

July 2015

Cleaner Air for London

Progress report on the delivery of the Mayor's Air Quality Strategy





Greater London Authority

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Cleaner air for London

Foreword by Matthew Pencharz, Deputy Mayor for Environment and Energy

Since coming to office the Mayor has been committed to improving air quality in London. In 2010 he published his Air Quality Strategy, which set out the most comprehensive and ambitious package of measures any world city is taking to tackle air pollution. This report updates Londoners and other stakeholders on the Mayor's efforts on delivering against this important agenda.

The highlight of this year's report is confirmation of the Mayor's proposals for the world's first Ultra Low Emission Zone (ULEZ) in central London from 2020. London is currently the only city in the world to propose a low emission zone based around the new Euro 6 emission standard. This will be a game changer for London's air quality reducing nitrogen oxide (NO_x) emissions by half and ensuring 80 per cent of central London meets tough European legal limits for nitrogen dioxide (NO₂).

The ULEZ is only feasible because of the Mayor's efforts since 2008 to clean up the bus and taxi fleets. By 2016 NO_x emissions from the bus fleet will have been halved compared to 2008 thanks to an ambitious roll-out of 1,700 hybrid buses, the world's largest bus retrofit programme and trials of new technologies like electric and hydrogen buses. The Mayor has led international efforts to make these ultra low emission vehicle the standard used in cities around the world, hosting the Global Clean Bus Summit at City Hall in June.

On taxis, the Mayor has introduced the capital's first ever age limit, retiring more than 6,000 of the most polluting taxis. From 2018, subject to consultation, the Mayor proposes all new taxis will be required to be zero emission capable with more than 9,000 expected to be on London's streets by 2020. In March the Mayor secured £25 million in funding from the Government, combined with £40 million in TfL funding, to make this commitment a reality.

More than 2,000 jobs have been created in Coventry and over £300 million in foreign direct investment secured in order to manufacture these new zero emission capable taxis in the UK. This is all a result of the Mayor's policies and shows London's potential to unlock the economic growth by positioning the UK at the forefront of the ultra low emission economy. We will build on these achievements later this year when we bid for further funding from the Government's Office for Low Emission Vehicles to deliver a technological revolution in London's vehicle fleets.

The Mayor also continues to reduce emissions from other sources. Air quality neutral requirements in the London plan continue to reduce emissions from future developments, retrofit programmes have reduced emissions from more than 500,000 buildings across the capital and from September London will introduce strict new minimum emissions standards for construction equipment.

At local level, nearly £6 million in funding has been allocated to boroughs as part of the Mayor's £20 million Air Quality Fund, with the next round now open. To further support the boroughs to tackle local hotspots, the Mayor is consulting on a new statutory approach to Local Air Quality Management reflecting the capital's unique challenges and opportunities.

The trend analysis in this years report shows that these measures are starting to be felt, with an estimated 12 per cent reduction in NO₂ concentrations at roadside sites since 2008. The report also contains updated health statistics which underline that the work is far from complete, with the equivalent of 9,400 deaths brought forward as a result of long-term exposure to air pollution. This new evidence stresses the importance of finding a long-term sustainable solution to aviation capacity in the South East of England and recognising that Heathrow is not a viable option for expansion if public health is to be protected and the EU legal limits for NO₂ achieved.

Following the Supreme Court ruling this April, the Mayor is working closely with the Government to secure additional funding and further national action to make London's air quality better still. This will be the focus of much of the effort of the remaining ten months of the Mayor's term in office and I invite Londoners and stakeholders to work with us to ensure London has the best air quality of any major world city by 2020.

A handwritten signature in blue ink, appearing to read 'Matthew Pencharz', with a long horizontal flourish extending to the right.

Matthew Pencharz

Deputy Mayor for Environment and Energy

1. Introduction

The Mayor of London is committed to improving air quality in London. In 2010 he published his Air Quality Strategy, "Clearing the Air". Policy 15 committed to report back regularly on the progress made delivering the strategy. This report is the second such report and includes:

- an analysis of recent trends in air pollution in London (section 2);
- an update on the latest understanding of health impacts of air pollution in London (section 3);
- an update on the implementation of the transport and non-transport policies included in the Mayor's Air Quality Strategy, as well as the measures announced by the Mayor in February 2013 such as the Ultra Low Emission Zone (section 4);
- next steps, setting out what further action the Mayor will take to improve air quality (section 5).

In the two years since the last report was published the Mayor has consulted on and confirmed his proposals to introduce the world's first Ultra Low Emission Zone (ULEZ), including new requirements for buses and taxis. This is expected to result in a halving of nitrogen oxide (NO_x) road transport emissions in central London by 2020. Going forward, from September 2015 construction equipment used in London will have to meet tough new emission standards and the Mayor will consult on changes to the statutory Local Air Quality Management system.

In April the Supreme Court ordered the Government to redraft the national nitrogen dioxide (NO₂) air quality action plan, as well as 16 regional action plans including for Greater London, to ensure these areas reach compliance with legal NO₂ limits as soon as possible. The Mayor has always said that he wants London to be compliant with NO₂ legal limits by 2020 at the latest and he set out a potential road map to compliance in his Air Quality Manifesto published in Summer 2014. Transport for London (TfL) set out more detailed analysis as part of its Transport Emission Road Map published in September 2014.

The Ultra Low Emission Zone, cleaner buses and new requirements for zero emission capable taxis is expected to ensure more than 80 per cent of central London is compliant with EU legal limits for NO₂ by 2020. It is now for Government and the European Commission to propose the remaining measures which will take London to full compliance and the Mayor will continue working with these and other partners to deliver the air Londoners deserve.

2. Trends in London's air quality

Trends in monitoring data

London has the most comprehensive monitoring network, funded by London boroughs, the GLA, TfL and Heathrow Airport. Many of these sites are part of the London Air Quality Network (LAQN)¹, managed by King's College London's Environmental Research Group.

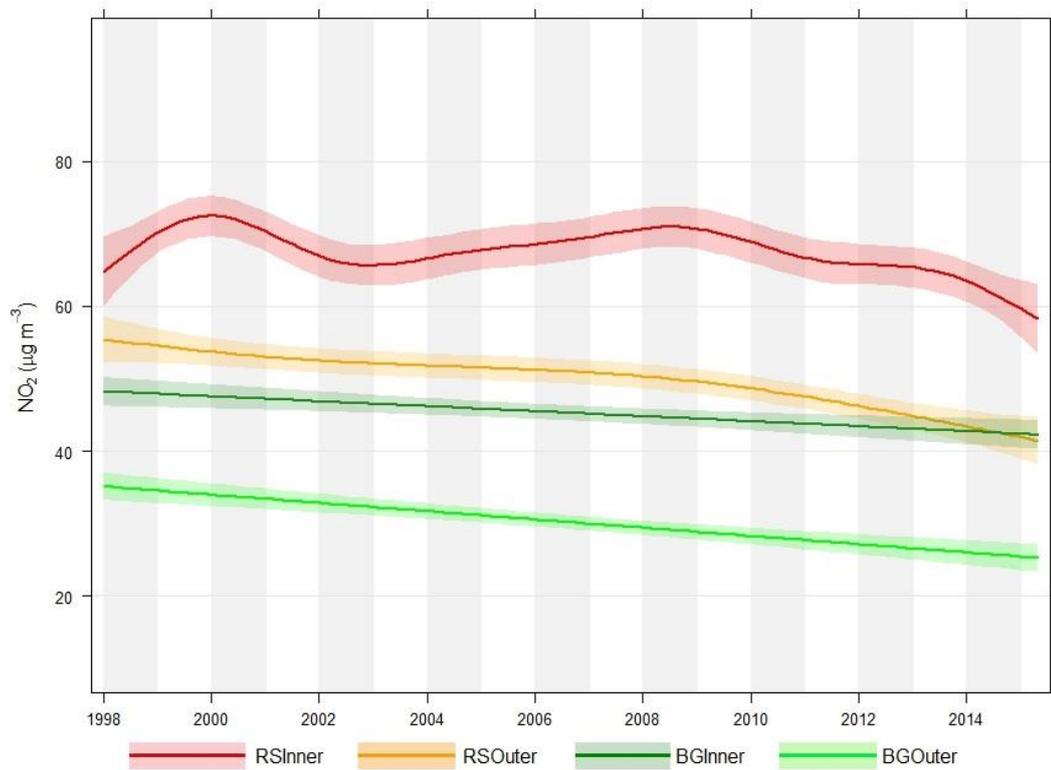
This network gives us unique opportunities to understand trends in London's air quality. One way to view air quality monitoring data is to group monitors based on their location and distance from the roadside and look at the average concentrations. For example, roadside monitors are within 5m of roads, whilst background sites are away from major sources.

