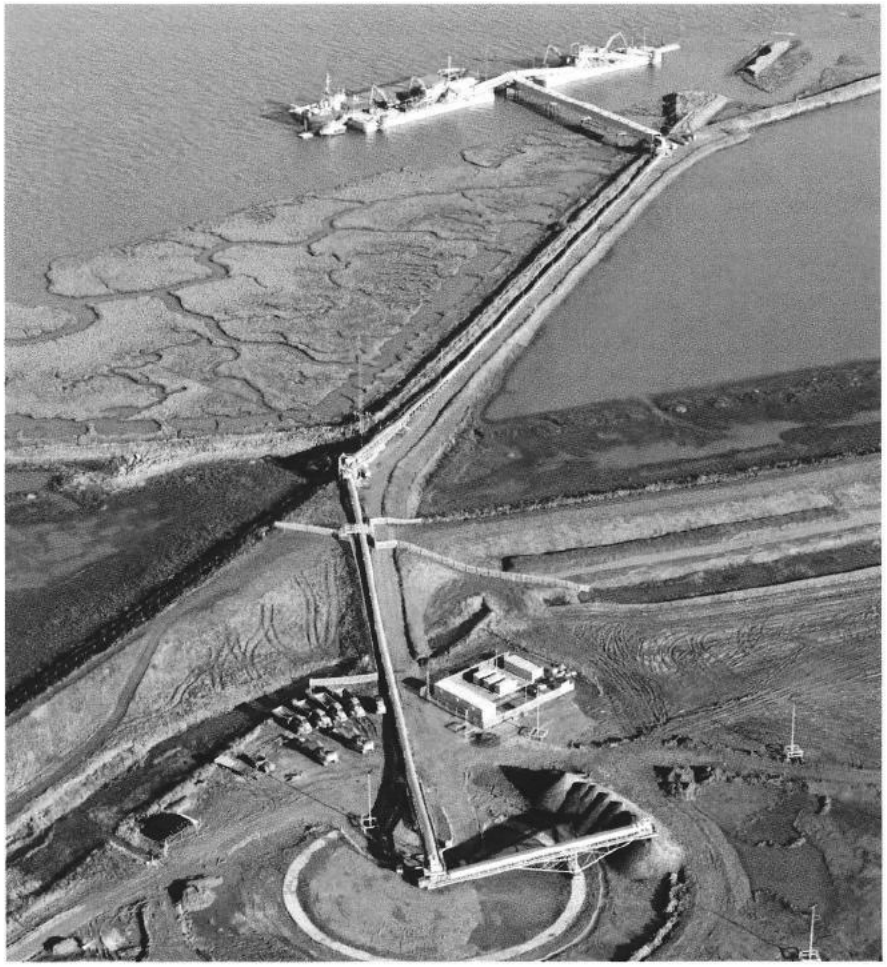
Managing environmental impacts, current and future performance



Crossrail is reusing excavated materials at Wallasea Island for the Royal Society for the Protection of Birds

Carbon, energy and climate resilience

Reducing carbon emissions and preparing for the potential impacts of climate change and extreme weather

We are currently the single biggest consumer of electricity in London and one of the top 10 in the UK. Electricity consumption is a significant contributor to climate change and we have a responsibility to use energy efficiently.

As we continue to invest in transport infrastructure and service capacity, one of our major challenges is how to reduce total carbon emissions. Progressively improving the efficiency of our operations is essential if this is to be achieved.

Approximately half of our carbon dioxide (CO_2) emissions come from electricity used for powering the Tube; the other half is associated with hydrocarbon fuel use in buses, support fleet vehicles and emissions from the taxis and private hire vehicles that we license.

