

Transport for London

Environment Report 2007



About TfL

Transport for London (TfL) was created in 2000 and is a functional body of the Greater London Authority (GLA). Its role is to implement the Mayor of London's Transport Strategy and manage transport services across the Capital.

TfL manages London's buses, London Underground (LU), Docklands Light Railway (DLR) and Croydon Tramlink. It also runs London River Services (LRS), Victoria Coach Station and the London Transport Museum. In November 2007, it became responsible for the new London Overground train services, which operate on the North London Railway.

As well as running London's Congestion Charging scheme, TfL manages a 580km network of main roads, all of London's 6,000 traffic lights and regulates taxis and the

private hire trade. To ensure greater accessibility, TfL also coordinates schemes for transport users with mobility impairments as well as running Dial-a-Ride, a door-to-door service for disabled people who are unable to use buses, trams or the Tube.

Real progress is being made to improve road safety in the Capital and to enhance conditions for walkers, cyclists, drivers and freight operators.

Thanks to increased investment by TfL in schemes and infrastructure, the number of people cycling on London's major roads has now risen by 83 per cent compared with 2000. This, together with TfL's continued focus on programmes that encourage people to reduce their reliance on private cars for short journeys, has helped the Capital become the only major city in the world to achieve a shift away from private car usage.

'As well as improving our transport networks, we are looking at the way TfL impacts on the environment as a business.'

Peter Hendy, London's Transport Commissioner



Number of passenger journeys by modeⁱ

Transport mode	Passenger journeys 2006/07 (million) ⁱⁱ	Change since 2005/06
Underground	1,010	+4%
Bus	1,880	+4%
DLR	61.3	+16%
Croydon Tramlink	24.5	+9%
LRS	2.42	+14%
Taxicard journeys ⁱⁱⁱ	1.28	+14%
Dial-a-Ride	1.17	-5%
Taxis & private hire vehicles	91	+4%
Car	3,970	0%
Motorcycle	73	-1%
Bicycle	170	+8%
Walk	2,050	0%



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Message from the Commissioner



The Mayor of London's Climate Change Action Plan sets out clear targets for cutting emissions across the Capital and the steps that must be taken to meet these targets. The plan makes it clear that reducing transport-related greenhouse gas emissions will help London tackle climate change and the environmental, social and economic implications that this global threat brings with it.

TfL has a large part to play in the plan, and rightly so. Our organisation is made up of around 20,000 staff, spread across numerous locations, and during 2006/07 our total expenditure was £6.5bn. In addition, around three billion passenger journeys were made on the TfL network, nearly 215 million

higher than in 2005/06. This gives some idea of the scale of our operations – and the opportunity we therefore have to make a big difference.

So far, TfL's efforts have helped achieve a switch from private car usage to public transport of five per cent between 1999 and 2006 – the first modal shift of its kind in a major world city. This has been largely due to service improvements, especially on London Buses; capacity increases with projects such as the Docklands Light Railway (DLR) Woolwich Arsenal extension and the new 6.5km DLR line from Royal Victoria to Stratford International; Congestion Charging and increased investment in cycling, from £5.5m in 2002 to £24m for 2006/07.

Emissions from road traffic have also stabilised in London, while they have risen in other world cities. A major factor has been the Congestion Charge, which has led to a 16 per cent cut in carbon dioxide (CO₂) emissions within the central London zone. By extending the zone westward in February 2007, traffic levels were reduced by 13 per cent. Plans were also put in place for a London-wide Low Emission Zone to deter the most polluting vehicles from driving in the area.

We are operating our transport systems more efficiently and we are pioneering technologies such as improved engines, lighter vehicles and low carbon fuels,

especially among our 8,200-strong bus fleet. In March 2007, a double-decker hybrid bus was introduced in the Capital, the first of its kind to enter public service anywhere in the world.

There are a number of initiatives underway such as school, workplace and personal travel plans, and we are working hard to establish public transport, walking and cycling as increasingly attractive alternatives to the car to encourage more sustainable travel. Increased investment, and events such as the Grand Départ of the Tour de France, has helped boost the number of people cycling on London's major roads by 83 per cent, compared to 2000.

Overall, our efforts to reduce, reuse and recycle are delivering real benefits. The success of TfL's Oyster card, which is now being used for 73 per cent of all passenger journeys, has meant one million fewer paper tickets being sold each week. Recycling on the Underground has also been stepped up following a dramatic increase in the amount of waste paper being left on the Tube. Every day, 32 tonnes of rubbish are removed from the Underground, an unfortunate rise of almost 30 per cent on last year's figures. Around 32 per cent of it is recycled, and this is planned to increase.

As well as improving our transport networks, we are looking at the way TfL impacts on

the environment as a business. In 2006/07, 20 per cent of the electricity used by TfL was from renewable sources and we succeeded in cutting energy consumption at our head offices by 14 per cent. We are also implementing measures to reduce water consumption and have introduced stringent procurement guidelines to ensure we purchase goods with a lower environmental impact.

This report demonstrates TfL's commitment to, and progress with, delivering environmental improvements. However, the Capital's population and economy are set to grow significantly in the coming years and the demand for public transport will only increase, making the challenge facing us even greater. We're taking great strides forward but there's still a lot to do if we are to help ensure a clean, healthy, prosperous city for future generations.



Peter Hendy
Commissioner
Transport for London

Environmental achievements

This is TfL's fourth annual Environment Report, covering the financial year ending 31 March 2007. It aims to provide an overview of the environmental issues that are most relevant to TfL's operations. In addition, it outlines the organisation's approach to addressing and managing these issues in line with the Mayor's strategies to make London a more sustainable city.

Progress made by TfL during 2006/07 is discussed throughout this report and is illustrated by case studies highlighting examples of TfL's environmental projects and progress. Some key environmental achievements from 2006/07 are outlined below:

- The western extension of the Congestion Charging zone was introduced. So far it has reduced traffic levels by 13 per cent, on average, and is expected to reduce CO₂ emissions and air pollution
- Plans for the Low Emission Zone were finalised following public consultation and approved by the Mayor of London. From 2008, it will require diesel-engine HGVs, coaches and buses to meet Euro 3 emissions standards for particulates, reducing pollution throughout Greater London. Over time, tougher emissions standards will be introduced for a broader range of heavy vehicles
- 'Sustainable freight distribution: A plan for London', which sets out proposals to encourage more environmentally friendly freight operations, was consulted on and finalised
- Spoil from tunnel-boring to form the DLR Woolwich Arsenal extension was transported via Thames barges, which saved around 11,000 lorry journeys by road over the duration of the project
- TfL contributed to the development of the Mayor's Climate Change Action Plan and launched its own Climate Change Fund, which is offering up to £25m over the next three years to support additional CO₂ reduction initiatives within TfL



- Smarter Travel Sutton was launched, which is an intensive three-year programme of travel demand management measures aimed at encouraging more local residents to use public transport, walk and cycle^{iv}
- Oyster cards were used for more than 73 per cent of the daily 9.2 million trips on public transport in the Capital, and around one million fewer paper tickets were sold each week as a result
- TfL completed a successful three-year trial of hydrogen-powered fuel cell buses, and developed plans to procure additional hydrogen vehicles
- The world's first double-decker hybrid bus went into service, with plans to have a total of 60 hybrid buses operating by the end of 2008
- The first fleet of Euro 4 buses entered service, which have pollution abatement technology fitted as standard. They also have better fuel economy and emit less CO₂
- Energy champions at LU stations reduced energy consumption by 14 per cent, by encouraging colleagues to turn off unnecessary lighting and escalators during engineering hours
- Improving the efficiency of lighting and heating systems and reminding staff to switch off un-used equipment enabled TfL's head offices to achieve recognition through the Energy Efficiency Accreditation Scheme^v
- As a result of the DLR extension, London City Airport now has the highest proportion of passengers arriving by rail of any airport in the UK, which has led to a reduction in car and taxi trips to the airport and an estimated annual saving of more than 156 tonnes of CO₂ emissions

TfL, transport and the environment

TfL's operations extend to every London borough and a number of surrounding counties, and the organisation's activities affect the vast majority of those living and working in the Capital.

The population of London currently stands at more than 7.5 million and is expected to grow to 8.1 million^{vi} by 2016. This rise will be accompanied by an increase in passenger journeys and freight transport so it is imperative that TfL delivers the services London needs to meet future demand and support economic growth.