Figures 1 and 2 below show the improving trend in NO₂ and PM₁₀ concentrations at sites on LAQN. Overall, there has been a gradual reduction in NO₂ and PM₁₀ concentrations at background sites in inner and outer London and outer London roadside sites. Inner London NO₂ roadside sites have a more variable trend but have seen a steeper decline from 2012. This decline is also reflected in the Inner London PM₁₀ roadside sites.

These reductions are important as they show that, overall, air quality is improving in London and is on a strong downward trajectory. This is supported by analysis at most individual monitoring sites, although the dynamic nature of air pollution and the way it is affected by multiple factors (temporary issues like construction activity, weather, local road layouts etc) means concentrations at some sites can go up while the overall trend across the city is improving.

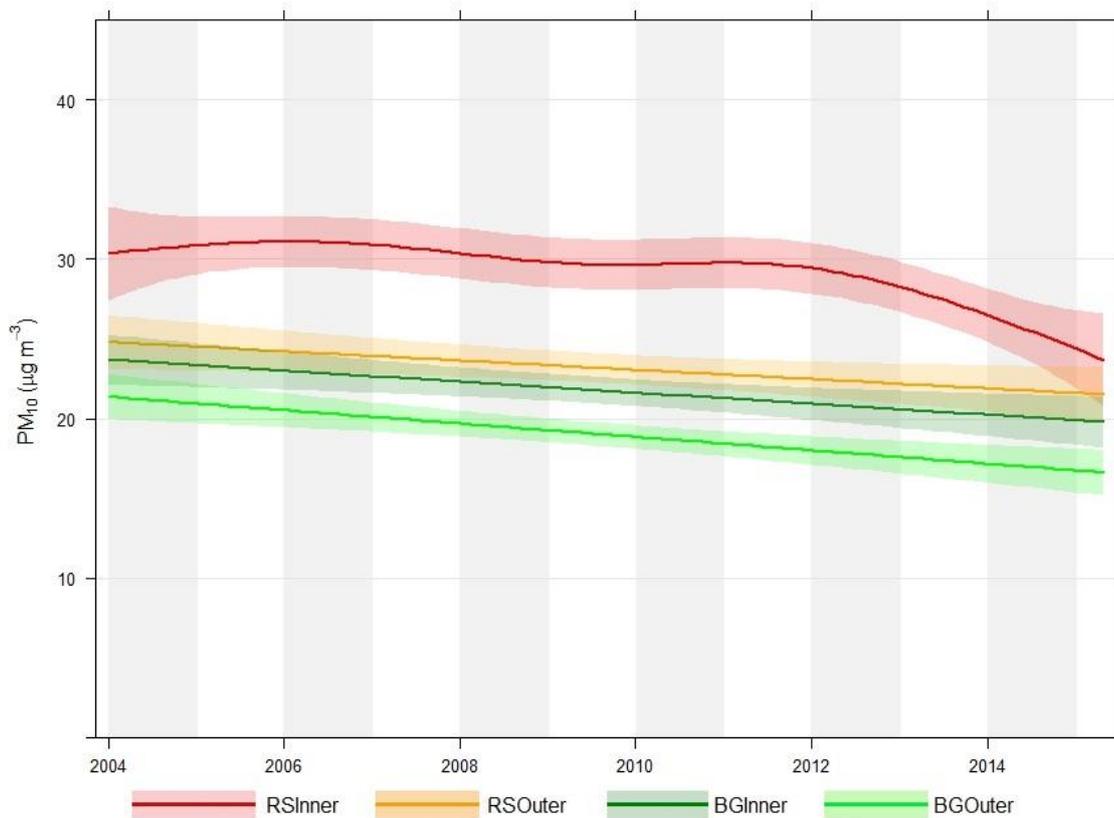
The improving real world experience provides vital context for the health impacts analysis in section 3 of this progress report, which is based on modelled data. Understanding that air quality is improving means that the health effects associated with pollution will be improving (i.e. reducing) as well.

¹ www.londonair.org.uk

Figure 1: Trends in NO₂ 1998 to 2014

Source - the London Air Quality Network and analysis by King's College London (BG = "background", not next to a road. RS = "Roadside" and "inner" and "outer", refer to inner and outer London).

Figure 2: Trends in PM₁₀ 2004 to 2014²



Source - the London Air Quality Network and analysis by King's College London. (BG = "background", not next to a road. RS = "Roadside" and "inner" and "outer", refer to inner and outer London).

These averages do not however reflect the variability between individual site characteristics and trends. In addition they reflect all pollution sources experienced at a monitoring site and not just locally emitted pollution or road based pollution specifically.

Pollutant concentrations in London are affected by emissions in London, pollution from outside London and the UK, and other factors such as weather. Using sophisticated statistical models it is possible to 'remove' the weather effect from trends in concentrations of the main pollutants monitored at sites in the LAQN. This allows for the production of trends where the impact of variable weather conditions is reduced. This

² Due to monitoring methodological changes a time series can only be derived for PM₁₀ from 2004

analysis was conducted by the Environmental Research Group at Kings College and has shown the following trends from 2008 to 2013:

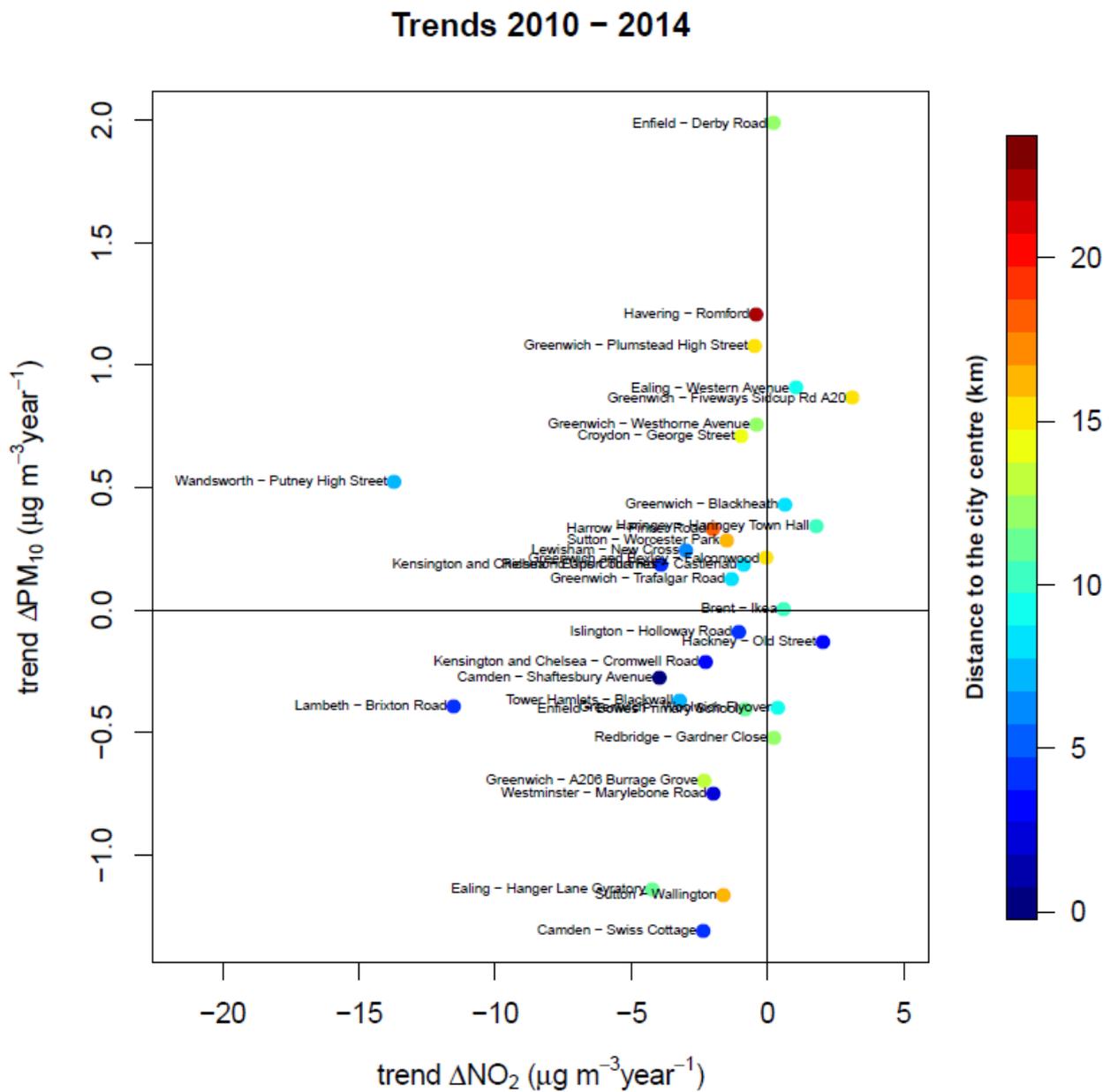
- NO_x roadside sites show a downward trend of 1.25% per year, equating to a total reduction over the six year period of 7.5%
- NO₂ roadside sites show a downward trend of 2.1% per year, equating to a total reduction over the six year period of 12.6%.
- PM₁₀ roadside sites show a downward trend of 1.4% per year, equating to a total reduction over the six year period of 8.4%
- PM₁₀ background sites a downward trend of 0.65% per year, equating to a total reduction over the six year period of 3.9%
- PM_{2.5} roadside and background sites show a downward trend of 2.2% per year equating to a total reduction over the six year period of 13.2%
- Black Carbon (only monitored at three sites) has shown small decreases but these are not considered statistically significant.

