicles which will be manufactured by Wrightbus, a family-owned company based in Ballymena, Northern Ireland, who won the contract in 2009 to build the initial eight prototypes.

The introduction of these 600 buses alone will reduce CO_2 emissions in the capital by approximately 20,600 tonnes a year.

Selective Catalytic Reduction (SCR)

TfL trialled the retro-fitment of an innovative SCR system in 2012 which is proven to reduce

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London has Europe's largest hybrid bus fleet with 420 vehicles

harmful NOx emissions by 88%. The £10 million retrofit programme, partially funded by the DfT, involves the retrofitting of 900 older Euro III buses with SCR equipment, in particular targeting vehicles that pass through areas that have air quality issues.

Hydrogen

In 2010, TfL began a trial of zero emission hydrogen buses on route RV1, which operates from Covent Garden to Tower Gateway. The project was funded jointly by TfL, the Department of Energy and Climate Change (DECC) and the European Union via the Cleaner Hydrogen in Cities (CHIC) project. Operating from a purpose built garage in Lea Interchange, these state-of-the-art vehicles were purpose built for TfL and only emit water – making them the ideal vehicle to operate on this route which passes some of London's most poullted areas. Later in 2013, a fleet of eight of these buses will operate on the UK's first zero-emission bus route.

Electric

TfL will trail two pure-electric buses in late-2013. This will be the first time pure-electric buses will operate as part of TfL's fleet and the trial will be used to establish whether the technology is suitable for the tough operating enviroment of London. The first two buses will operate on routes 507 and 521 – which are short duration commuter routes. The buses are 12m-long single-deck buses supplied by Chinese manufacturer BYD. This maufacturer was chosen as it has extensive experience in battery technology and we felt could offer a vehicle that could be operated in a rigorous urban environment all day with recharging in the garage overnight.

As part of the DfT's 2013 Green Bus Fund, we were also successful in our bid to procure a further four pure-electric single-deck buses. We are now considering which manufacturers we may want to procure buses from to conduct further trials. These buses are expected to enter service, alongside the BYD vehicles, in 2014.

TfL is also part of a collaborative project called ZEUS (Zero Emission Bus Systems) which is bidding for EU funding to trial electric buses. If the bid is successful, London would demonstrate



up to four range extended electric buses that utilise rapid induction charging infrastructure. Suitable bus stations would be modified with the charging infrastructure allowing the buses to 'charge-up' at the end of their route. The project would also include similar demonstrations in seven other European cities including Glasgow. A decision of the European funding is expected in late-2013.

Biodiesel

In 2011, TfL began a trial of biofuel in 12 Dial-a-Ride minibuses that carry elderly and disabled passengers who are unable to use mainstream public transport. Biodiesel is a renewable, clean burning fuel made from used cooking oil from the catering industry, and tallow which is the residue from the meat processing industry.

Following this successful trial we have recently commenced a pilot programme in Stagecoach's Barking bus garage. Using a B20 biofuel – a high quality blend of 20% biodiesel and 80% petrodiesel – it is estimated that these vehicles will produce 15% less carbon emissions than a standard diesel bus. They will also use cooking oil and tallow that would otherwise be disposed of at costly landfill sites.

By 2016, the Mayor of London wants the city to have the cleanest, lowest emission bus fleet of any major city in the world. This will improve the quality of life and health of all Londoners and builds on the significant emission reductions delivered over the past four years.

The operation of a green bus fleet is one element of a comprehensive set of measures that the Mayor of London has introduced to tackle air pollution. Over the past four years, the Mayor of London has tightened the standard of the Low Emission Zone, further reducing the emissions of approximately 150,000 vehicles. He has introduced age limits to retire the oldest and most polluting taxis and has delivered a package of innovative local measures through his Clean Air Fund. The Mayor of London has also announced plans to introduce an Ultra Low Emission Zone in central London and has tightened the requirements for vehicles to qualify for a 100% discount to the Congestion Charge.



Mike Weston is Operations Director for London Buses. After graduating from Loughborough University in Transport Planning and Economics Mike joined London Transport in 1985, initially in network planning and then moving on to other areas such as management of bus contracts and bus infrastructure. Mike became Head of Operations in 2003 and in August 2004 was promoted to Operations Director which widened his responsibility. He now manages the delivery of bus operations which includes development of the bus fleet. Mike is also responsible for safety and the environment across Surface Transport, and the business units of Victoria Coach Station, London River Services and Dial-a-Ride.

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...AND SOON THEY'LL DRIVE YOUR PASSENGERS.

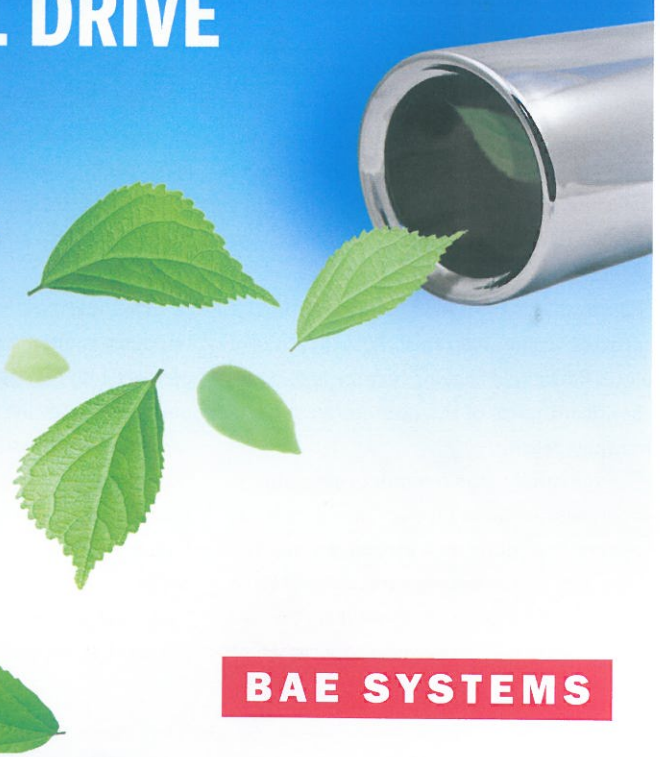
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