Transport has a significant effect on the environment, which TfL has an opportunity and a duty to reduce.

The Mayor's five environmental strategies set out his proposals, priorities and targets for making London a more sustainable city. They cover air quality, biodiversity, energy, waste management and ambient noise, all of which are discussed in more detail later in this report. The Mayor has also set out a Climate Change Action Plan.

TfL plays a key role in implementing the Mayor's environmental strategies and plans by:

- Influencing how people travel and the way goods are transported in order to

reduce the impacts of private transport, in particular encouraging the use of more environmentally-friendly modes, including public transport, walking and cycling

- Reducing the environmental impacts of the public transport services for which TfL is responsible
- Managing the impacts of TfL's offices, support services and construction projects

TfL's environmental priorities are set by the Mayor's Transport Strategy, the London Plan and the environmental strategies. These priorities are determined by considering the main environmental concerns in London – and on a global scale – and understanding the relative impact of transport on them. TfL's ability to control or influence particular environmental impacts is also taken into account and efforts are focused on the areas where the most substantial improvements can be made.

TfL's environmental priorities can be considered in terms of three main issues:

- **Facing up to the global challenge of climate change:**
Transport, in particular private motor vehicles and road freight, is a major source of CO₂ emissions in London, which contributes to global climate change



- **Protecting the local environment:**

Air pollution and noise are the biggest impacts that transport has on the local environment – again transport by road is the major contributor. TfL also has a role to play in managing the built environment and protecting biodiversity

- **Making better use of resources:**

In addition to energy, TfL uses significant quantities of resources such as water and construction materials. The amount and type of resources used, and how waste materials are managed, determine the extent of the environmental impact

The following sections describe each of these challenges in more detail, explain TfL's response and report on performance in 2006/07.

Although much of TfL's work to reduce the environmental impacts of transport is aimed at private transport, including cars and the freight sector, it is important to note that the environmental key performance indicators (KPIs) reported here only measure the impacts of public transport, including taxis and private hire vehicles, and the support services run by TfL and its contractors. This is due to a lack of available, accurate data, which TfL is seeking to address. See 'About this report' and the separate data tables section of this document for more information.

More than half a billion vehicle kilometres were covered by buses, trains on the Underground and DLR last year – almost enough to travel to the sun and back, twice!^{vii}

Together, vans and goods vehicles drove almost 10 times as far. Cars, motorcycles and taxis travelled more than 50 times that distance^{viii}

Facing up to the global challenge of climate change

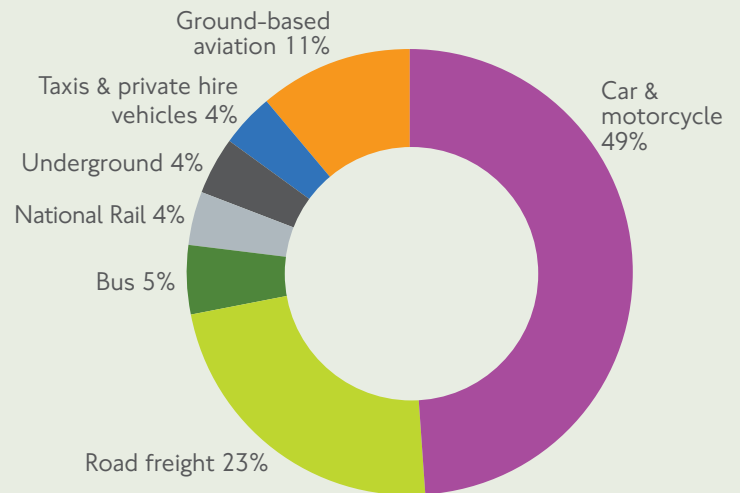
The challenge

Climate change has fundamental environmental, social and economic implications. It is broadly accepted that it is caused by emissions of greenhouse gases, particularly CO₂ from human activities.

Transport (excluding aviation) accounts for 22 per cent of London's total CO₂ emissions.^{ix} Private cars and road freight contribute the majority of emissions from transport.

As a result, CO₂ emissions from transport in the Capital are contributing to problems that are already being encountered on a global scale.

CO₂ emissions from transport in London during 2006 by mode^x



Case study: Renewable energy for street lighting

The London Borough of Hounslow has been trialling solar and wind-powered street lighting on Hounslow High Street in a bid to cut associated CO₂ emissions.

The lighting was successfully introduced in August 2007 after financing was made available through TfL's Local Implementation Plan funding process, which requires boroughs to submit plans outlining projects that support the Mayor's Transport Strategy at a local level.

Installation of the lighting has successfully raised awareness of the benefits of using renewable energy and other boroughs have since sought funding for street lighting powered in this way. This is good news as the boroughs are actively looking for innovative ways to protect London's environment.

The trial is also enabling TfL to look into the potential for using renewable energy powered street lighting on the Transport for London Road Network (TLRN).



TfL's response

Addressing this issue is the Mayor's top priority and this was outlined in his Climate Change Action Plan, published in February 2007. For CO₂ emissions, the Plan aims to achieve a 60 per cent reduction on 1990 levels, by 2025, across all sectors. The Plan includes a Green Transport Programme, which will enable the transport sector to make a contribution to achieving this target in London.

TfL has an obligation not only to control emissions from public transport and its own support services, but to go beyond that and help reduce CO₂ emissions from private cars and freight vehicles, which emit much more CO₂ than the public transport system.

To fulfil its role and face up to the challenge of climate change, TfL is striving to cut emissions by:

- Changing the way people travel by making public transport more attractive, promoting walking and cycling, managing travel demand, introducing Congestion Charging, and influencing land use planning. Travel demand management includes implementing school, workplace and personalised travel plans and raising travel awareness, all of which are being tested in the Smarter Travel Sutton pilot launched in 2006^{xi}
- Encouraging more efficient operation of private and public transport, including promoting smarter driving techniques, developing intelligent speed adaptation systems for road vehicles, improving the efficiency of train control systems on the Underground and using infrastructure and equipment more efficiently
- Promoting enhanced vehicle and fuel types, including more fuel efficient engines, lighter vehicles and low carbon fuels. Improved vehicle technologies and alternative fuels are being introduced on public transport, including hybrid vehicles and hydrogen power. Biofuels are also being trialled with a view to identifying fuels that deliver emissions reductions while meeting broader sustainability standards. TfL is also encouraging adoption of new technologies and low carbon fuels for private transport
- Reducing emissions from TfL's offices and support services by improving the energy efficiency of offices and using renewable energy, implementing a travel plan and behavioural change campaign for staff, operating its support fleet more efficiently by incorporating improved vehicle and fuel types

Many of the above measures to reduce CO₂ emissions will also lower air pollution and improve the local environment.

Implementing them is an ongoing process, and it will take time to achieve significant reductions in CO₂ emissions.

In early 2007, TfL launched its Climate Change Fund that sets aside £25m over three years for projects that will deliver CO₂ savings, above and beyond those already budgeted for in the Business Plan.

Another vitally important objective is to adapt TfL's infrastructure to cope with the expected impacts of climate change, such as increased summer temperatures and flash flooding. This is being addressed through TfL's Investment Programme and ongoing asset management activities, including extensive work to investigate means of cooling the Underground.

Case study: Plaistow's energy champion

Station Supervisor Ricky Gregory was named LU's Energy Champion for 2006/07 after leading his Plaistow colleagues in a bid to significantly reduce the amount of energy used at the station.

Plaistow used to be among the poorer performing stations when it came to conserving energy, with lights being left on constantly. However, during the station's refurbishment, Ricky made sure contractors fitted new lighting with sensor controls to cut back on the energy being wasted.

He also inspired his colleagues to join the transformation by turning lights off when they weren't needed, switching

off computer monitors and making sure heaters were only used when necessary. As a result, Plaistow leaped from 229 to 14 in LU's league of the most energy-efficient stations.

Ricky's endeavours were inspired by LU's Energy Station Challenge, which encourages staff to think about energy and CO₂ efficiency during their already busy working days.

Since it began seven years ago, the initiative has led to a 14 per cent reduction in the amount of energy used at stations, has cut costs and has generated friendly competition.