New work with King's College London's Environmental Research Group is investigating the variability in changes in roadside measurements across the capital. Specifically this analysis is looking at the difference or increment between the roadside measurement and that at an equivalent background site in order to quantify the air pollution from traffic as distinct from other regional and urban sources.

It is clear that the traffic contribution to pollution concentrations at some sites is improving much faster than at others. For example, NO₂ and PM₁₀ concentrations have reduced at Marylebone Road and other sites over the last four years but this trend has not been seen at all roadside sites in inner London. Marylebone Road is not unique in displaying these air quality improvements as Figure 3 shows. Understanding the reasons for changes at some sites and not others will provide evidence on the types of policies and actions that can help reduce pollution across London as a whole.

Figure 3: Understanding concentration trends for both PM₁₀ and NO₂ at selected monitoring stations

Note: Monitoring stations shown in the bottom left hand quadrant of the graph have seen a reduction in both NO₂ and PM₁₀ concentrations. This includes a number of monitoring stations, including Marylebone Road.



The first stage of this work is categorising roadside monitoring sites based on their trends from 2005 to 2009 and 2010 to 2014. The break in 2009/10 was chosen based on the changes seen in the overall trend data. Figures 4 and 5 show how the roadside NO₂ increment has had a very different trend between 2005 and 2009 and between 2010 and 2014. Overall between 2005 and 2009 the roadside increment of NO₂ increased on average 1.63ug/m³ per year albeit with a large amount of variability between sites and within sites readings over that time period – shown in figure 4. The majority of sites saw an increase with Westminster Charing Cross Library (WM4, now closed) showing the highest average increase but there were a handful of sites showing decreases (like LB4 Lambeth Brixton Road).

Between 2010 and 2014 (shown in figure 5) many sites across London saw significant decreases to the extent that overall the roadside increment NO₂ decreased on average by 1.654ug/m³ per year yet there were still a handful of sites that continued to record increased levels of NO₂.

Changes in particulates from the road have shown another interesting trend. Between 2010 and 2014 PM₁₀ has reduced at some sites but increased at others. Overall the average annual change is a small decrease of 0.07µg/m³. However, at sites that measure PM_{2.5} there has been an overall annual decrease of 0.70µg/m³. This includes some sites where PM₁₀ is also falling but there are sites that are seeing an increase in the PM₁₀ roadside increment and a decrease in the PM_{2.5} roadside increment which may point to important changes in non-exhaust emissions traffic.

The findings of this study will be published later in 2015. This will be used to identify the specific sites which will be examined in more detail to look for explanations for the variability between locations and unexpected trends.

Figure 4: Trends in monitored NO₂ concentrations from 2005-2009 (from monitoring stations which have more than 75% data capture).

Note: Any monitoring station recording on the left hand side of the dotted line shows a reduction in annual average NO₂ concentration.

Trends 2005 – 2009

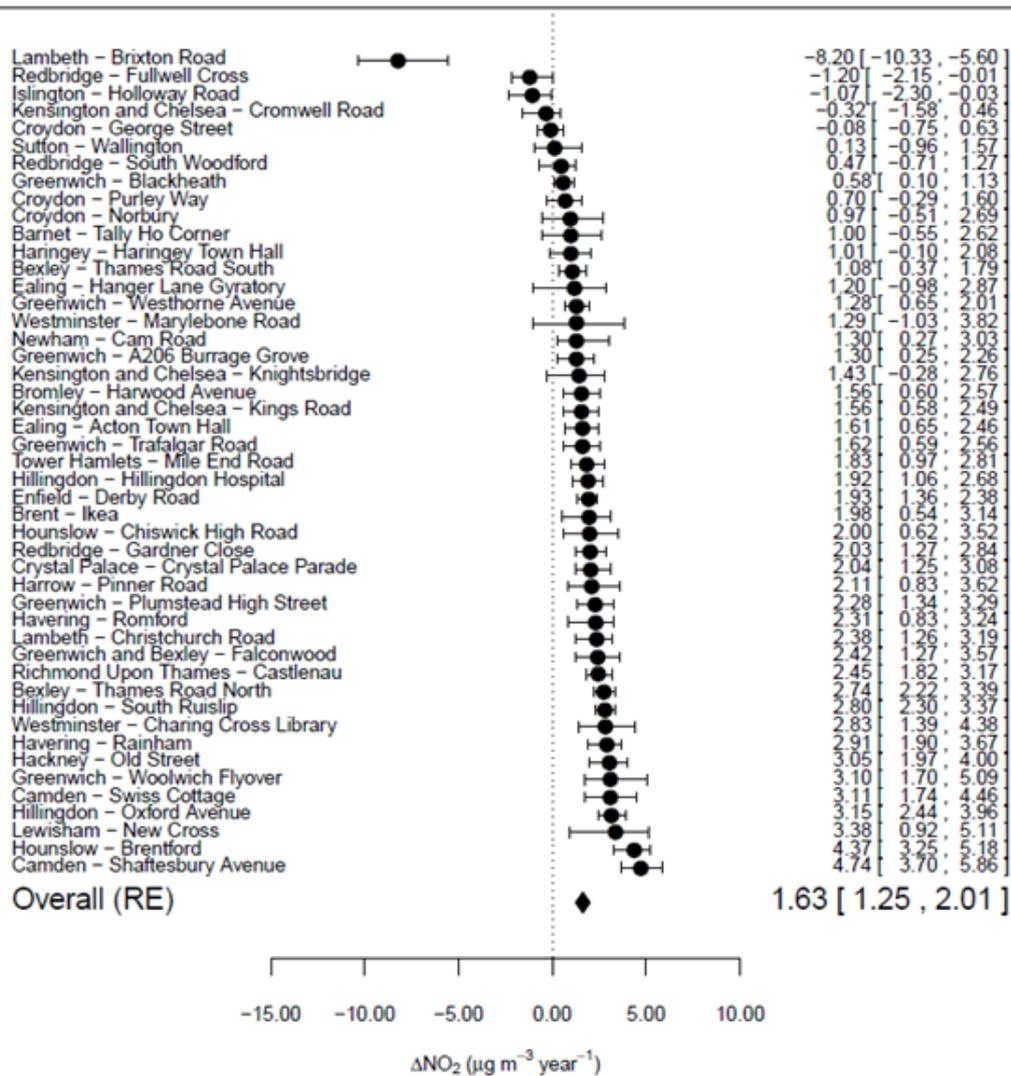
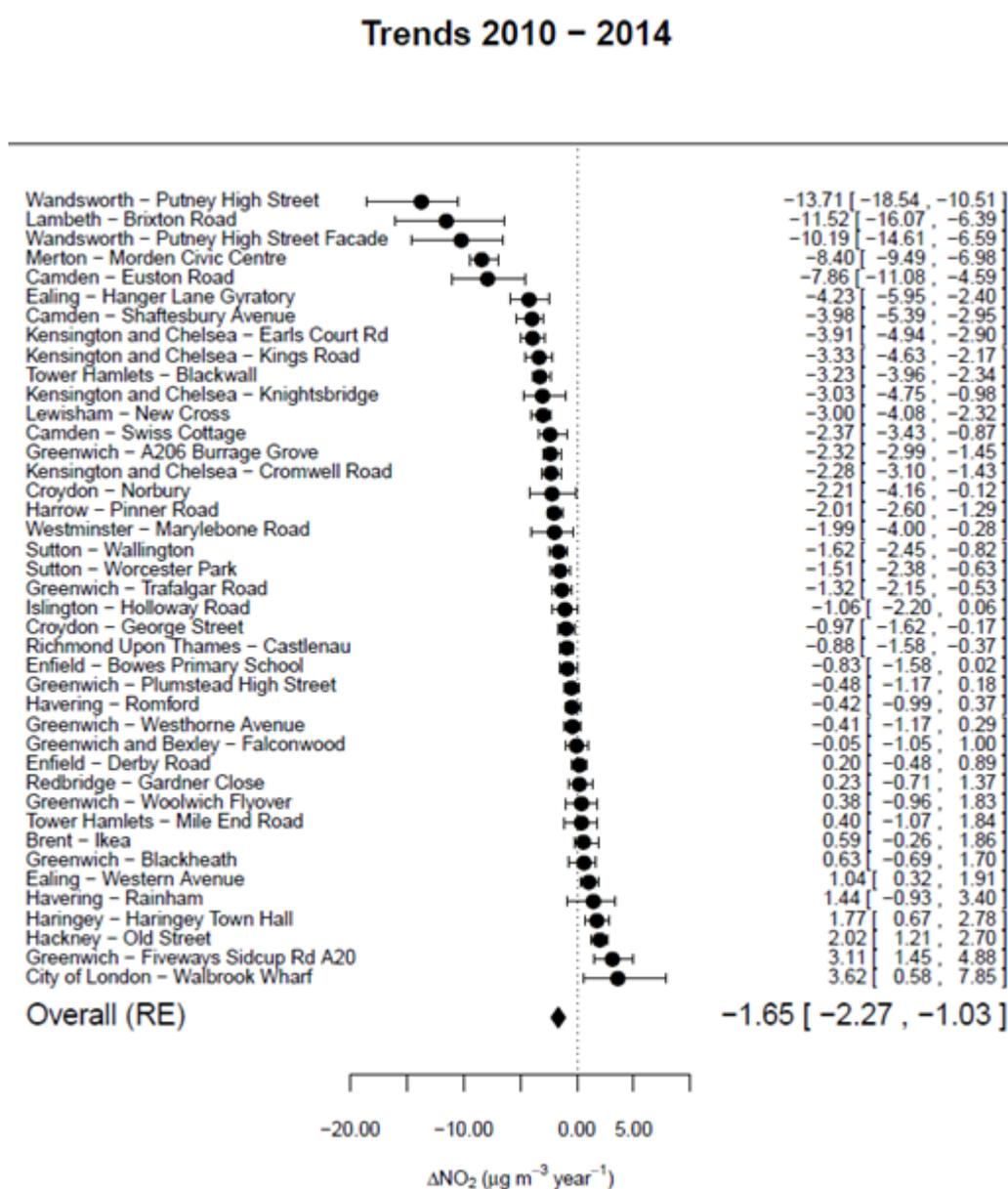