Achievements

We set a target to reduce the normalised CO_2 emissions (measured in grams of CO_2 per passenger kilometre) from our main public transport services by 20 per cent in 2017/18, against a 2005/06 baseline (equivalent to 1990 emissions). In 2013, we reported a fall in normalised emissions to 61 grams equivalent CO_2 (CO_2e) per passenger kilometre, slightly more than 20 per cent below the baseline (77 grams CO_2 per passenger kilometre). As a result, we achieved the 2017/18 target in 2013. We are now setting a more ambitious goal to support the Mayor's aim of a 60 per cent CO_2 reduction in London by 2025.

We have looked at how we purchase electricity, including considering lower carbon and diversified sources, and have introduced procurement processes to develop this further. We have also put in place a range of measures to help monitor and manage our electricity use. These include installing automatic meters at more than half of our Tube stations and in many surface transport operational premises and demonstrate carbon assessment into project decision-making and management.

In addition, we have implemented energy efficiency initiatives across our head offices, Underground and Surface Transport business areas. Those that ensure efficient use of electricity to power Tube trains are best delivered as lines and trains are upgraded. Measures implemented during recent improvement work, for instance on the Victoria line, include using regenerative braking – where energy otherwise lost when trains slow down is captured and made available for use by following trains.

A number of innovative measures have been tested at Vauxhall bus station, Walworth bus garage, head office buildings and at Leicester Square and Sloane Square Tube stations. These include renewable energy, lighting, centralised cooling and heat recovery systems, plus automation and control technology. The most successful measures will be introduced elsewhere across our organisation.

We have significantly reduced CO_2 emissions from our bus fleet by introducing hybrid engines. Also, in our support fleet, the specification for grams per kilometre of engine emissions has consistently improved. There is also the successful ongoing Destination Green staff engagement campaign and awards,

Head Office Environment Champions and LU's Energy Saving Challenge.

We have assessed and evaluated the impacts of extreme weather and future climate change on our assets and services, referencing the 2009 United Kingdom Climate Projections (UKCP 09). We have focused on the predictions for Greater London rainfall and temperature in the 2020s, 2050s and 2080s. With today's extreme weather, we have a proactive planning approach in response to forecasts. We aim to run as many services as possible and provide accurate real-time information as a situation develops, and this has received positive feedback following the winter storms and rain of 2013/14.

Objectives

- We will minimise our energy use and therefore the carbon emissions of assets, buildings and vehicles
- We will use energy-efficient and low-carbon principles are embedded across all levels of the organisation
- Our energy will come from verifiable low-carbon or renewable energy sources
- We will minimise the risks to people, operations and assets from extreme weather and climate change

Targets

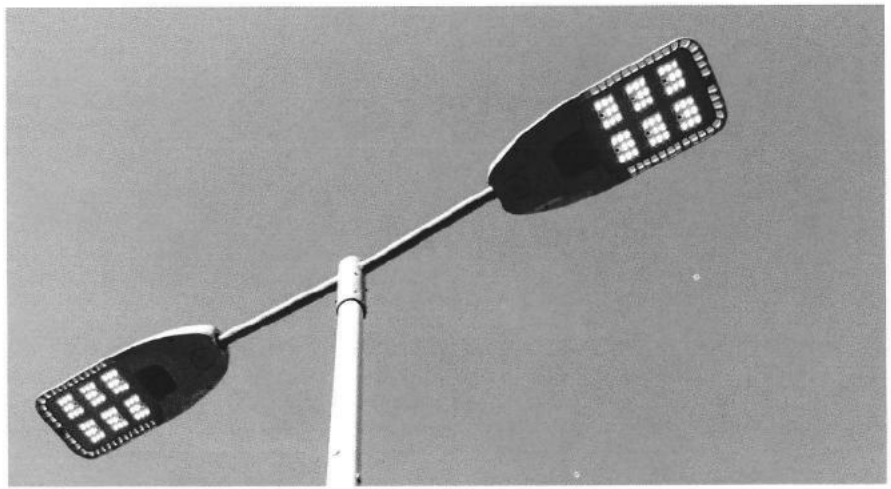
We will contribute towards achieving the Mayor's target of a 60 per cent reduction in CO_2 emissions by 2025 (against a 2013 baseline) by aiming for a 40 per cent cut in TfL CO_2 emissions.