TfL's performance

TfL uses the following KPIs to monitor progress in reducing its contribution to climate change:

- Total CO₂ emissions and CO₂ emissions per passenger kilometre
- Energy consumption, by energy type
- Proportion of electricity obtained from renewable sources

Although many of the policies and activities described above are targeted at reducing emissions from private transport, including cars and freight, the KPIs reported below do not yet include emissions from these modes due to a lack of reliable data. The trends described in this section do not, therefore, represent the whole picture, but TfL is working to address this by improving the KPIs it uses for future years. Details of the data included are available in the separate data tables section.

The two largest modes, the Underground and buses, each account for just over a third of TfL's CO₂ emissions. In 2006/07, total reported CO₂ emissions were virtually the same as in 2005/06, even though total passenger kilometres travelled on the main public transport modes increased by six per cent.

Greater energy efficiency on the Underground, in London Streets operations and in TfL's head offices, plus reduced emissions from buses, have all helped to maintain emissions at the same level in spite of increasing service delivery.

Emissions of CO₂ from the production of electricity used by TfL, mainly to power the Underground, have been included in the figures reported below. In 2006/07, electricity use accounted for 32 per cent of TfL's total reported CO₂ emissions. The remaining 68 per cent arose from combustion of gas and liquid fuels.

CO₂ emissions

Year	Total CO ₂ emissions (tonnes) ^{xii}
2005/06 ^{xiii}	1,720,000
2006/07	1,720,000

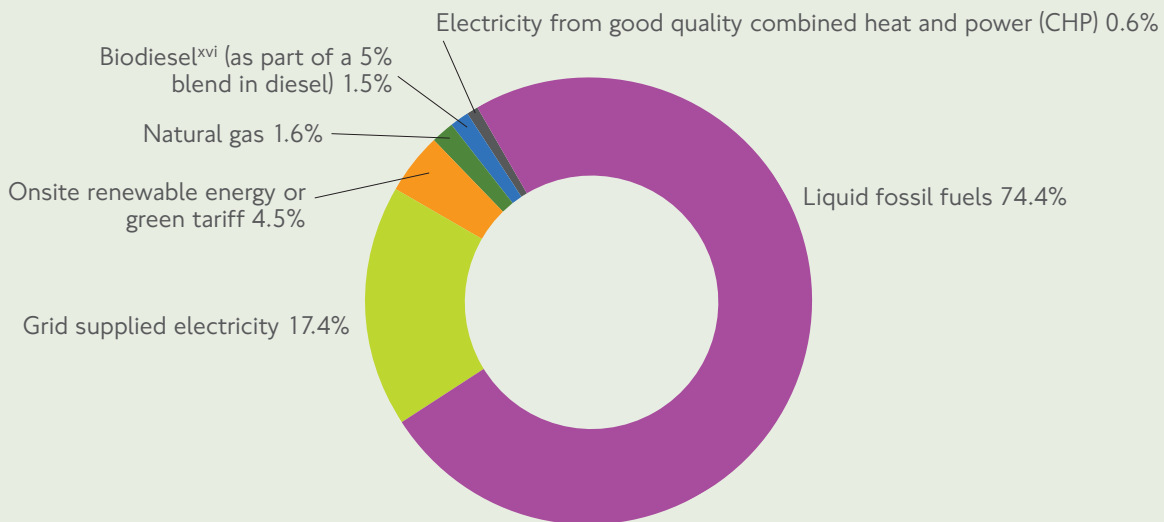
CO₂ emissions per passenger kilometre^{xiv}

Transport mode	CO ₂ emissions (grams), per passenger km 2006/07	Change since 2005/06
Underground	65	-3%
Bus	82	-12%
DLR	74	-20% ^{xv}
Croydon Tramlink	42	5%

Emissions per passenger kilometre on the Underground have fallen since 2005/06 due to increasing usage and more efficient operation, continuing a downward trend established in 2003. Buses also reduced their emissions per passenger kilometre by carrying significantly more people. The number of passenger kilometres increased on DLR and a drop in electricity consumption was also reported, although this is understood to be linked to more accurate monitoring of electricity use and does not necessarily indicate increased efficiency. Croydon Tramlink's emissions increased, as the electricity supply was changed in 2006/07 and no longer includes a portion of green tariff electricity.



Sources of energy used in 2006/7



The total reported amount of electricity and fuel used by TfL and its services was 5.8 billion kWh in 2006/07, a slight increase compared to the previous year. The proportion used from each energy source in 2006/07 is shown above.

TfL's head office buildings are only responsible for 1.2 per cent of the TfL Group's total CO₂ emissions. However, significant efforts have been made to reduce energy consumption at these sites. As a

result of this, energy consumption has decreased by 14 per cent per unit of floor space in head office buildings, to 357kWh per square metre in 2006/07.

Twenty per cent of electricity consumed across TfL in 2006/07 came from renewable sources, purchased through green tariff contracts, compared with 19 per cent in 2005/06. Figures for the proportion of energy purchased from renewable sources have been revised for

2005/06 due to improved information on the amount of energy supplied for street lighting and traffic signals.

TfL has sought to improve its understanding of the green tariffs offered by energy suppliers. It is considering how renewable energy is supplied under these tariffs and establishing whether the premium it pays is being invested in additional renewable energy generation or subsidising suppliers' compliance with the Renewables Obligation.^{xvii}

The organisation is keen to ensure that the renewable energy it purchases is additional to that required by Government targets and will be reviewing its energy procurement policy during 2008/09.

Further information

For an explanation of causes and potential consequences of climate change, visit www.climatechallenge.gov.uk

To find out more about the Mayor's Climate Change Action Plan, go to www.london.gov.uk/londonissues/environment.jsp

For details of UK and international government plans to tackle climate change, see www.defra.gov.uk/environment/climatechange/index.htm and www.unfccc.int

Go to tfl.gov.uk for more on TfL's initiatives to reduce the impact transport has on climate change.



Case study: Park Royal waste to energy plant

More than 300 new waste management facilities must be developed to deliver the Mayor's targets for waste self-sufficiency within the Capital. Waste vehicles represent up to 10 per cent of the total freight traffic on London's roads, so the impacts of transporting waste to and from proposed facilities is an important consideration in developing new sites.

The Park Royal Industrial Estate in west London has been identified as a potential site. A TfL-funded study into the transport impacts of a new 'waste to energy' plant on the industrial estate took place during 2006 for the Park Royal Partnership, a company that coordinates a variety of services in the area on behalf of the London Development Agency, local authorities and businesses operating at Park Royal.

The potential new plant could process 100,000 tonnes of commercial and industrial waste a year, which might

otherwise be transported to landfill sites outside London. This could reduce annual distances travelled by waste vehicles by some 500,000km, saving around 450 tonnes of CO₂ a year. The renewable electricity and fuel produced from waste at the facility could generate much bigger savings of more than 12,000 tonnes of CO₂ each year, by replacing conventional energy supplies.

Results of the study will be used to feed into the Pan London Construction and Waste Transport Model. This will provide strategic information on the best locations for new waste management sites.

Stephen Steele, Head of TfL's Freight Unit, said: 'The team actively promotes the consideration of freight transport impacts during the planning of new developments in London, including new waste management facilities.'

Protecting the local environment

The challenge

As in any urban area, the local environment in London is affected by a range of issues, including air pollution, noise, the condition of the built environment and biodiversity.

Nitrogen oxides (NO_x) and fine particles (PM₁₀) emissions from transport are of particular concern, as both pollutants can cause health problems and concentrations in the Capital currently exceed national air quality objectives. Forty-one per cent of London's emissions of NO_x and 67 per cent of the city's PM₁₀ emissions are from road transport.^{xviii}

Noise can disrupt people's lives, leading to stress and disturbed sleep patterns. Ambient noise levels in the Capital are highest along major roads and in Inner London.^{xix} The design, cleanliness and condition of the built environment, including London's buildings, streets and transport system as a whole, also impact on quality of life in the city.

As a transport provider responsible for managing a significant area of land, including wildlife habitats, TfL understands that its activities have a major effect on the quality of London's environment.