Figure 5: Trends in monitored NO₂ concentrations from 2010-2014 (from monitoring stations which have more than 75% data capture).

Note: Any monitoring station recording on the left hand side of the dotted line shows a reduction in annual average NO₂ concentration.



Trends in exposure and inequality

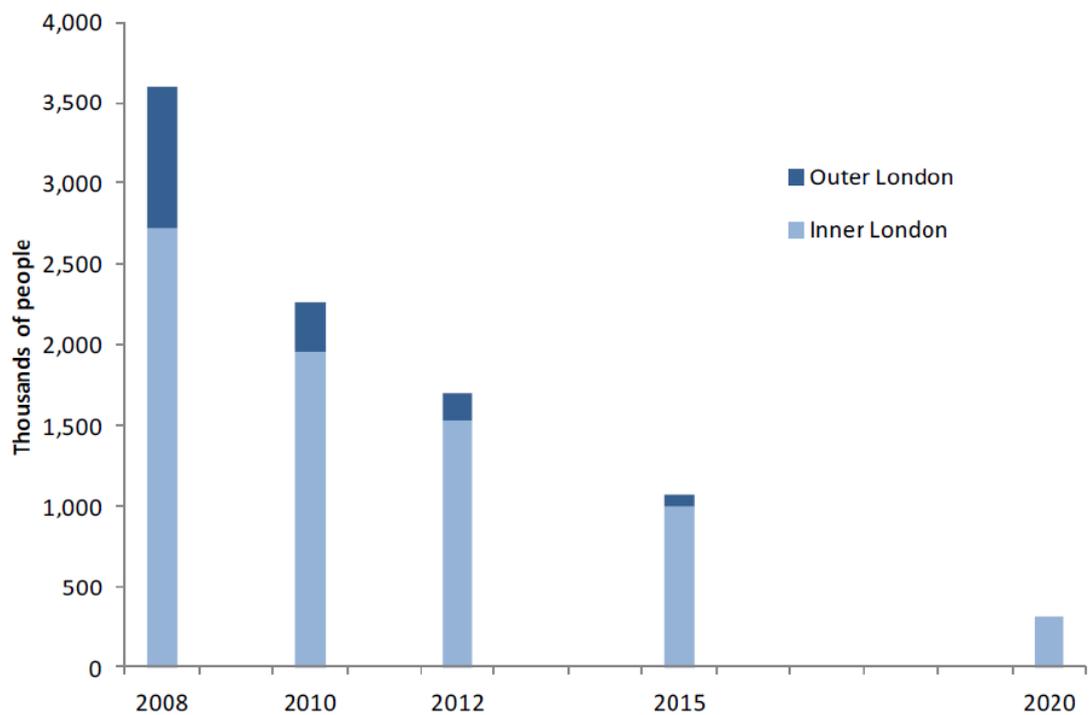
In 2008 around 3.6 million Londoners were estimated to live in areas exceeding the EU legal annual limit value for NO₂ (Figure 6). However thanks in part to the measures the Mayor has implemented, including tighter low emission zone standards, cleaning up the bus fleet and retiring more than 6,000 of the oldest most polluting taxis, by 2012 this figure was estimated to have more than halved.

By 2015 it was estimated that this figure had further reduced to around 1 million people and that by 2020 it will be around 300,000, with those people mainly living in central London. Consequently, the Mayor has proposed a central London Ultra Low Emission Zone from 2020 and other measures to help address these remaining hotspots.

Analysis undertaken for the GLA shows populations living in the most deprived areas are on average currently more exposed to poor air quality than those in less deprived areas. 51% of the Local Super Output Areas (i.e. roughly wards) within the most deprived 10% of London have concentrations above the NO₂ EU limit value. This is in contrast to 1% above the NO₂ EU limit value in the 10% least deprived areas.

Inequalities as a result of air pollution are predicted to reduce by 2020 as a result of new policies predominantly resulting from reductions in road transport emissions, most notably associated with the ULEZ.

Figure 6: Estimated number of Londoners living in areas where average concentrations exceed the EU legal annual limit value for NO₂ (40ug/m³) for 2008 to 2020, broken down by borough (residential population only)



3. Health impacts of air pollution in London and associated economic costs

The adverse impact of air pollution on human health is the key driver for action to improve air quality in London. In 2010 the Institute of Occupational Medicine (IOM) estimated the mortality impacts of air pollution in London, concluding that the long term exposure to particulate in London had an impact on mortality in 2008 equivalent to 4,300 deaths brought forward based on 2006 levels of PM_{2.5} (see box 1 for an explanation of key terms).

Due to the large number of variables that influence the health impacts of air pollution, scientific understanding of this complex relationship is continually advancing. For this reason, in 2014 the GLA and TfL decided to commission a study by King's College London to better understand the health impacts of air pollution in London based on the latest evidence. The King's health report has been published alongside this progress report. For the first time, the study included the health impacts of NO₂ as well as for particulate (PM_{2.5}).