We will further reduce the amount of carbon per passenger journey by cutting emissions of CO_2 per passenger kilometre by 40 per cent by 2025 (against a 2013 baseline).*

A 40 per cent reduction in overall CO_2 emissions is a stretching target as our planned increase in services and infrastructure will result in a further rise in energy use. To fully meet our targets requires the reduction in the carbon intensity of grid electricity as projected by the Government's Committee on Climate Change.

We will achieve these targets by:

- Diversifying energy supply to increase the amount of decentralised energy from local generators in London. Our aspiration is to achieve 20 per cent of annual demand from these sources by 2016 and 40 per cent by 2020
- Embedding energy efficiency and resilience in business processes, for example business cases, design and procurement
- Introducing a programme of energy efficiency improvements for our assets and buildings, using the GLA's RE:FIT methodology where appropriate
- Developing a culture of energy efficiency and low-carbon behaviour across the organisation through, for example, staff engagement initiatives and performance management



TfL is delivering energy efficient lighting at many tramstops, stations, tunnels and buildings

- Using low-carbon fuels and vehicles in our fleet, including the hybrid bus roll-out; biodiesel bus pilot; trialling and promoting electric vehicle and hydrogen fuel cell technology for buses. Dial-a-Ride vehicles and our support fleet; and working with Government agencies to achieve our goals
- Taking a risk-based approach to identifying and managing key weather and climate vulnerabilities. We will keep our identified risks as low as is reasonably practical and will review them on a regular basis

Measuring progress

We will measure and publicly report on our carbon emissions against an annual forecast. This will cover the emissions that we have control over, for instance arising from buses, Underground and Overground trains, DLR, Tramlink and head office buildings.

We will also report on weather and climate change resilience reviews and plans.

* Under r.. lowing new information

Air quality

Reducing polluting emissions and exposure to air pollution in London

We are a key partner in delivering the Mayor's Air Quality Strategy, through policy measures such as the Low Emission Zone, delivering sustainable transport options and promoting low-emission vehicles, walking, cycling and smarter travel choices.

We aim to reduce emissions to air from our bus fleet, the taxis and private hire vehicles we license and our support fleet. We also aim to lead by example, demonstrating good practice in the type of vehicles we use and how they are operated. Combustion of fuel results in emissions of pollutants into the air as particulate matter (PM) and oxides of nitrogen (NO_x).

The Transport Emissions Action Plan sets out our continuing work to achieve air quality improvements from wider, private transport in the Capital. This includes plans to develop an Ultra Low Emission Zone in central London by 2020. The environmental performance related to this is outside the scope of this framework.

Achievements
We are proud to have the cleanest bus fleet in the UK as a result of fitting diesel particulate filters (DPFs) to Euro II and III vehicles and introducing diesel-electric hybrid buses, including the New Routemaster. NO_x emissions will be reduced further with the early replacement of approximately 900 Euro III vehicles with Euro VI models and retrofitting the remaining Euro III buses in the fleet with selective catalytic reduction equipment.

Similar efforts are being made to reduce emissions from other parts of our fleet. Trials of ultra low-emission vehicles will continue in the support fleet and DPFs are being fitted to Woolwich Ferry vessels. We are also working with the taxi and private hire industry to encourage the introduction of ultra low-emission vehicles.

The Mayor has called on local authorities to introduce innovative measures to improve air quality through the Mayor's Air Quality Fund. This builds on lessons learnt from the Government-funded Clean Air Fund, which:

- Trialled dust suppressants
- Fitted DPFs on buses on routes through air quality priority areas
- Encouraged behaviour change through public campaigns and advice for drivers of taxis and private hire vehicles
- Researched the air quality benefits of green walls

We have reduced dust from our construction activities, for example at the Tottenham Court Road and Victoria station upgrade projects, and cut vehicle air emissions associated with freight transport by developing detailed delivery and equipment removal plans.