TfL's response

Recognising the sensitivity of the local environment and the need to actively protect it, TfL has adopted the following objectives in line with the Mayor's strategies:

- Reduce pollutant emissions to air
- Reduce transport-related noise
- Maintain and, where possible, enhance the quality of London's built and natural environment

In order to meet these objectives, TfL is continuing to:

- Encourage a shift to transport modes with a lower impact on the local environment through improving public transport, Congestion Charging, travel demand management, promotional campaigns, and walking and cycling facilities
- Encourage use of cleaner vehicles, through schemes such as the Low Emission Zone, and use technologies for public transport that reduce local and regional impacts such as hybrid vehicles, lower noise road surface materials, quieter engines and exhaust treatment technology
- Identify and assess the local environmental impacts of major new projects and some established operations using techniques such as traffic modelling, emissions modelling, noise measurement and biodiversity surveys, and develop targeted plans to mitigate these impacts
- Manage existing assets, for example by improving maintenance of rail tracks, road surfaces and engines; preserving historic buildings and infrastructure;



cleaning up litter and graffiti; and repairing vandalised infrastructure

- Actively improve the built and natural environment it manages, through measures such as design quality standards for buildings and other assets, and where possible, improving the landscape to protect and enhance areas rich in biodiversity

It is worth noting that many measures that will help to tackle climate change will also reduce air pollution and noise, including modal shift and improved technologies such as hybrid vehicles. Where possible, opportunities are sought to achieve wider air quality and noise benefits through climate change initiatives.

Case study: School travel plans

Thousands of young people across the Capital have been helping to protect the environment by taking part in TfL's School Travel Plan Programme.

Introduced in 2004, the programme set out to significantly reduce the number of car trips made to and from schools and to remove barriers – real or perceived – to walking, cycling or using public transport.

TfL is committed to ensuring that all of London's schools have a travel plan in place by the end of 2009. By May 2006, a total of 53 per cent had established a plan meeting the national standards, as laid out by the Department for Children, Schools and Families.

School travel plans have led to an average 6.9 per cent reduction in the number of car trips being made to and from schools participating in the programme.

This is expected to benefit the local environment around the schools and reduce CO₂ emissions.

The success has been boosted by further initiatives funded by TfL, including the first cycling school of excellence at New City Primary School in the London Borough of Newham, promotion of cycling with the Go Bike! and BIKE IT initiatives, introduction of the Walk on Wednesday incentive scheme and an increase in the number of TfL School Travel Advisers.

Emma Sheridan, School Travel Plan Programme Manager at TfL, said: 'The programme is delivering real results in terms of modal shift and is a positive example of successful collaboration across TfL departments, London boroughs and schools.'

Case study: LU Biodiversity Action Plan

Orchids on the Northern line, great crested newts on the Central line and stag beetles on the District line were some of the highlights identified in LU's first Biodiversity Action Plan.

LU is one of the largest land owners in London and manages approximately 10 per cent of the Capital's wildlife habitat. With more than half of the Tube network above ground, trackside vegetation provides a valuable haven for plants and animals.

LU published its plan in March 2007 to ensure that the biodiversity value of its property was managed appropriately, particularly as it moved into a major period of investment across the network.

Based on initial LU monitoring and a series of surveys carried out by PPP contractors Metronet and Tube Lines, LU built up a picture of the plants, animals and habitats on its property. It also worked with the London Biodiversity Partnership to understand what could be done to conserve and enhance the biodiversity value of its trackside.

The plan sets out actions to be delivered over a three-year period. Work has already started on these, including development of a communications plan to identify how TfL can improve awareness and understanding of biodiversity among its staff and customers.

The plan can be downloaded from tfl.gov.uk/tubeenvironment

TfL's performance

TfL monitors its performance with respect to the local environment through a series of KPIs:

- For air pollution, it measures total NO_x and PM₁₀ emissions and bus emissions per passenger kilometre
- For noise, it currently records noise complaints on LU, the proportion of LU track that is continuously welded, the proportion of the TLRN which is surfaced with lower noise materials, and the proportion of the bus fleet which is 2dB(A) quieter than the noise certification test limit



- For maintaining and enhancing the built environment, the KPIs are taken from mystery shopper surveys, customer satisfaction surveys and the Local Environmental Quality Survey of England

Again, these KPIs do not yet include the impacts of private transport, including cars and freight, due to a lack of reliable data. Details of the data included are available in the separate data tables section of this document.

NO_x emissions^{xx}

Year	Total NO _x emissions (tonnes)
2005/06 ^{xxi}	8,350
2006/07	8,200

PM₁₀ emissions

Year	Total PM ₁₀ emissions (tonnes)
2005/06 ^{xxii}	159
2006/07	137

Reported total NO_x emissions from public transport and TfL's support services decreased by two per cent between 2005/06 and 2006/07. Reported total PM₁₀ emissions fell by 14 per cent over the same period. Buses, taxis and private hire vehicles are responsible for most of these emissions.

NO_x emissions per bus passenger kilometre decreased by 12 per cent over the year, while PM₁₀ emissions per bus passenger kilometre dropped by 17 per cent, due to increasing passenger travel.

Taxis and private hire vehicles also achieved a reduction in emissions. Taxi owners have been replacing or upgrading vehicles to meet the requirements of the Taxi Emissions Strategy, introduced in 2004, while emissions from private hire vehicles were cut due to the replacement of older vehicles with ones that achieve better Euro emission standards.

Activities to reduce noise from the transport network continued in 2006/07. LU received 11 per cent fewer noise complaints compared to the previous year, while DLR reported noise complaints for the first time. LU and its suppliers have actively engaged with local authorities and communities to manage the impacts of

noise associated with operation of the railway, engineering works and maintenance. The length of LU track that is continuously welded has also doubled, which reduces operational noise. The amount of the TLRN that is surfaced with lower-noise materials has increased to 78 per cent and four per cent of the bus fleet is now at least 2dB(A) quieter than the required legal limit.

Surveys provide TfL with data on Londoners' perceptions of the cleanliness and condition of the built environment which TfL controls. Results show that these generally improved in 2006/07, but Londoners perceived an increase in the amount of waste on the streets in retail and commercial areas.



Further information

The National Air Quality Archive contains an explanation of air pollution – see www.airquality.co.uk/archive/index.php

The London Health Commission offers a useful summary of the links between noise and health at www.londonhealth.gov.uk/pdf/noise_links.pdf.

The Mayor's strategies on air quality, ambient noise and biodiversity are available from

www.london.gov.uk/mayor/environment/strategy.jsp, while the London Plan and associated documents provide more detail on the built environment (www.london.gov.uk/mayor/planning/strategy.jsp).

See tfl.gov.uk for further examples of what TfL is doing to protect the local environment.

‘In a modern world city, people should have the opportunity to live and work without fear of being poisoned by the air they breathe. Thousands of Londoners suffer ill-health from pollution released by traffic fumes. This is why we are launching the London-wide Low Emission Zone. It will improve Londoners' quality of life, and help make London cleaner and greener for residents and visitors alike.’

Ken Livingstone, Mayor of London

Making better use of resources

The challenge

TfL has a responsibility to ensure it uses resources efficiently, to minimise:

- Natural resource depletion
- Emissions and other negative impacts associated with the extraction of natural resources and manufacturing
- The distance that goods are transported
- Waste

Fuel and electricity are among the main resources used by TfL. Other significant goods it purchases include water, construction materials, vehicles, electrical and electronic equipment, furniture and office supplies.

For more information on how energy consumption is being managed, see the 'Facing up to the global challenge of climate change' section of this report.

TfL's response

Overall, the organisation is seeking to:

- Reduce resource consumption and minimise waste
- Use more environmentally friendly products
- Reuse materials on-site where possible, including aggregates and grey water
- Recycle waste

TfL has adopted the GLA Group Responsible Procurement Policy, which commits the organisation to purchasing goods and services that have lower negative impacts and deliver environmental and social benefits where possible.

In addition, it has signed up to the Mayor's Green Procurement Code, which involves working with the Mayor and London Remade^{xxiii} to purchase more products with recycled content.

TfL will also support delivery of the Mayor's forthcoming Water Strategy and Business Waste Strategy, when finalised.

TfL's performance

The organisation's performance on energy consumption is detailed earlier in this report (see 'Facing up to the global challenge of climate change').

In terms of other resource use, TfL currently monitors water consumption, paper use and spend on recycled products across the public transport modes and its support services. TfL is seeking to improve its KPIs but time is needed to establish reporting processes, particularly where contractual arrangements need to be made for data collection. Details of the KPI data are available in the separate data tables section of this document.



Case Study: Water saving devices

The installation of dual flush and urinal controls has helped TfL significantly cut water usage at 10 of its head office sites.