These estimates are subject to great uncertainty but do highlight the continued importance of measures to tackle London's NO₂ sources, and the need for expert bodies such as the Government's Committee on the Medical Effects of Air Pollution (COMEAP) to urgently verify the emerging methods for quantifying the health effects associated with NO₂ to help communicate the full impacts of NO₂.

Box 1: Understanding long term health effects

Mortality relates to death and **morbidity** relates to illness.

The term burden is used for approximate 'snapshot' calculations of the health effects of the total **long-term exposure** to man-made air pollution in a particular year. **Mortality burden** is expressed as '**life-years lost**' across the population as a result of deaths (a 'life-year' is one year lost for one person).

Mortality burden can also be expressed as '**equivalent or attributable deaths at typical ages**', the deaths in 2010 that would account for the loss of life years if air pollution were the sole cause of those deaths. In reality air pollution is likely to contribute a small amount to the deaths of a larger number of exposed individuals rather than being solely responsible for the calculated number of equivalent or attributable deaths.

Key Findings for 2010

The health impacts of air pollution have been estimated for 2010 as this is the latest available 'base' year for the London Atmospheric Emission Inventory and associated air quality modelling. As such this analysis will not reflect the impact of many of the interventions outlined in the Mayor's Air Quality Strategy (published in 2010) and implemented since this date, such as tighter Low Emission Zone standards and age limits for taxis introduced in 2012.

It is also important to recognise that the report has used various statistical devices to model air pollution in future years to enable a trend analysis to be undertaken. Only 2010 modelling has been validated against real-world monitoring to ensure that the figures provided for 2010 are as accurate as possible, within the constraints of the existing methods available to assess NO₂ health impacts. As a result it is not possible to use the health study to assess improvements or otherwise in air quality in London. Further information on the latest monitoring trend is included in section 2 of this progress report.

Furthermore, the improving real world experience set out in section 2 provides vital context for the health impacts analysis below. Understanding that air quality is improving means that the health effects associated with pollution will be improving (i.e. reducing) as well.

Mortality burden associated with long-term exposure to PM_{2.5}

The mortality burden of long term exposure to anthropogenic PM_{2.5} for the year 2010 is estimated to be 52,500 life-years lost, equivalent to 3,500 deaths at typical ages. The estimate for PM_{2.5} attributable deaths has decreased from the previous Institute of Occupational Medicine (IOM) estimate of 4,300 attributable deaths for 2008 partly due to a decrease in concentrations, to which policy interventions will have contributed, as well as some updates to the previous methods and inputs, such as using anthropogenic rather than total PM_{2.5} and declines in baseline mortality rates.

Mortality burden associated with long-term exposure to NO₂

The estimated mortality burden of long-term exposure to NO₂ has previously been unquantified due to the considerable uncertainty in the effects. However emerging methods for quantification indicate that the mortality burden associated with 2010 levels

of NO₂ could be up to 88,100 life-years lost, equivalent to 5,900 deaths at typical ages³. Whilst it is important that we consider the potential magnitude of these effects, these figures must be used with caution due to the uncertainties in the approach as acknowledged by the World Health Organisation (WHO) and the Committee on the Medical Effects of Air Pollution (COMEAP).

Combining PM_{2.5} and NO₂

Combining the PM_{2.5} and NO₂ figures creates a total figure of 9,400 equivalent deaths brought forward in 2010. Due to the lack of certainty around the methodology for calculating the NO₂ long-term health effects and for understanding the overlap between the health effects of the two pollutants further advice is needed from the Government's Committee on the Medical Effects of Air Pollution (COMEAP) before this can be considered a definitive estimate.

Trend analysis

Population-weighted annual mean concentrations are expected to decline for both PM_{2.5} and NO₂ between 2010 and 2020 thanks to measure adopted by the Mayor.

For anthropogenic PM_{2.5}, these projected changes would result in a gain of 901,466 life-years across the population followed up to 2114 (the minimum total result) compared with pollution remaining at 2010 levels. For NO₂ the predicted gain of up to 2,919,741 life years assuming a 30% overlap with PM_{2.5} was substantially larger, although less certain. The overall total could therefore be as much as 3,821,207 life years gained.

Short-term exposure and hospital admissions

Mortality is not the only air pollution related health effect – estimates indicate that in 2010 PM_{2.5} and NO₂ were associated with approximately 1,990 and 420 respiratory hospital admissions respectively with an additional 740 cardiovascular hospital admissions associated with PM_{2.5}.

Box 2: Understanding short term health effects

Health effects associated with **short-term exposure** relate to day-to-day changes in concentrations of air pollution. Such effects are hospital admissions or an increase in numbers of deaths, described as '**deaths brought forward**'. This term relates to the fact that this type of study cannot distinguish whether the deaths are brought forward by only

³ assuming the WHO recommended option of a 30% overlap between the effects of PM_{2.5} and NO₂

a short amount of time, and would not result in changes to the annual death rate, or whether the deaths are brought forward by a longer time.

Air pollution related hospital **admissions** cannot be identified directly in individuals but can be estimated from the increase in hospital admissions on high air pollution days after other possible explanations have been taken into account. These hospital admissions are either 'additional' or 'brought forward' as a result of air pollution. **Respiratory** hospital admissions relate to the lungs and **cardiovascular** hospital admissions relate to the heart and circulation.

Attributing health impacts to emissions sources

Pollution concentrations in London, and therefore the associated health impacts, can be attributed to broad emissions sources. The new report indicates that sources outside London make the largest contribution to the estimated mortality burden from long term exposure to PM_{2.5} in London as a whole, as well as being responsible for the majority of health effects associated with short term exposure to air pollution in London. External sources are responsible for just under half of the mortality burden associated with NO₂. 75% of the cardiovascular hospital admissions associated with PM_{2.5} result from sources outside London.

This is a sobering thought: even if all local emissions sources in London were successfully removed nearly half the health effects associated with long term exposure to air pollution in the capital would continue to be felt. On top of this, almost two-thirds of the health effects due to short term exposure such as deaths brought forward and hospital admissions, would be continue. This underlines the importance of coordinated national and European action to tackle sources of pollution to properly address transboundary effects.

Economic costs

The estimated economic costs of the above health impacts ranged from £1.4 billion to £3.7 billion, depending on whether the costs associated with long term exposure to NO₂ are included. It underlines the economic rationale for further measures to tackle pollution.

4. Implementing the Mayor's Air Quality Strategy

The Mayor's Air Quality Strategy is divided into 15 policies, each of which contains a number of actions. A progress update against each policy is given below and includes a traffic light ("Red, Amber, Green") summary of progress.

Policies 1-5 relate to transport sources, policies 6-12 relate to non-transport sources, policies 13 and 14 relate to actions to be undertaken by others and policy 15 relates to monitoring and reporting.

Policy 1 – Encouraging smarter choices and sustainable travel	
The Mayor, working with boroughs and stakeholders, will support Londoners and those working in and visiting the capital in making behavioural changes to the way they travel to reduce emissions and will promote more efficient use of vehicles.	
Progress: <ul style="list-style-type: none">• TfL is delivering the Mayor's Cycling Vision which aims to get more people cycling, more safely, more often. £913 million will be invested cycling over the next 10 years. Construction has begun on the Central London Grid, the two flagship Cycle Superhighway routes (North-South and East-West) and the first Quietways, with seven pilot routes to be delivered by 2016. More than 580,000 cycle journey stages are made every day in London and cycling in London has more than doubled in the last decade. Average cycling flows on the Transport for London Road Network (TLRN) increased by 11 per cent between 2013/14 and 2014/15.• The Legible London network of signage to support walking is continuing to expand, supported by third party funding and the Borough Local Implementation Plan (LIP) programmes. Approximately 1,480 signs across 30 boroughs have been installed to date, improving the attractiveness of walking as a mode of transport.• TfL has actively supported car club expansion and London now has one of the largest car club markets in Europe, with over 135,000 members in January 2015. TfL is working closely with the industry and boroughs to accelerate this expansion and has facilitated the development of a Car Club Strategy for London, which sets a vision to take car clubs to the mainstream and achieve 1 million members by 2025.• TfL's Behaviour Change team has engaged with 1,300 London workplaces to promote walking and cycling initiatives including the installation of 16,000 cycle parking spaces.	

