Implementation of the Low Emission Zone and other measures to improve air quality in London

What would you describe as the biggest challenges to successfully implementing the Low Emission Zone (LEZ)?

As the first scheme of its kind in the UK, the biggest challenge from TfL and the Mayor’s perspective was ensuring the correct legal framework and enforcement infrastructure was in place to allow us to implement and manage the LEZ. As such, a number of different legal options were considered, each with their own costs and benefits. The option chosen was to implement a charging scheme, similar in nature to the existing Congestion Charging scheme. This option utilised the power of the Mayor, under Schedule 23 of the GLA Act 1999, to implement the LEZ by way of a Scheme Order.

There were also a number of technical challenges around the infrastructure necessary to manage and enforce the scheme, such as building a database of compliant vehicles registered in the UK using information from a number of different sources, and a process for operators of non-UK vehicles to register the compliance of their vehicles with TfL.

One particular challenge involved working closely with the DfT to design and agree the size, type and placement of the entirely new road signs that were required. Now that such signage is agreed it can be used by other authorities in England and Wales, as well as in Scotland subject to appropriate approvals.

In Scotland, it is hoped that an LEZ will be in place in a Scottish city by the end of 2018. Is 14 months adequate to ensure that it is fit for purpose and functions properly?

In our experience it is possible to implement a scheme in this timeframe. Excluding the revision of the Mayor’s Transport and Air Quality Strategies, it took about a year and half to implement the Low Emission Zone in London.

It should be noted that the LEZ covers the whole of the Greater London area and therefore requires a large infrastructure of cameras and road signs to ensure it can be properly managed. London benefited from being able to ‘piggy-back’ on the existing camera network and back-office system used by the Congestion Charge, which had been in place since February 2003.
The Congestion Charge took around two years to implement. Using the Congestion Charge back-office and camera infrastructure, it took Transport for London a little over eight months to implement the T-charge (following final approval of the scheme by the Mayor).

How much time were operators and owners of the vehicles covered by the LEZ given to comply with its introduction?

A first stage period of public and stakeholder consultation took place between January and April 2006 on Revisions to the Mayor’s Transport & Air Quality Strategies to allow for a London LEZ. This consultation was on the principle of a LEZ scheme. The findings were reported to the then Mayor in July 2006.

This led to a second phase of consultation on detailed scheme proposals (as set out in the Scheme Order). The Scheme Order sets out the details of the Scheme, specifying and defining the vehicles to be included in the proposed LEZ, the vehicle emission standards, vehicles which could be eligible to apply for a 100% discount, the proposed LEZ boundary and the level of the daily charge and penalty charge. This consultation stage ended early February 2007 with a report being prepared by TfL for the Mayor to allow him to make a final decision on whether or not to confirm the Scheme Order (with or without changes) in May 2007.

We started communicating from June 2007 using an extensive multi media campaign including local and national press, an extensive print and poster campaign and key partnership working encouraging third parties to cascade information to their customers and members. The first phase of the scheme was introduced in February 2008.

As the LEZ was introduced in phases, some vehicle owners had more time to prepare than others depending on when they were affected by the new LEZ emissions standards. The table below shows how some vehicle owners had less than a year to prepare whereas others had significantly longer.
Whether air quality has improved in London since the introduction of its Air Quality Strategy in 2010? Which policies in particular have been the most successful, and what have the key barriers been e.g. technical, or stakeholder opposition?

Monitored air pollution trends

On average, based on analysis of monitoring data provided by the London Air Quality Network (LAQN) across London the following pollution trends are observed:

- NO2 concentrations continue to fall in London, with the greatest reductions being observed at roadside sites in Inner, where pollution concentrations are significant higher, on average, that outer London. Current trends analysis indicated concentrations are reducing by about 4% each year. Historically
NO2 concentrations in London remained flat or broadly increasing until about 2008/9 but are now consistently improving year on year.