The technology was installed in February 2007 and helped to reduce annual water use in TfL's head office buildings by 17 per cent to 9.4m³ per person in 2006/07, just short of the year's target of 9m³.

It is planned to roll the technology out to additional TfL sites to help the organisation work towards a target

of 8m³ per person in 2007/08. Investigations are also underway to understand the benefits of fitting low-flow mixer taps on basins.

Quinten Babcock, Environment Manager, Group Property and Facilities at TfL, said: 'The target for our head office buildings for the year ahead is challenging. Dual flush and urinal control devices are an important step towards achieving it.'

Reported water consumption has increased, due to the inclusion of figures for bus stations and DLR for the first time. If these new figures are taken out of the calculation, so that 2005/06 performance can be directly compared with 2006/07, consumption actually decreased by four per cent. This was due to efforts to improve efficiency in LU, an ambitious water saving programme in TfL's head office buildings and the water shortages of summer 2006.

Office paper consumption across TfL increased by 26 per cent to 393 tonnes in 2006/07, while the proportion of recycled paper used in offices decreased from

19 per cent to 13 per cent. TfL has taken steps to address this by encouraging double-sided printing in its head office buildings and changing its paper supply contract to significantly increase the proportion of recycled paper purchased in future. In addition, LU used 1,180 tonnes of paper for customer information leaflets, all of which was recycled paper. Total reported spend by TfL on recycled products was almost £4.5m in 2006/07, compared with £4m in 2005/06.

Water consumption

Year	Water consumption (m ³)
2005/06	756,000
2006/07	798,000 ^{xxiv}

Case study: Green procurement

During 2006/07, TfL ensured that all the main components of new office work stations including desks, chairs, desk dividers and carpet tiles, were made from recycled material.





While selecting suppliers for office furniture and carpets, TfL included details of the Mayor's Green Procurement Code in the tender documents to make suppliers aware of its policy of purchasing recycled products with improved

environmental performance. During the selection process, the suppliers' credentials on energy management and resource use were also considered.

These environmental improvements have been implemented with no additional cost to the business. Work is continuing with suppliers to ensure future procurement continues to achieve minimum environmental impact and maximum benefit to TfL.



Waste generated and proportion recycled

Type of waste	Amount of waste generated (tonnes). Lighter shade shows amount recycled.
Commercial and industrial waste	2005/06  10,800 (2,840 recycled)
	2006/07  14,800 ^{xxv} (4,870 recycled)
Construction and demolition waste	2005/06  134,000 (115,000 recycled)
	2006/07  131,000 (108,000 recycled)

TfL also monitors how much waste is produced by its own operations, how much is collected on the public transport modes and what proportion is recycled. There are significant data gaps in this area, which TfL is striving to address. See the separate data tables section for details of what data have been reported. The available figures indicate that TfL needs to work

harder to achieve its objectives of reducing waste and increasing recycling.

Reported commercial and industrial waste increased by 37 per cent compared to the previous year. This was caused partly by the inclusion of data for buses and DLR for the first time, but a significant increase was also observed across other areas of TfL.

The introduction of free afternoon newspapers, which are often discarded on public transport services, is thought to have contributed to this. The proportion of commercial and industrial waste recycled also increased compared to 2005/06.

The amount of construction and demolition waste decreased by two per cent and a slightly lower proportion was recycled compared to 2005/06. These figures only take into account construction and demolition waste generated by LU and bus stops and shelters, as data are not yet available for TfL's other construction activities. Reporting processes are currently being established for other modes and major construction projects to obtain a better understanding of performance in this area.

Nine per cent of all TfL's waste was classified as hazardous. This has increased significantly from two per cent in 2005/06, due in part to larger quantities of hazardous waste being generated by demolition and refurbishment works for the Investment Programme. Hazardous waste is recycled where possible.

Further information

The GLA Group Responsible Procurement Policy is available from www.london.gov.uk/gla/tenders/index.jsp

For more information about the Mayor's Green Procurement Code, including advice for businesses on recycling and buying recycled products, see www.londonremade.com/mgpc.asp

The Waste and Resources Action Programme website also offers useful information. Go to www.wrap.org.uk

The Environment Agency's website provides background information and tips on water efficiency at www.environment-agency.gov.uk/subjects/waterres/287169/



Case study: Recycling on the Underground

The introduction of two free afternoon newspapers for London has meant a surge in the amount of paper waste that is left on Tube trains. However, LU and its suppliers have responded positively and stepped up activities to recycle both customer and station waste.

Every day around 32 tonnes of rubbish is removed from the LU network, a rise of almost 30 per cent compared to a year ago. Extra cleaners have been employed and paper intended for recycling is being gathered from all LU terminus stations and picked up by a dedicated collection truck.

In addition, more than 90 per cent of station offices now have paper recycling facilities for staff. Installing facilities has proved challenging in some cases due to limited space at stations, especially those in central London, but it has contributed to LU's recycling rate increasing from 27 per cent to 32 per cent.

Work is now underway to further understand, and overcome, any additional space and collection restrictions at Underground stations. It is hoped addressing these issues will help achieve a 35 per cent recycling target for 2007/08.

TfL's approach to managing the environment

Policy and strategy

The Mayor's environmental and transport strategies provide a framework for TfL to manage the environmental impacts of the transport system and its business activities.

Improved environmental performance is one of the core objectives of Transport 2025, the organisation's vision for developing transport in London.^{xxvi}

TfL has a health, safety and environment policy, signed by the Commissioner and TfL's managing directors, which outlines the organisation's commitment to realising environmental benefits and minimising impacts such as pollution. The organisation has also adopted the GLA's Responsible Procurement Policy, which includes a commitment to encouraging better environmental performance among its suppliers and contractors. In addition, it has a travel plan and a policy for travel at work, both of which encourage more environmentally friendly travel by staff.

Governance

Environment managers, planners and others within TfL's modes and businesses support the day-to-day management of environmental impacts. They meet regularly to share good practice and develop ideas, through TfL's Environmental Liaison Group. The diagram opposite shows the structure of the organisation, highlighting where environmental management fits in.

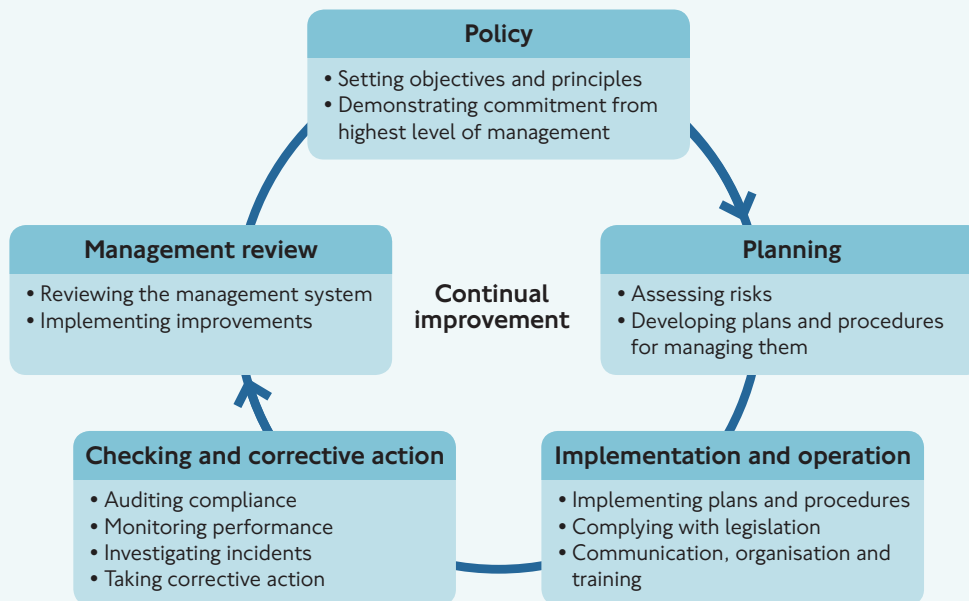
Within TfL, environmental performance is reviewed by the Board's Safety, Health and Environment Committee. TfL's environmental performance is reported to the GLA, through regular liaison meetings and written reports on specific items, the annual budget submission and this document.



Environmental management systems

Environmental management systems are being implemented across TfL, based on recognised good practice including ISO 14001.^{xxvii} The diagram below shows their general structure.