Across these workplaces, the programme has achieved a 15.8 per cent increase in the number of employees using a bike to get to work, compared to the number before receiving cycling products and services from TfL.

- 1,345 schools are part of the Sustainable Travel Active Responsible and Safe (STARS) accreditation scheme. On average, the STARS schools have recorded an eight per cent modal shift from car use to active transport, saving 44 million vehicle kms and 8,000 tonnes of CO₂ per year from the school run.
- TfL's newly created Urban Motoring team is engaging with both motorists and the motoring industry to encourage a reduction in car trips and to promote Ultra Low Emission Vehicles. Engagement includes vehicle demonstrations and test drives at events such as the 2015 Regent St Motor Show.

Policy 2 – Promoting technological change and cleaner vehicles

The Mayor, through TfL, working with the Government and boroughs will promote the transfer to and use of low emission vehicles for private and freight transport.

Progress:

- TfL published its Transport Emissions Roadmap in 2014, presenting a top ten of proposed innovative measures to help meet London's air quality challenges. This includes the Ultra Low Emission Zone for central London
- TfL is now producing an Ultra Low Emission Vehicle Delivery Plan to set out actions to support the uptake of electric and hydrogen vehicles, including the delivery of supporting charging/refuelling infrastructure. This will be published in Summer 2015.
- TfL has worked with partners to secure over 1,400 charge points in the Source London electric vehicle charging network. To ensure investment in its continued expansion without ongoing public subsidy, the management of Source London was successfully transitioned to a private operator, Blue Point London (a subsidiary of Bolloré, who operate an electric vehicles car club in Paris) in 2014.
- TfL is an active partner in a number of European funded projects that support the development of innovative vehicle technology and urban freight solutions, sharing best practice across the EU. Projects include LaMiLo, which develops innovative solutions to improve the efficiency and sustainability of last mile logistics;

FREVUE, through which electric freight vehicles will be exposed to daily rigours of urban logistics to prove they can offer a viable alternative to diesel vehicles; and CITYLAB, which aims to improve city logistics by establishing seven living laboratories to test different solutions and provide guidance on how to replicate them in other urban areas.

- TfL has established a Low Emission Commercial Vehicle programme that aims to accelerate the development, supply and wider uptake of low emission commercial vehicles and refuelling infrastructure. The programme will prepare the freight industry for the introduction of the Ultra Low Emission Zone.
- The GLA'S Agile Demonstrator Programme has provided grant funding to Gnewt Cargo and DHL to develop and implement consolidation solutions in central and outer London areas. Both projects aim to reduce the impacts of freight by using low emission vehicles for last mile deliveries.

Policy 3 – Priority locations and local measures

The Mayor, through TfL and working with the boroughs, will introduce targeted local measures to improve air quality at locations with high air pollution concentrations.

Progress:

- The Mayor's Air Quality Fund (MAQF) has so far made almost £6 million of funding available to innovative air quality projects led by the boroughs. This is helping support a wide range of projects including: freight consolidation; green walls; reducing and measuring construction pollution; responsive digital signs to reduce engine idling; support for low emission vehicles; and awareness-raising, education and business engagement schemes.
- TfL are supporting Low Emission Neighbourhoods (LENs) in air quality hotspots, and/or locations where a lot of vehicle journeys begin. LENs would encourage the use of ultra low emission vehicles, reduce overall vehicle movements and support urban realm transformations. TfL is also working with the GLA to explore how to apply the Low Emission Neighbourhoods (LENs) concept to new large scale developments to help guide the way they are built, and to avoid creating emissions as much as possible. £2 million has been included as part of the £8 million round of the MAQF (2016/17 to 2018/19) to trial two LENs, which must be match funded.

Policy 4 – Reducing emissions from the public transport fleet

The Mayor, through TfL and working with the Government, boroughs and transport operators, will minimise emissions from London's public transport system.

Progress:

- TfL now has 1,300 low-emission hybrid buses in service, including 500 New Routemasters, and this number will rise to 1,700 by 2016. The New Routemaster produces around one quarter of the PM and NO_x of the fleet average hybrid Euro V generation bus, and 20 per cent less CO₂. It is also more fuel efficient. The Euro VI engine fitted to all recent and future conventional and hybrid buses delivers even lower PM and NO_x emissions.
- By 2015, all TfL buses will meet the Euro IV standard for PM₁₀ and NO_x. Around 1,800 Euro III buses are being retrofitted with selective catalytic reduction (SCR) equipment to reduce their NO_x emissions by up to 88 per cent.
- By 2020, all double deck buses entering ULEZ will be hybrid diesel-electric and all single decks will be zero tailpipe emissions (i.e. hydrogen or pure electric).
- TfL is increasing the number of all-electric zero-tailpipe-emission buses in the fleet from eight to 15 this year. From September 2015, route 312 in south London will be the capital's first entirely electric-powered service.
- There will also be a trial of rapid induction charging from autumn 2015 which will enable range-extended hybrids buses to run up to 80 per cent of the time on battery power, with no tailpipe emissions for that period of operation.
- TfL currently has eight zero-tailpipe-emission hydrogen buses in service, and plans to raise this to 10 from 2016, and operate these until at least until 2019.
- From 2018 all newly manufactured Taxis and PHVs will need to meet Zero Emission Capable standards (See Box 3).
- Agreement from the Network Rail to electrify the Gospel Oak to Barking Line from 2017/18 has been secured.

Box 3: Spotlight on Zero Emission Capable Taxis

In January 2014, The Mayor announced plans for all new taxis to be Zero Emission Capable (ZEC) by 2018. This requires new taxis to have a minimum zero emissions range of 30 miles and maximum CO₂ emissions of 50g/km. This brought forward the original deadline of 2020 set out in the MAQS in response to engagement with taxi manufacturers.

The ZEC taxis form an integral part of the ULEZ and will provide significant reductions in NO_x and PM emissions compared to a conventional diesel taxi and help to reduce running costs for drivers. Both Geely and Frazer Nash have launched prototype vehicles and have announced plans for ZEC taxis to go on sale from 2017, with a £250 million investment in a new facility to produce ZEC vehicles in Coventry. Funding has been secured from the TfL business plan and the Office for Low Emission Vehicles to provide financial support for early adopters of the new vehicles.

A consultation for the final proposals for ZEC taxis and a potential ZEC standard for Private Hire Vehicles is underway, with a final decision expected to be announced in the Autumn.

Policy 5 – Schemes that control emissions to air

The Mayor, through TfL, will continue to operate the Low Emission Zone (LEZ) and will consider tightening the standards after 2020 to more closely match the ULEZ standards. TfL will explore tightening the central London ULEZ standards or expanding the area it covers in the future, perhaps so that all cars and vans must be zero emission capable (eg plug-in hybrid or zero emission at tailpipe) from 2025, as put forward in TfL's Transport Emissions Road Map. TfL is actively considering a retro-fit solution for its Euro V hybrid buses to meet the Euro VI standard and it is expected this will act as a stimulus to the development and commercial production of retrofit solutions for other heavy diesel vehicles.

Progress:

- Plans for the central London Ultra Low Emission Zone from 2020 have been confirmed (see box 4)
- The London wide LEZ scheme continues to show very high levels of compliance with 99 per cent of larger vans and 96 per cent of HGVs and coaches meeting the required emissions standard.

- By the end of 2015, all TfL buses will meet the Euro IV emission standard for NO_x.

Box 4: Spotlight on the Ultra Low Emission Zone

The world first Ultra Low Emission Zone (ULEZ) will launch in central London on 7 September 2020, significantly improving air quality and helping to protect the health of Londoners. It will require vehicles travelling in the Congestion Charge Zone of central London to meet new emission standards 24 hours a day, seven days a week or pay a daily charge.

As part of the ULEZ TfL is committed to ensuring that by 2020 all 300 single decker buses operating in central London are zero emission from the tailpipe (e.g. pure electric or hydrogen), and all 3,000 double decker buses will be hybrid, including 800 New Routemasters.

The full ULEZ package is expected to halve emissions of NO_x and PM from vehicle exhausts in central London. This should mean that more than 80 per cent of central London would be expected to meet the NO₂ annual EU legal limits as a result. The number of people living in areas of poor air quality (where levels of NO₂ exceed legal limits) would reduce by 74 per cent in central London, 51 per cent in inner London and 43 per cent in outer London. It will also encourage the use of more sustainable forms of transport, and provide a stimulus to the 'green economy' - in particular the development of ultra low emission technology and vehicles.