- Reductions of NO2 concentrations at background sites and outer roadside sites also continue to be observed. Recent trends suggest that on average, concentrations at roadside site in outer London are now slightly lower than inner London background concentrations.

- Concentrations at roadside sites in inner London are still well above the legal limits for NO2 and continue policy intervention is required to reduce concentrations further.

- NOx concentrations are continuing reduce across London, although the reduction in NOx at roadside sites in Inner London is less than for NO2 concentrations. TfL will be investigating the further trends in NOx and NO2 concentrations to help understand the reasons for variations in trends.

- PM10 concentrations in London have reduced significantly over the years. These reductions have continued across London, however from 2015 onwards the average trends suggest that PM10 concentrations in Inner London are increasing somewhat. The reasons for these may be related to weather conditions but also may in part be due to increases in the use of solid fuel burning in some areas.

- Similarly to PM10, concentrations for PM2.5 have been reducing for a number of years, but recent trends analysis suggest that the reductions are now starting to level off in Inner London.

Further research is required to understand the underlying reasons for increasing PM10 and PM2.5 in Inner London.

Trends at individual sites will vary, and some sites will go up and some with go down, however, overall, grouping sites together to represent Inner and Outer London, allow more general trends for London to be represented.

Understanding emission sources in London

In London we estimate about half of emissions come from road transport sources; the other half broadly come from non-transport sources like construction, buildings and the river. The Mayor’s existing powers are strongest in relation to road transport and thus much of our effort has focused on these sources.

With road transport, the key issue has been emissions from diesel vehicles and the failure of previous Euro standards to effectively tackle diesel NOx emissions on road. This has meant that concentrations of this pollutant have not fallen as fast as they should have done.

However a distinction needs to be drawn between NOx and PM10 reduction proposals. For example the age limits on taxis and PHVs (15 years and 10 years
respectively) and the strengthening of the London wide LEZ from Euro 3 to Euro 4 in 2012 were introduced to tackle PM10 emissions.

The Euro VI standard is proving more successful in reducing on road NOx, particularly from heavy vehicles, meaning that future policies restricting older vehicles can successfully tackle both pollutants. Some issues remain with the Euro 6 standard for light diesel vehicles, and this is discussed further below.

A programme of DPF and SCR retrofit in 2013 was successfully installed on 900 Euro III buses to tackle both pollutants (NOx and PM). The most recent trials on bus SCR systems are showing up to 95 percent reduction in NOx on road. In the medium to long term we are looking to phase out diesel entirely and move to a fully zero emission bus fleet.

We are setting a requirement for all single decker buses in central London to be hydrogen or electric from 2020 and we are currently trialling range extended and fulling electric double decker buses. We are planning an entirely zero emission bus fleet by 2037 at the latest.

Amongst stakeholders there has been some concern amongst some freight and coach organisations to implementation of the T-Charge and the LEZ. However generally there has been overwhelming public support for proposals, including from most business organisations who can see the benefits of cleaner air in attracting staff and customers.

**What technical innovations have been trialled in London, and how does their performance in reducing air pollution compare to e.g. behaviour change through promoting active travel?**

We have undertaken a range of technology trials with our bus fleet on the most effective way to reduce emissions as well as trialling wireless charging, hydrogen and electric buses. As discussed this has seen a 95 per cent reduction in NOx from these buses. A range of innovative air quality solutions has been trialled through the Mayor’s Air Quality Fund to tackle air pollution at specific hotspot locations through, for example anti-idling campaigns, school campaigns and green infrastructure. It is not possible to make general statements directly comparing the effectiveness of differing approaches to reducing air pollution. A combination of behaviour change, technology and regulation is needed to reduce air pollution.

The Mayor has set an ambitious mode share target for 80 per cent of journeys to be undertaken by foot, bike or public transport by 2041, up from 64 per cent today. It is not possible to disaggregate the direct emissions impact of individual behaviour change programmes at a City wide level. However the generalised shift away from private car use towards walking, cycling and public transport in London has contributed to the reduction in emissions mentioned above. With tyre and brake wear forming approximately 75 per cent of road transport PM emissions, this is vital to reducing emissions from this source in particular.