Structure of TfL's environmental management systems



Systems have been established for the Corporate directorates, LU, and London Streets, which is part of Surface Transport. Within the Corporate directorates, a management system is in place for the

Major Projects department and one is being developed for Group Property and Facilities, which manages TfL's head office buildings. Systems are also being developed for the rest of Surface Transport and London Rail.

To support implementation of environmental policy and strategy, and assist in monitoring environmental performance, TfL has a suite of environmental objectives and KPIs (see table 1).

Table 1: Summary of TfL Group environmental objectives and KPIs

Objective	KPI	Data		
		2005/06	2006/07	Change
Reduce greenhouse gas emissions	Total CO ₂ emissions (tonnes)	1,720,000	1,720,000	0%
	CO ₂ emissions from the main public transport modes (g per passenger km):			
	• LU	67	65	-3%
	• Bus ^{xxviii}	93	82	-12%
	• DLR ^{xxix}	92	74	-20%
	• Croydon Tramlink	40	42	+5%
	Consumption (million kWh) ^{xxx} of:			
• Standard grid supplied electricity	1,040	1,010	-3%	
• Electricity from good quality CHP	17.8	36.7	+106%	
• Renewable electricity generated on-site or supplied through Climate Change Levy exempt green tariffs	277	263	-5%	
• Natural gas	111	92.8	-16%	
• Liquid fossil fuels (see 'Data tables' for details)	4,320	4,330	0%	
• Biodiesel (as part of a 5% blend in diesel)	0	88.9	-	
Energy consumption in head office buildings (kWh/m ²)	414	357	-14%	
Proportion of electricity obtained from renewable sources	19%	20%	-	
Reduce pollutant emissions to air	Total NO _x emissions (tonnes)	8,350	8,200	-2%
	NO _x emissions from buses (g per passenger km) ^{xxxi}	0.96	0.86	-12%
	Total PM ₁₀ emissions (tonnes)	159	137	-14%
	PM ₁₀ emissions from buses (g per passenger km) ^{xxxii}	0.0018	0.0015	-17%

Objective	KPI	Data		
		2005/06	2006/07	Change
Reduce transport related noise and vibration	Number of noise complaints received ^{xxxiii}	479	458	-4%
	Percentage of LU track continuously welded	11%	24%	-
	Percentage of TLRN with lower noise surface material	70%	78%	-
	Percentage of buses in fleet at least 2dB(A) quieter than the required legal limit	0%	4%	-
Maintain and, where possible, enhance the quality of London's built environment	No Group KPI has been developed yet. See detailed data tables section for modal KPIs	-	-	-
Maintain and, where possible, enhance the quality of London's natural environment	No Group KPI has been developed yet	-	-	-
Reduce resource consumption and improve green procurement	Reported value of spend on recycled products, across TfL Group (£m)	4.08	4.47	+10%
	Amount of office paper consumed across TfL Group (tonnes)	312	393	+26%
	Proportion of office paper supplied from recycled sources	19%	13%	-

Objective	KPI	Data		
		2005/06	2006/07	Change
Reduce the waste generated by TfL activities, by applying the principles of reduce, reuse, recycle	Total commercial and industrial waste (tonnes) ^{xxxiv}	10,800	14,800	+37%
	Proportion of commercial and industrial waste recycled	26%	33%	-
	Total construction and demolition waste (tonnes)	134,000	131,000	-2%
	Proportion of construction and demolition waste recycled	86%	82%	-
	Proportion of total waste that is classified as hazardous (%)	2%	9%	-
Reduce water consumption	Amount of water consumed (total m ³) ^{xxv}	756,000	798,000	+6%
	Water consumed per occupant in head office buildings (m ³ per person)	11.3	9.4	-17%

About this report

TfL is committed to managing its environmental impacts and reporting on its performance. This report has been developed by TfL's Sustainability Unit, based on input from environment managers, planners and others across TfL.

Comment on data quality

Environmental KPIs were introduced in 2004 and data collection and reporting procedures are still developing across the TfL Group. Although KPIs are used to monitor and report performance, care should be taken when considering trends over time. More transport modes and business units have started to report this year and others have improved their data collection and reporting procedures. Where calculation processes have changed since last year's report, for instance where new emission factors have been introduced, 2005/06 figures have been updated and will therefore differ from those published in the 2006 Environment Report.

For clarity, detailed data tables are included in a separate section of this document.

TfL is working to improve the quality of data measured and reported. In particular, it is seeking to establish suitable KPIs to monitor the environmental impacts of private transport, particularly cars and freight, and indicate the effectiveness of TfL's efforts to reduce them.

A significant proportion of TfL's work is delivered through contracts with suppliers or partnerships with other organisations. This is a challenge for environmental reporting, both in terms of determining the boundary of TfL's activities and in establishing reporting processes. To help overcome this, TfL is including environmental reporting requirements in new contracts. Recently, these were agreed for highway maintenance, construction of the East London line extension, and the concession to operate London Overground services.



How to find out more

Additional information on key operating facts, corporate governance and financial performance is provided on the TfL website at tfl.gov.uk and in the 2007 Annual Report, available at tfl.gov.uk/annualreport

LU has produced its own environment report, which is available at tfl.gov.uk/tubeenvironment, and many of TfL's partners and suppliers also produce reports containing information relevant to London's transport system.

Feedback

TfL welcomes feedback to help improve its environmental performance and this report. Please send your comments to:

Sustainability Unit
Group HSE
Transport for London
Windsor House
42-50 Victoria Street
London SW1H 0TL

Alternatively, email:
helenwoolston@tfl.gov.uk

Endnotes

ⁱ All numbers in this report have been rounded to a maximum of three significant figures.

ⁱⁱ Actual passenger journey figures are provided for public transport. The figures for annual taxi, car, motorcycle, bicycle and walking journeys have been estimated, on the basis of daily average journey numbers published in the London Travel Report 2007.

ⁱⁱⁱ Taxicard is a scheme funded by the boroughs and the Mayor to improve the mobility of disabled people by providing subsidised trips in licensed London taxis (tfl.gov.uk/gettingaround/1197.aspx).

^{iv} See www.smartertravelsutton.org for more information.

^v The Energy Efficiency Accreditation Scheme, run by the Carbon Trust, is the UK's only independent award recognising achievements in reducing energy use by leading organisations in industry, commerce and the public sector. More information is available from www.carbontrust.co.uk/energy/takingaction/eeas.htm

^{vi} Mayor of London's 'most plausible scenario' for population growth, published in 'The London Plan – Spatial Development Strategy for Greater London', GLA, February 2004. This projection is based on various migration scenarios whereby London's population could increase by between 690,000 and 964,000.

^{vii} Together, LU, DLR and bus services operated 532.4 million vehicle km in 2006/07 (TfL Annual Report 2007).

^{viii} Data taken from the London Travel Report 2006, estimated on the basis of the Department for Transport National Road Traffic Survey for 2005.

^{ix} 2006 figures based on the latest available London Energy and CO₂ Emissions Inventory data for 2003, projected to 2006 based on growth projections for each sector (Climate Change Action Plan).

^x See note ix. The figures for ground-based aviation refer to emissions from taxiing aircraft, take-off and landing at London's airports only.

^{xi} See note iv.

^{xii} TfL's total CO₂ emissions include direct emissions from the combustion of fuel in vehicles and stationary appliances such as boilers, and indirect emissions from the generation of electricity which TfL uses. In June 2007, the Department for Environment, Food and Rural Affairs (Defra) changed the emissions factors it recommends for calculating CO₂ emissions from electricity generation. The new factors have been applied to 2005/06 and 2006/07 data to enable consumption to be compared over time. For details of emissions factors used, please refer to online guidance

available from www.defra.gov.uk/environment/business/envrp/pdf/conversion-factors.pdf

^{xiii} Bus mileage figures have been revised for 2005/06 and 2006/07 to include dead mileage, ie mileage travelled without fare-paying passengers from a base location (eg depot) to a point where passengers will be picked up, and vice versa. This has resulted in a change in reported emissions. In addition, emissions in 2005/06 have been recalculated using revised emissions factors, so differ from those reported in the 2006 Environment Report.