The ULEZ will require vehicles to meet the following standards:

- Cars, vans and minibuses – Euro 6 for diesel engines and Euro 4 for petrol engines. Non-compliant vehicles would be required to pay a daily charge of £12.50 for driving in the zone;
- Heavy goods vehicles, buses and coaches – Euro VI. Non-compliant vehicles will be required to pay a daily charge of £100;
- Motorcycles and similar vehicles – Euro 3. Non-compliant vehicles will be required to pay a daily charge of £12.50.

Additional proposals for Taxi and Private Hire Vehicle licensing are currently out for consultation.

Non Transport Measures

Policy 6 – Reducing emissions from construction and demolition sites	
<p>The Mayor will work with London boroughs, the GLA Group and the construction industry to encourage implementation of the Best Practice Guidance for construction and demolition sites across London.</p>	
<p>Progress:</p> <ul style="list-style-type: none">• The GLA has published Supplementary Planning Guidance (SPG) on the control of dust and emissions from construction and demolition in August 2014. This included proposals to address Non Road Mobile Machinery and to support the further roll-out of dust suppressants at construction sites.• New emissions requirements for Non Road Mobile Machinery used on construction sites will come into effect from September 2015. The GLA is undertaking training and developing a new web-based database to assist with enforcement of the scheme.	

Box 5: Spotlight on Mayor’s Air Quality Fund (MAQF)

The Mayor’s Air Quality Fund is providing £20 million in funding for local authority action over 10 years. The first round of MAQF projects started in 2013 and have included a whole host of innovative projects including green walls to protect pupils in playgrounds, a London-wide awareness campaign, a freight consolidation centre which has cut deliveries by half, anti-idling campaigns and a project protecting patients at Great Ormond Street Hospital from exposure to air pollution. The second round of the fund opened for applications in May 2015 and will provide £8million to boroughs over 3 years, including funding two truly transformational Low Emission Neighbourhoods

Policy 7 – Using the planning process to improve air quality	
The Mayor will ensure that new developments in London shall as a minimum be ‘air quality neutral’ through the adoption of best practice in the management and mitigation of emissions.	
<p>Progress:</p> <ul style="list-style-type: none"> • The Mayor published the London Plan in summer 2011, which includes policies to make new proposals ‘air quality neutral’ as a minimum. • The GLA continues to review planning cases referred to the Mayor as well as contributing to the development of strategic planning policy for Opportunity Area Planning Frameworks (OAPFs). 	

Policy 8 – Maximising the air quality benefits of low to zero carbon energy supply	
The Mayor will ensure that low to zero carbon energy sources in London do not contribute to the deterioration of local air quality through the adoption of best practice in the management and mitigation of emissions.	
<p>Progress:</p> <ul style="list-style-type: none"> • Supplementary Planning Guidance providing further advice to boroughs and developers on applying the ‘air quality neutral’ principle as well as emission requirements for combined heat and power and biomass boiler systems was published in 2014. 	

Policy 9 – Energy efficient buildings	
<p>The Mayor will encourage the retrofitting of existing homes and workplaces to make them as energy efficient as possible in order to reduce NO_x emissions from gas heating systems.</p>	
<p>Progress:</p> <ul style="list-style-type: none"> <li data-bbox="199 846 1294 1160">• Since its inception in 2009, RE:NEW – the Mayor’s domestic energy retrofit programme - has supported the retrofit of over 111,500 of London’s homes, saving over 30,000 tonnes of CO₂ a year. Coupled with wider market delivery, over 500,000 homes in London have been retrofitted. A third phase of RE:NEW launched in the summer of 2014, with the appointment of a new Support Team to support social housing providers, local authorities and the private sector to retrofit their homes. A new RE:NEW framework of suppliers will be launched in the summer of 2015. This phase has targets to retrofit 175,000 homes and generate savings of 93,000 tonnes of CO₂ by 2017. <li data-bbox="199 1218 1294 1464">• At the end of June 2015, around 450 of London’s public sector buildings had been or were in the process of being retrofitted through RE:FIT – the Mayor’s public buildings energy retrofit programme - saving over 30,000 tonnes of CO₂ a year. Almost 200 public sector organisations across the capital have so far participated in the programme. RE:FIT has targets to support the retrofit of 600 buildings, including 100 GLA Group buildings, and generate savings of 45,000 tonnes of CO₂ by the end of 2015. 	

Policy 10 – Improved air quality in the public realm	
<p>The Mayor will encourage the improvement of air quality in the public realm by planting urban vegetation to trap particulate matter, using his influence to increase green cover in the private and public realms and by discouraging anti-social burning and the illegal use of wood burning stoves to reduce smoke annoyance.</p>	
<p>Progress:</p> <ul style="list-style-type: none"> • A major programme of planting has been undertaken at priority locations. • Advice on using wood burning stoves that are exempt from Smoke Control Area restrictions, as well as on avoiding burning waste, are available on the GLA website and the Cleaner Air for London website. • Funding has been provided through the Mayor’s Air Quality Fund to undertake a number of area based schemes (see Box 6 for more information). 	

Policy 11 – Encouraging innovation	
<p>The Mayor will promote research into the causes and effects of air pollution in London, testing new techniques for improving air quality and encouraging their use when they are proven to be effective.</p>	
<p>Progress:</p> <ul style="list-style-type: none"> • The GLA helped to re-form and is co-chair of the Air Pollution Research in London (APRIL) group, which brings together policy makers and academics to investigate issues that impact directly on air quality in the capital. • By developing a new bespoke system for London Local Air Quality Management (LLAQM) and ensuring boroughs are delivering against the Cleaner Air Boroughs criteria, the GLA is spreading best practice across boroughs. • The GLA and TfL have provided two funding streams which are helping to promote innovative local action to reduce pollution: the £20 million Mayors Air Quality Fund and the Future Streets Incubator Fund. • In late 2015, the GLA will publish the London Atmospheric Emissions Inventory (LAEI)2013, utilising the latest available activity data, research, emission factors and understanding of air pollution. This will act as a basis for the development and assessment of future air quality proposals. 	

Policy 12 – Raising public awareness of air quality issues	
<p>The Mayor will encourage individuals to take action to improve air quality and will encourage the provision of targeted information about air quality to people most at risk from the health effects of air pollution.</p>	
<p>Progress:</p> <ul style="list-style-type: none"> • The GLA and London boroughs have a Cleaner Air for London website. The site provides information and guidance to a range of audiences about air quality in the Capital. • The GLA promotes and provides general funding to airTEXT, which provides information on air pollution to vulnerable Londoners. • The GLA will use the new LLAQM to provide additional impetus and support for boroughs to include air quality within their Joint Strategic Needs Assessment documents and to promote enhanced focus on air quality within borough public health teams. • In partnership with the London Boroughs the GLA has delivered a London-wide air quality communications campaign, Breathe Better Together, including posters on the Tube and radio adverts. Through the Mayor’s Air Quality Fund the GLA is supporting a range of borough-led awareness and engagement initiatives, including schools projects, business projects and anti-idling projects. • The Mayor has produced a video on the Mayor’s Air Quality Fund, released in May 2015 • The GLA has hosted several air quality events including an evening reception at Mansion House in 2014, which included a speech from the Mayor. • The Mayor also attended the House of Commons Environmental Audit Committee in September 2014. • Initiatives such as the ULEZ and Breathe Better Together have featured in national and/or regional papers and other media outlets 	

Actions by others

Policy 13 – Working with Government and other authorities	
The Mayor will encourage the development and implementation of proposals and action plans by the Government and other authorities aimed at achieving EU emissions limit values in Greater London for PM ₁₀ , PM _{2.5} and NO ₂ .	
<p>Progress:</p> <ul style="list-style-type: none"> • The Mayor has secured £35 million from the Office of Low Emission Vehicles to assist with the implementation costs of the ULEZ. • The Mayor continues to lobby Government for more resources and action at the national level, highlighting that he alone cannot solve London’s air quality challenge. • The Mayor has helped establish the Air Quality Initiative of the Regions (AIR) Group, with eleven European regions facing similar air quality challenges to London, to lobby the European Commission for additional resources and action at the European level. 	

