

Case Study

Electric bus investment delivers cleaner air, better health and a stronger economy



Stagecoach investment in new electric vehicles will help the UK Government and Greater Manchester Combined Authority achieve climate change and air quality improvement targets, delivering a range of environmental, health and economic benefits.

The Issue

Poor air quality and accelerating climate change linked to carbon emissions are two of the most important challenges facing our country and key city regions. Surface transport is the single largest producer of carbon emissions and the only sector where these are growing. Polluted air is estimated to contribute to more than 40,000 premature deaths across the UK each year, with emissions from cars and vans estimated to cost £6bn annually to the NHS and society. Major city regions, such as Greater Manchester, are seeking to address these challenges through a low emissions strategy and air quality action plan. Greater use of more sustainable public transport, along with active travel, is central to meeting ambitious national and regional targets

The facts

- Air pollution is a major cause of ill-health in our communities and contributes to the equivalent of 1,200 early deaths in Greater Manchester each year.
- Analysis by King's College London estimates that 1.6 million life years will be lost in Greater Manchester in the coming century due to its poisonous air, which is equivalent to an individual's life expectancy reduced by six months.
- Greater Manchester is the most congested region outside of London, with more than 150 roads in breach of legal NO₂ levels.
- In addition, poor air quality is a £1 billion annual cost to the Greater Manchester economy.
- Buses and coaches are responsible for just 6% of pollution from road transport, compared with 41% from diesel cars and 30% from diesel vans.
- However, only around 10% of all buses in Greater Manchester are either electric or meet Euro 6 standards.
- A Clean Air Zone is planned to be introduced in Greater Manchester in two phases from 2021 and 2023 which would involve daily penalties for non-compliant vehicles, including buses.
- Research by Greener Journeys, a UK campaign dedicated to encouraging people to make more sustainable travel choices, suggests that everyone switching from car to bus for just one journey a month would mean one billion fewer car journeys and would save two million tonnes of CO₂ every year in the UK.

The problem

- Transport-related air pollution and emissions will continue to pose serious health, environmental and economic challenges for the Greater Manchester city-region without co-ordinated action and radical behaviour change.
- In Greater Manchester, road transport contributes 65% of emissions of nitrogen oxides and 79% of particulates. It also accounts for 31% of carbon dioxide emissions.

- Nitrogen oxides, especially nitrogen dioxide, and particulates are the most worrying air pollutants in Greater Manchester. Data shows that the region has been in breach of its legal limits for nitrogen dioxide every year since 2011.
- In the UK, the government has introduced a “net zero” target for greenhouse gas (GHG) emissions by 2050
- The mayor of Greater Manchester, Andy Burnham, has pledged to make the Greater Manchester region carbon neutral by 2038.
- Bus operators in England, including Stagecoach, Britain's biggest regional bus operator, have pledged to work with government to make all new buses ultra-low or zero emission from 2025.
- However, the cost of transitioning to cleaner road transport technologies is significant. For example, a new single deck Euro VI diesel bus costs around £190,000. However, a new single deck ultra low emission bus costs £350,000 due to current lower volume production and more expensive components.
- In addition, there are significant associated costs to introduce dedicated electric charging infrastructure.

The solution

- Stagecoach has invested more than £1billion in greener buses with cleaner technologies over the past decade. It has been the leading investor in hybrid electric buses in the UK, as well as introducing vehicles powered by alternative fuels, including biofuels and hydrogen.
- The UK Department for Transport (DfT) and the Office for Low Emission Vehicles (OLEV) has put in place an Ultra-Low Emission Bus Scheme (ULEBS) to mitigate the significant extra cost of ultra-low emission buses (ULEBs) over standard diesel vehicles.
- A ULEB saves 30% well-to-wheel greenhouse gas emissions over the UK bus cycle compared to a Euro VI diesel bus of equivalent passenger capacity. It has a Euro VI certified engine or equivalent emissions capability, also helping reduce other emissions, such as harmful NOx and particulate matter.

- The £48m scheme is available to local authorities and bus operators in England and Wales- separate programmes are in place in Scotland and Northern - to help purchase ULEBs and supporting infrastructure between 2018-2021.
- Stagecoach, supported by Greater Manchester Mayor Andy Burnham, Transport for Greater Manchester and other key organisations, submitted a successful bid to the ULEBS to introduce a fleet of new e-buses in the region.
- A new 32-vehicle fleet of zero emissions electric buses are being introduced in Greater Manchester in early 2020 at a total cost of £16.5million, with £6.9m from ULEBS.
- Investment is also being made in delivering infrastructure and power requirements at depot level. Intelligent chargers will be used to limit loadings on the electricity supply and maximise vehicle availability.
- The new double-decker buses - which will replace conventional Euro 3 and Euro 4 vehicles - have a range of up to 190 miles and capacity to carry around 80 passengers.
- They are being built by the UK's leading electric bus manufacturer Alexander Dennis using battery and power electronics expertise from automotive company BYD.
- The e-bus fleet will operate two key high frequency services connecting Manchester city centre, Manchester Airport, five hospitals and two universities. It will also complement recent public investment in bus priority measures in the south of the city.

The benefit

- The new e-bus fleet for Greater Manchester offers a 62% improvement in CO2 emissions over the latest low-carbon emission buses and supports the region's Air Quality Action Plan
- Overall, the initiative will save 920,000 litres of diesel a year, reduce annual CO2 by 2,400 tonnes, and cut NOx emissions by 9% and particulates by 7% across the fleet.

- The introduction of new electric buses will enable the cascade of existing low-carbon emissions vehicles onto two routes, allowing allow the removal of older buses that comply with previous emissions standards and delivering a further improvement in overall emissions.
- As well as delivering associated health benefits, the investment will support efforts to deliver modal shift from the car and reduce congestion. Pollution from vehicles is four times worse in congestion compared to free-flowing traffic.
- Stagecoach's investment will also help accelerate the introduction of e-buses across Europe. There are currently around 725,000 buses in operation across Europe, but only an estimated 2,500 of those are fully electric.

Summary

Greater Manchester, one of the UK's biggest and most important city regions, faces an environmental, health and economic challenge from worsening road congestion and declining air quality.

Sustainable urban mobility solutions are central to national governments and regional authorities delivering on their strategies to meet the twin challenges of addressing climate change and delivering cleaner air.

Stagecoach worked in partnership with Greater Manchester Combined Authority, the region's Mayor and the Department for Transport to deliver plans for a fleet of new zero emission electric buses for the region.

The new investment will deliver significant greenhouse gas emissions reductions, cuts to local air pollution, improvements to public health and opportunities to deliver modal shift from the private car to shared bus travel to cut congestion and improve the functioning for the local economy.