^{xiv} The emissions per passenger kilometre are based on the fuel or electricity used to power the vehicles and, in the case of the electric modes, the directly associated infrastructure. The figures do not include emissions associated with support services such as maintenance vehicles, bus stations or offices, although these are included in the TfL Group totals. Emissions per passenger kilometre for the electric-powered modes are higher than reported in the 2006 Environment Report, due to Defra's revision of the emission factor it recommends for grid supplied electricity. LU has calculated emissions per passenger kilometre for its Environment Report using a different approach, in which all energy used to power the infrastructure and support

services is taken into account, so the resulting figures differ.

^{xv} Electricity consumption was estimated for 2005/06 for DLR and is understood to be significantly higher than actual consumption, resulting in the higher than expected CO₂ emissions per passenger kilometre reported for that year. The figure for CO₂ emissions per passenger kilometre for 2006/07 is based on actual electricity consumption and is a more accurate representation of the environmental impacts of DLR.

^{xvi} Many fuel companies supplying fuel to bus operators are delivering up to five per cent biodiesel blended into the standard diesel, which has been factored into fuel consumption and emissions calculations.

^{xvii} The Renewables Obligation legally requires energy suppliers to supply an increasing percentage of electricity from renewable sources. Further information can be obtained from Ofgem (www.ofgem.gov.uk/sustainability/environment).

^{xviii} London Atmospheric Emissions Inventory 2003 (GLA) (State of the Environment Report).

^{xix} Trend from noise mapping based on 2001 data on traffic flows. The noise mapping will be revised in 2007.

^{xx} Emission factors for NO_x and PM₁₀ from buses are derived using the Millbrook test cycle, for London operating conditions. For other sources of air pollution, emission factors are extracted from the National Atmospheric Emissions Inventory (www.naei.org.uk)

^{xxi} See note xiii.

^{xxii} See note xiii.

^{xxiii} London Remade (www.londonremade.com) is a not-for-profit organisation which aims to improve waste management and recycling in London. It advises organisations on how to reduce, reuse and recycle their waste; develops markets for recycled products; and supports enterprises working in the waste sector.

^{xxiv} Bus stations and DLR reported water consumption for the first time in 2006/07, resulting in an apparent increase in the Group total. The Group total for 2006/07 without their contribution is 715,000, a four per cent decrease compared to the previous year.

^{xxv} Waste from bus stops and shelters and DLR was reported for the first time in 2006/07, resulting in a larger increase in the Group total than would be observed without their contribution.

^{xxvi} Transport 2025 can be downloaded from tfl.gov.uk/corporate/about-tfl/publications/1482.aspx

^{xxvii} ISO14001 is an international standard for environmental management systems. See www.iso.org for further information.

^{xxviii} See note xiii.

^{xxix} See note xv.

^{xxx} Energy consumption has been converted to kWh for all energy types using conversion factors published in the 'Digest of UK Energy Statistics: 2007' from the Department for Business, Enterprise and Regulatory Reform, available from www.berr.gov.uk/energy/statistics/publications/dukes/page39771.html

^{xxxi} See note xiii.

^{xxxii} See note xiii.

^{xxxiii} Noise complaints were only reported for LU in 2005/06 and for LU and DLR in 2006/07.

^{xxxiv} See note xxv.

^{xxxv} See note xxiv.

Glossary of terms

CHP	–	Combined heat and power
CO ₂	–	Carbon dioxide
dB(A)	–	'A' weighted decibel
DLR	–	Docklands Light Railway
GLA	–	Greater London Authority
HGV	–	Heavy goods vehicle
KPI	–	Key performance indicator
kWh	–	Kilowatt hour
LEQS	–	Local Environmental Quality Survey
LPG	–	Liquefied petroleum gas
LRS	–	London River Services
LU	–	London Underground
NO _x	–	Nitrogen oxides
PM ₁₀	–	Fine particles less than 0.01mm in diameter
PPP	–	Public Private Partnership
TfL	–	Transport for London
TLRN	–	Transport for London Road Network






Transport for London

Environment Report 2007

Data tables



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Energy consumption, by mode and source

Mode or business unit	Total energy consumption (million kWh)		Energy sources (%)		Notes
	2005/06	2006/07	2005/06	2006/07	
LU	1,221	1,221	Grid supplied electricity (80%), green tariff electricity (14%), natural gas (6%)	Grid supplied electricity (78%), green tariff electricity (14%), natural gas (5.7%), diesel (1.6%), petrol (0.4%), liquefied petroleum gas (LPG) (0.1%), fuel oil (0.2%)	Includes traction, stations, depots, support fleet, contractor vehicles and Greenwich Power Station. Fuel consumption by the support fleet and contractor vehicles was not reported in 2005/06
London bus network	2,349	2,384	Diesel (99.7%), grid supplied electricity (0.006%), green tariff electricity (0.2%), LPG (0.02%), natural gas (0.1%), petrol (0.005%)	Diesel (95.8%), biodiesel (3.7%), grid supplied electricity (0.3%), green tariff electricity (0.1%), LPG (0.04%), natural gas (0.01%), petrol (0.002%)	Includes London Buses, bus stops and shelters and ticket machines. Energy used for bus stops and shelters was not reported in 2005/06. 75% of the diesel fuel supplied for buses has been assumed to contain 5% biodiesel, based on a survey of suppliers. Bus mileage figures and fuel consumption have been revised for 2005/06 and 2006/07 to include dead mileage, ie mileage travelled without fare-paying passengers from a base location (eg depot) to a point where passengers will be picked up and vice versa
Bus permits and agreements	77	85	Diesel (100%)	Diesel (100%)	Includes the impacts of coaches with London Service Permits, for the portion of their journeys that take place in London. Also includes buses operating under London Local Service Agreements
Croydon Tramlink	11	11	Grid supplied electricity (82.3%), green tariff electricity (14.5%), natural gas (3.2%)	Grid supplied electricity (97.2%), natural gas (2.8%)	Includes traction, stops and depot
Taxis	903	921	Diesel (100%)	Diesel (100%)	Includes fuel used by taxis
Private hire vehicles	935	969	Diesel (55.5%), petrol (44.5%)	Diesel (60.28%), petrol (39.7%), LPG (0.02%)	Includes fuel used by private hire vehicles

Energy consumption, by mode and source (continued)

Mode or business unit	Total energy consumption (million kWh)		Energy sources (%)		Notes
	2005/06	2006/07	2005/06	2006/07	
Dial-a-Ride	10	11	Diesel (88.6%), grid supplied electricity (7.1%), natural gas (4.3%)	Diesel (89.5%), grid supplied electricity (6.7%), natural gas (3.8%)	Includes vehicle fuel and depots
LRS	49	45	Marine diesel (98.9%), grid supplied electricity (0.4%), green tariff electricity (0.7%)	Marine diesel (96.5%), grid supplied electricity (1%), green tariff electricity (2.5%)	Includes fuel for boats using LRS piers and electricity used for piers
Victoria Coach Station	2	2	Grid supplied electricity (40.2%), green tariff electricity (28.3%), natural gas (31.5%)	Grid supplied electricity (30.5%), green tariff electricity (43%), natural gas (26.5%)	Only includes energy for operating the building, does not include coaches travelling to or from it
London Streets	73	92	Grid supplied electricity (17.6%), combined heat and power (CHP) electricity (24.4%), green tariff electricity (56.6%), diesel (0.5%), petrol (0.7%), LPG (0.2%)	CHP electricity (39.9%), green tariff electricity (55.3%), diesel (4%), petrol (0.5%), LPG (0.3%)	Includes street lighting, traffic signals and vehicles run by London Streets employees and some contractors. Contractor vehicles did not report fuel consumption in 2005/06
Transport Policing and Enforcement Directorate (TPED)	-	0.4	-	Diesel (27.6%), petrol (61.8%), LPG (10.6%)	Includes vehicles. TPED was included in London Streets data for 2005/06
DLR	51	45	Grid supplied electricity (88.2%), natural gas (11.8%)	Grid supplied electricity (93.8%), natural gas (6.2%)	Includes traction, stations and depots. Electricity consumption was estimated for 2005/06 for DLR and is understood to be significantly higher than actual consumption. 2006/07 figure is actual electricity consumption
Head office buildings	59	53	Grid supplied electricity (3.6%), green tariff electricity (54.6%), natural gas (41.8%)	Grid supplied electricity (4.7%), green tariff electricity (58.7%), natural gas (36.5%), petrol (0.05%), LPG (0.05%)	Includes buildings and fuel for support vehicles. Support vehicles were not reported on in 2005/06

General notes: Energy consumption has been converted to kWh for all energy types using conversion factors published in the Digest of UK Energy Statistics: 2007 from the Department for Business, Enterprise and Regulatory Reform, available from www.berr.gov.uk/energy/statistics/publications/dukes/page39771.html. Biodiesel has been assumed to have the same energy content as diesel.