Policy 14 – Working with boroughs	
The Mayor will assist boroughs in carrying out the exercise of their statutory duty to improve air quality in London	
<p>Progress:</p> <ul style="list-style-type: none"> • The Mayor has published new Local Implementation Plan (LIPs) guidance, which provides even more scope for the funding to be spent on air quality initiatives and low emission vehicles. • The Mayor is providing £20 million to boroughs through his Mayor’s Air Quality Fund. £6 million has already been allocated and the next round of £8million in funding opened for applications in May 2015. 	

- The GLA is co-ordinating all London applications to the Defra Air Quality Grants programme, in order to help ensure all opportunities are maximised and to avoid any duplication of borough-led air quality programmes.
- In Summer 2015 the Mayor will consult on plans for a brand new bespoke system for the way that London boroughs monitor and manage local air quality. This new system will help to ensure that all borough responsibilities are simplified, clear and statutory and will also provide support, co-ordination and resources to help ensure effective action at the local level.

Box 6: Spotlight on London Local Air Quality Management

In July 2015 the Mayor will launch a consultation on a new statutory framework to guide the way that boroughs monitor and work to reduce local air pollution. Currently boroughs must adhere to the national framework, but there is a widely-recognised need for a London-specific system that will enable us to target the specific challenges and opportunities in London. The new system will streamline processes and provide resources and support to enable more effective local action. The new system will be in place by January 2016.

Policy 15 – Monitoring progress and reporting

The Mayor will monitor changes to air quality in London and will take additional action where necessary to implement the policies and proposals of the National Air Quality Strategy and achieve relevant EU limit values in Greater London.

Progress:

- Following the Supreme Court’s ruling in April the Mayor and his team have engaged with the Government to highlight priorities for action in London, as well as providing support, data and other information to Defra to support the redrafting of the national and Greater London regional NO₂ air quality action plans.

5. Next steps

Over the coming months, in response to requests from the London boroughs and other stakeholders, the GLA and TfL will look at additional measures to improve air quality in London. This includes considering the further expansion of the Ultra Low Emission Zone, including:

- Reviewing all suggestions for amendments to the ULEZ boundary;
- Considering options to be assessed, driven by air quality impacts, implementation and compliance costs and the general workability of options;
- Undertaking high-level assessment of options, alongside other possible measures (e.g. tightening the standards for the London-wide Low Emission Zone); and
- Feeding back findings to stakeholders in 2015, including London Councils, before undertaking more detailed assessment and modelling of a short list of options and reporting findings of the detailed assessment work to stakeholders in early 2016, for discussion about the next steps.

This is in addition to the GLA and TfL's continuing work to drive down emissions ahead of 2020. This includes:

- The development of TfL's Ultra Low Emission Vehicle Delivery Plan for London and TfL's Freight Strategy, both to be published later this year;
- The Mayor's proposed London Local Air Quality Management framework, which will be subject to consultation;
- The continuing Mayor's Air Quality Fund, the next round of which will provide £8 million in funding, including £2 million for two Low Emission Neighbourhoods, a key measure for tackling pollution hot spots identified in TfL's Transport Emissions Road Map; and
- Continued investment in walking, cycling and public transport to encourage and support a shift to more sustainable travel.

It is estimated that ULEZ will ensure around 80 per cent of central London is compliant with EU legal limits for NO₂. Therefore in order to reach full compliance the Mayor is calling on Government and the EU to take or facilitate more action:

The Mayor has called on the [European Commission](#) to:

- Approve a new protocol for real world testing of the new Euro 6 engine emission standard to make sure it delivers; the Commission also needs to help accelerate the uptake of these cleaner vehicles;

- Make it easier to access and combine EU funding like structural funds to tackle pollution and create an Urban Clean Air Fund for European cities.

The Mayor is also lobbying for central government to:

- Ensure fiscal incentives only encourage and promote the cleanest vehicles, and consider both carbon and air pollutant emissions in any eligibility requirements;
- Help scrap older diesel vehicles through the introduction of a national diesel scrappage scheme;
- Update the Clean Air Act to give councils the right powers to deal with local emissions such as from construction site machinery;
- Support a local approach to air quality by following London's lead in providing £20 million for pollution hotspots;
- Help London's public transport go ultra-low emission by 2020, by protecting the existing funding for supporting ultra low emission vehicles and providing additional funds for hybrid, electric and hydrogen buses and the charging infrastructure needed to support ultra low emission vehicles;
- Tackle emissions from buildings by considering air quality alongside carbon dioxide (CO₂) in the Department for Energy and Climate Change's priorities; and
- Immediately rule out the expansion of Heathrow Airport to protect public health and help achieve EU legal limits for NO₂ (see Box 7)
- Put air quality at the heart of health policy by using Public Health England to push for further action to tackle air pollution and reduce exposure.

Box 7: Heathrow expansion and air quality

The Airports Commission has previously concluded that without "substantial and forceful measures" the air quality impacts of expansion at Heathrow would be significantly adverse. Yet no further detail on how to mitigate against pollution, on the costs of that mitigation or its effects has been provided as part of their final report.

Prior to publishing the final report, the Airports Commission recently consulted on air quality impacts associated with expanding aviation capacity in the South East. While the Airports Commission methodology was flawed in several ways, it is clear that a third runway would make Heathrow the worst air quality black spot in London by 2030. Sections of the A4 Bath Road would have the worst nitrogen dioxide (NO₂) concentration in London. There are also several locations around Heathrow where the Commission predicts an additional 12 ug/m³ of NO₂ concentration as a result of expansion (the legal limit is 40 ug/m³ of NO₂).

It is clear within the limits of the data made available that allowing Heathrow to expand would be inconceivable if the Government is to set out a plan for meeting EU air quality targets that fulfils its legal obligations. The short and long-term health impacts associated with exposure to NO₂ as set out in this report make clear that expansion of Heathrow is not a viable option and the Mayor has called on Government to immediately rule it out.

Other formats and languages

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Chinese

如果需要您母語版本的此文件，
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Hindi

यदि आप इस दस्तावेज की प्रति अपनी
भाषा में चाहते हैं, तो कृपया निम्नलिखित
नंबर पर फोन करें अथवा नीचे दिये गये
पते पर संपर्क करें

Vietnamese

Nếu bạn muốn có văn bản tài liệu
này bằng ngôn ngữ của mình, hãy
liên hệ theo số điện thoại hoặc địa
chỉ dưới đây.

Bengali

আপনি যদি আপনার ভাষায় এই দলিলের প্রতিলিপি
(কপি) চান, তা হলে নীচের ফোন নম্বরে
বা ঠিকানায় অনুগ্রহ করে যোগাযোগ করুন।

Greek

Αν θέλετε να αποκτήσετε αντίγραφο του παρόντος
εγγράφου στη δική σας γλώσσα, παρακαλείστε να
επικοινωνήσετε τηλεφωνικά στον αριθμό αυτό ή ταχυ-
δρομικά στην παρακάτω διεύθυνση.

Urdu

اگر آپ اس دستاویز کی نقل اپنی زبان میں
چاہتے ہیں، تو براہ کرم نیچے دئے گئے نمبر
پر فون کریں یا دیئے گئے پتے پر رابطہ کریں

Turkish

Bu belgenin kendi dilinizde
hazırlanmış bir nüshasını
edinmek için, lütfen aşağıdaki
telefon numarasını arayınız
veya adrese başvurunuz.

Arabic

إذا أردت نسخة من هذه الوثيقة بلغتك، يرجى
الاتصال برقم الهاتف أو مراسلة العنوان
أدناه

Punjabi

ਜੇ ਤੁਹਾਨੂੰ ਇਸ ਦਸਤਾਵੇਜ਼ ਦੀ ਕਾਪੀ ਤੁਹਾਡੀ ਆਪਣੀ ਭਾਸ਼ਾ
ਵਿਚ ਚਾਹੀਦੀ ਹੈ, ਤਾਂ ਹੇਠ ਲਿਖੇ ਨੰਬਰ 'ਤੇ ਫੋਨ ਕਰੋ ਜਾਂ ਹੇਠ
ਲਿਖੇ ਪਤੇ 'ਤੇ ਰਾਬਤਾ ਕਰੋ:

Gujarati

જો તમને આ દસ્તાવેજની નકલ તમારી ભાષામાં
જોઈતી હોય તો, કૃપા કરી આપેલ નંબર ઉપર
ફોન કરો અથવા નીચેના સરનામે સંપર્ક સાધો.



GREATER LONDON AUTHORITY