ZeEUS project

London demonstration

MAYOR OF LONDON

TRANSPORT FOR LONDON
EVERY JOURNEY MATTERS

Working in partnership:

Foreword

Double-deck buses have been a familiar sight in the Capital for decades, enabling millions of Londoners to go about their daily lives. In 15 years, the number of bus users has increased by almost 80 per cent and with London's population forecast to rise by 1.4 million in the next 15 years, the number of bus journeys will also soar. Annual bus trips are expected to rise from 2.4 billion to 2.6 billion by 2020/2021.

With this in mind, we are working to ensure we can meet this demand. We must keep London moving, and continue to make our bus network one of the most efficient in the world. These, however, are not our only challenges. Although we are on track to meet the future travel needs of the city, our priority is to do it in a way that minimises the environmental impact. We are commited to exploring how technology and innovation can help us do this.

Fifteen hundred double-deck buses on London's streets are hybrid, and that number will grow to 3,300

by 2020. We also have several trials under way testing greener technology and charging strategies.

We are pleased to be contributing to the Zero Emission Urban Bus System (ZeEUS) project, which gives us the opportunity to investigate how wireless inductive charging of a double-deck bus could be a solution to sustainable public transport in years to come.

Mike Weston
Director of Buses,
Transport for London

A breath of fresh air – improving London's air quality

Improving air quality is top of the agenda in London. The Mayor has pledged a 60 per cent reduction in the city's carbon dioxide emissions by 2025, compared with 1990 levels.

Ground-based transport accounts for just over a fifth of the Capital's greenhouse gas emissions. Given the expected rise in London's population and employment, significant changes have taken place – with more actions planned – to achieve that target.

The Mayor is legally obliged to work towards the UK Government's air quality objectives, which commit us to meeting limit values set out in the European Union legislation. In some areas, our air quality exceeds the EU limit values for nitrogen dioxide by three times.

As the organisation accountable for delivering a comprehensive transport network in London, we at TfL have committed to:

- Maintain and enhance a reliable, accessible and high quality bus network
- Continue to deliver environmental improvements, including improving the natural environment and air quality, and reduce the impact of noise

We will continue to develop diesel hybrids, electric and hydrogen fuel buses as viable public transport options. This will support the Mayor's long-term vision for London's bus fleet to meet European emission standards, and to affirm its position as a world-leading city tackling climate change.

Welcome to the ZeEUS project

For the next 15 months we will be participating in the ZeEUS (Zero Emission Urban Bus System) project, which is partly funded by the EU. London, alongside seven other cities across Europe, is testing a range of different innovative electric bus technologies and charging infrastructure solutions. Throughout the project the performance of the buses will be monitored to assess the economic and environmental impacts while they are in service. We look forward to working with European partners to share knowledge, data and expertise from each demonstration to develop our future strategy, and to make a real difference to climate change internationally.


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The London trial

Over the past few years we have successfully electrified single-deck buses, and we currently have 17 in our fleet. The question was, although more technically demanding, could we do the same for a double-deck bus? With it being a much-loved symbol of London, we set ourselves the challenge of electrifying a double-deck bus that could be charged wirelessly.

The idea is that the driver will simply park the bus over a 100kwh charging plate at the route's termini to top up its batteries. The power supply will also be supplemented by overnight plug-in charging at the bus garage. It is the first time that this type of inductive charging technology has been tested on a double-deck bus in the UK.

Information about the ZeEUS buses

- Three double-deck range-extended, electric diesel, Enviro 400H hybrid buses will be used
- The buses will be able to run in electric mode for up to 80 per cent of the time over a 20-hour operational day
- The vehicles have Geo-Fencing capabilities that will allow the automatic change to electric mode at hotspots to reduce harmful emissions
- The 61kwh battery can also be charged on-board through regenerative braking technology, with the Euro 6 engine acting as a generator (optimising the battery storage)
- The unloaded weight of each bus is 12,350kg

Partners

- **Alexander Dennis Ltd**
  bus manufacturer
- **European Commission**
  co-funder
- **IPT Technologies**
  charging infrastructure supplier
- **UITP International Association of Public Transport**
  project coordinator
- **Tower Transit**
  bus operator
- **Transport Research Laboratory and Transport & Travel Research Ltd**
  data analysis

Route 69

Following research and in-depth analysis, we selected bus route 69 – which runs from Canning Town Bus Station to Walthamstow Central Bus Station – to host the ZeEUS demonstration. The main reasons for choosing this route are:

- It is 11 km long, which minimises the impact of large, heavy battery packs
- It is served entirely by double-deck buses
- We own the bus stations at each end of the route, making installation of ground charging modules easier to control

Next steps

Our participation in the ZeEUS project will help us understand how best we can use technology in the future to reduce the impact our expanding bus fleet has on the environment. Once we optimise the wireless inductive charging technique, we will then consider rolling this method out to other routes across the Capital. Although this may not be the sole solution to improving air quality in London, it can definitely be one of them.

Useful links

To find out more about our bus investment programme and use of green technology, visit tfl.gov.uk/bus-investment

The Zero Emission Urban Bus System project
zeeus.eu

UITP
www.uitp.org/zeeus-zero-emission-urban-bus-systems

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