CO₂ emissions, by mode

Mode or business unit	Total CO ₂ emissions		Notes
	2005/06	2006/07	
LU	529,464	519,710	Includes emissions associated with traction, stations, depots, support fleet, contractor vehicles and Greenwich Power Station
London bus network	616,682	615,344	Includes emissions from London Buses, stations, bus stops and shelters. Bus stations included for the first time in 2006/07. CO ₂ emissions per unit of biodiesel have been assumed to be 55 per cent less than emissions per unit of diesel
Bus permits and agreements	20,313	22,353	Includes emissions from coaches with London Service Permits, for the portion of their journeys that take place in London. Also includes emissions from buses operating under London Local Service Agreements
Croydon Tramlink	4,693	5,391	Includes emissions associated with traction, stops and depot
Taxis	237,442	242,165	Includes emissions from taxis
Private hire vehicles	249,789	259,991	Includes emissions from private hire vehicles
Dial-a-Ride	2,862	3,105	Includes emissions from vehicles and depots
LRS	10,615	9,603	Includes emissions from LRS piers, and boats that use them
Victoria Coach Station	497	358	Only includes emissions from operating the building, does not include coaches travelling to or from it
London Streets	13,471	11,986	Includes street lighting, traffic signals and vehicles run by London Streets employees and some contractors. Contractors did not report emissions in 2005/06
TPED	-	97	Includes emissions from vehicles. TPED was included in London Streets data for 2005/06
DLR	24,646	22,671	Includes emissions associated with traction, stations and depots
Head office buildings	5,624	4,880	Includes emissions associated with buildings and support vehicles. Support vehicles were not reported on in 2005/06

General notes: TfL's total CO₂ emissions include direct emissions from the combustion of fuel in vehicles and stationary appliances such as boilers, and indirect emissions from the generation of electricity which TfL uses. In June 2007, Defra changed the emissions factors it recommends for calculating CO₂ emissions from electricity generation. The new factors have been applied to 2005/06 and 2006/07 data to enable consumption to be compared over time. For details of emissions factors used, please refer to online guidance from Defra, available from www.defra.gov.uk/environment/business/envrp/pdf/conversion-factors.pdf

NO_x and PM₁₀ emissions, by mode

Mode or business unit	Total emissions (tonnes)				Notes
	NO _x		PM ₁₀		
	2005/06	2006/07	2005/06	2006/07	
LU	29.3	7.22	1.06	0	Includes Greenwich Power Station. Emissions from support fleet and contractor vehicles were included for 2005/06 only
London bus network	6,356	6,437	12	12	Includes emissions from buses
Bus permits and agreements	123	137	3	2	Includes emissions from coaches with London Service Permits, for the portion of their journeys that take place in London. Also includes emissions from buses operating under London Local Service Agreements
Croydon Tramlink	0.07	0.06	0.001	0.001	Includes emissions from boilers in the depot
Taxis	854	722	89	74	Includes emissions from taxis
Private hire vehicles	711	651	49	45	Includes emissions from private hire vehicles
Dial-a-Ride	35.8	35.5	1	1	Includes emissions from Dial-a-Ride vehicles and boilers in depots
LRS	236	212	4	4	Includes emissions from boats using LRS piers
Victoria Coach Station	1.14	0.09	0	0	Includes emissions from boilers in the building, does not include coaches travelling to or from it
London Streets	4.31	-	0.27	-	Includes emissions from support fleet. Emissions were not reported for 2006/07
TPED	Negligible	Negligible	Negligible	Negligible	
DLR	Negligible	Negligible	Negligible	Negligible	
Head office buildings	Negligible	Negligible	Negligible	Negligible	

General notes: Emission factors for NO_x and PM₁₀ from buses are derived using the Millbrook test cycle, for London operating conditions. For other sources of air pollution, emission factors are extracted from the National Atmospheric Emissions Inventory (www.naei.org.uk). Although CO₂ emissions associated with the generation of electricity used by TfL are included in this report, NO_x and PM₁₀ emissions from electricity generation are not included as the significance of air pollution is highly dependent on location.

Built environment quality indicators, by mode

Mode or business unit	KPI	Score		Notes
		2005/06	2006/07	
LU	Train graffiti	72%	74%	Mystery shopper survey (MSS) score
	Station graffiti	78%	81%	
	Train cleanliness	66%	67%	
	Station cleanliness	67%	70%	
London bus network	Bus cleanliness and condition	77%	78%	Customer satisfaction survey (CSS) score
	Station cleanliness and condition	-	76%	
	Stop and shelter cleanliness and condition	77%	74%	
Bus permits and agreements	No KPI			
Croydon Tramlink	Tram cleanliness and condition	85%	-	CSS score. No figure was reported for 2006/07
Taxis	No KPI			
Private hire vehicles	No KPI			
Dial-a-Ride	No KPI			
LRS	No KPI			
Victoria Coach Station	Station cleanliness and condition	77%	-	CSS score. No figure was reported for 2006/07
London Streets	Quality of the street environment	3.8	3.4	Local Environmental Quality Survey (LEQS) score for TLRN streets
TPED	No KPI			
DLR	Train cleanliness	-	95%	CSS score. DLR reported these figures for the first time in 2006/07
	Station cleanliness	-	95%	
Head office buildings	No KPI			

General notes: The MSS and CSS award scores of up to 100, based on perception of cleanliness and condition. The higher the MSS and CSS score, the better the performance. The LEQS is conducted by the environmental charity Capital Standards at many sites across London. Scores range from minus eight to eight, with a score between zero and four classed as satisfactory, and from four to eight as good.

Water consumption, by mode

Mode or business unit	Water consumption (m ³)		Notes
	2005/06	2006/07	
LU	603,679	569,605	Includes water used in stations and depots
London bus network	8,060	55,516	Includes water used in stations and depots. With the exception of East Thames Buses, this data was collected for the first time in 2006/07
Bus permits and agreements	Not applicable		
Croydon Tramlink	No figures reported		
Taxis	Not applicable		
Private hire vehicles	Not applicable		
Dial-a-Ride	5,602	5,609	Includes water used in depots
LRS	22,508	23,453	Includes water used on LRS piers
Victoria Coach Station	24,637	26,411	Includes water used at Victoria Coach Station
London Streets	No figures reported		
TPED	Not applicable		
DLR	-	27,214	Includes water used at stations and depots. Reported for the first time in 2006/07
Head office buildings	91,189	89,860	Includes water used in office buildings

Waste production and recycling, by mode

Mode or business unit	Commercial and industrial waste (tonnes)				Commercial and demolition waste (tonnes)				Hazardous waste (%)		Notes	
	Total waste		Amount recycled		Total waste		Amount recycled		Proportion of total waste			
	2005/06	2006/07	2005/06	2006/07	2005/06	2006/07	2005/06	2006/07	2005/06	2006/07		
LU	9,052	11,690	2,421	3,680	134,204	131,439	114,505	107,937	2%	9%	Includes waste from stations, depots, trains, Investment Programme works and Greenwich Power Station	
London bus network	229	1,056	57	218	0	673	0	658	33%	6%	This only includes waste from East Thames Buses, bus stops and shelters. Stops and shelters were included for the first time in 2006/07	
Bus permits and agreements	Not applicable											
Croydon Tramlink	No figures reported											
Taxis	Not applicable											
Private hire vehicles	Not applicable											
Dial-a-Ride	153	98	23	6	0	0	0	0	No figures reported		Includes waste from depots	
LRS	215	260	53	120	0	0	0	0	25%	38%	Includes waste from LRS piers	
Victoria Coach Station	350	360	0	0	0	0	0	0	10%	14%	Includes waste from the station	
London Streets	No figures reported											
TPED	Negligible											
DLR	-	294	-	0	No figures reported							Includes waste from stations and depots
Head office buildings	852	1,088	290	421	No figures reported				0.1%	0.1%	Includes office waste	