Objectives
- We will work towards zero pollutant emissions from our fleet vehicles
- We will include air quality requirements in policies, projects and contracts

Our electric bus on trial from Victoria to Waterloo

Targets
We will seek to support the Mayor's air quality targets for London by delivering a 50 per cent reduction in NO_x emissions from the bus fleet by 2020, against a 2013 baseline.

We will reduce PM emissions from the bus fleet by 25 per cent by 2020, against a 2013 baseline.

These targets are ambitious but will be achievable through a range of measures including:

- Delivering selective catalytic reduction to reduce NO_x emissions from Euro III buses
- Introducing 1,700 hybrid buses by 2016
- Implementing a technology and fuel demonstration programme to reduce emissions from buses, including trialling hydrogen and electric buses
- Continuing to implement our support fleet environmental policy, working with the Office for Low Emission Vehicles to achieve air quality and carbon reduction goals
- Working in partnership with Government, the EU and other transport organisations and technical experts to continue trialling new technologies and fuels. Hydrogen buses are a small but important part of the fleet and the first electric buses began running in London 2014. Infrastructure development will continue to support these emerging technologies and trials of wireless induction charging is the next important step
- Specifying, through procurement and contracts, that our suppliers must meet emission requirements for their vehicle fleets

Measuring progress
We will measure and report publicly on the 50 per cent reduction target for NO_x and 25 per cent reduction target for PM emissions by 2020, against an annual forecast.

Noise

Effectively managing and controlling transport-related noise and vibration

Noise is an important part of determining quality of life in the Capital. Sound levels or vibration from transport, such as train and vehicle movements, construction works or public announcements, can affect those who work or live close to the transport system.

We want to ensure that noise disturbance is minimised wherever possible. As a result we make every effort to specify noise limits and good practice on construction sites, trains and vehicles that are at least as good as statutory standards. We also make sure public announcements at stations are limited to the minimum required.

We have to balance the need to deliver improvement projects quickly with an obligation to reduce noise nuisance, especially at night, to residential and business neighbours, in partnership with local planning authorities.

Achievements

Construction activities are monitored carefully to ensure that agreed noise limits and operating hours are adhered to. We communicate plans for out-of-hours working to neighbours in advance.

We have recently seen a significant increase in construction works as part of our improvements, including for Crossrail and on major LU projects. This is in addition to our regular maintenance. While associated noise complaints often mirror the amount of construction work taking place, there has been a gradual decline in the number of noise complaints that we receive.

Much has been done to reduce noise from buses, trains, support fleet vehicles, rail and road surfaces, and we will continue to trial and use improved technology and materials. Measures have been implemented that help us minimise noise, especially during night-time engineering hours.

Objectives

- We will reduce noise and vibration from our vehicles and rolling stock
- We will reduce noise and vibration from our transport infrastructure and operations
- We will reduce noise and vibration from our maintenance and improvement programmes
- We will develop a target for surfacing the TLRN with lower-noise materials

Targets

- Reduce the number of noise-related complaints
- Respond to 100 per cent of noise and vibration complaints regarding rail services within 10 working days, and deal with 90 per cent of these within the target date
- Review the Section 61 (construction noise consenting) process and deliver improvements applicable to large, medium and small projects
- Ensure 90 per cent of buses in our fleet are at least two decibels quieter than the required legal limit by 2015

We will achieve these targets by:

- Continuing to test and use improved technology and materials, including targeted trials for solutions relevant to specific locations, with the aim of reducing noise impacts
- Ensuring effective communication with local residents and businesses potentially affected by noise or vibration from construction and maintenance activities
- Producing a regular summary of rail complaints by, for instance, service area
- Developing a tool showing areas with jointed track and a programme for replacement
- Completing the roll-out of quieter trains on all LU sub-surface lines by 2016

Measuring progress

We will measure and report annually on progress in achieving our noise targets and the associated delivery plans.

Our new trains are quieter for customers and neighbours