**Whether the GLA is satisfied that the data available for London’s Clean Vehicle Checker is robust, given recent investigations into the veracity of official**
estimates of vehicle emissions? How might the real world performance of vehicles be better analysed?

The Mayor's Cleaner Vehicle Checker uses on-road test data captured by Emissions Analytics Limited, an independent vehicle testing company, using Portable Emissions Measurement System (PEMS) equipment. Emissions Analytics has developed a database of 'real-world' emissions from a wide range of vehicles sold in the UK, France and European countries.

A recent academic report commissioned by ‘Allow Independent Road-testing’ (AIR, www.allowair.org), and conducted by Imperial College London, compares PEMS testing done by Emissions Analytics to PEMS tests for the same vehicle models from other organisations including the Department for Transport. The report finds that Emissions Analytics methodology is robust and fit for purpose, and in most instances comparable to the official ‘Real Driving Emissions’ (RDE) type approval tests that need to be undertaken by manufacturers. The report also finds that in a number of technical areas Emissions Analytics testing may actually be more representative of real world driving than the RDE type approval test.

Given the dependence on driving style, this report indicates the Emissions Analytics results provide a very good indication as to the real world emissions of a new car. The report can be found here: https://drive.google.com/open?id=0B5x9Ob3Plcc3ajc5U2pNaGJrWVk.

The GLA are also working in partnership with the TRUE Initiative to gather data from roadside emissions testing in London to develop a ‘Used Vehicle Checker.’ The TRUE Initiative is a group of experts and interested parties, including the FIA Foundation and ICCT(International Council on Clean Transportation), which tries to show the gap between emissions tested in real-world conditions rather than in labs.

Is London using the data it records from the LEZ and T-Charge which might be shared with other groups or agencies to better underpin future modelling?

We share data with Defra and with the CAZ cities in England. Much of the research and survey works that has been developed by London has underpinned some of Defra modelling. TfL has met with different authorities to provide insight and advice on development of LEZ type measures and is active on work groups set up for CAZ cities. TfL are happy to meet with counterparts in Scottish cities to discuss further cooperation and collaboration.

What recommendations for change are likely from the air quality audits the GLA is carrying out at 50 primary schools? Also, are pupils and parents being involved in these audits?

The Mayor is offering 50 primary schools in highly polluted areas the chance to have an air quality audit. These audits will give primary schools expert advice on how to improve the air school children breathe.

The focus of the recommendations will be on interventions that will reduce emissions or exposure to emissions. Audit recommendations could include:
moving school entrances and play areas to reduce exposure to busy roads;

‘no engine idling’ schemes to reduce harmful emissions during the school run;

looking at the school estate to minimise emissions from boilers, kitchens and other sources;

changes to local roads, including improved road layouts, restricting the most polluting vehicles around schools and pedestrianisation around school entrances;

‘green infrastructure’ such as ‘barrier bushes’ along busy roads and in playgrounds to ‘block’ out toxic fumes; and

encouraging walking and cycling through competitions, ‘walking buses’ with large groups of pupils walking together on pavements, plus improving cycle and walking routes.

The engagement with primary schools to deliver this programme is taking a ‘whole school’ approach whereby parents and school children have participated in the engagement activities with the aim of raising awareness about the impact of exposure by school children to poor air quality.

For your 12 Low Emission Bus Zones, has there been any evidence of less clean buses being moved to other parts of London?

The intention behind the Low Emission Bus Zones is for all buses to be replaced or retrofitted rather than relocated to other parts of London. Due to a supplier delay there was a short term measure relocation of 30 buses on the first Low Emission Bus Zone in Putney. Controls are in place to ensure that this does not happen in the future.

With the requirement for all new taxis licensed in London after 1 January 2018 to be zero emission capable, what positives do the GLA hope might result from this and what challenges are you possibly facing from stakeholders surrounding this change?

Every licensed taxi is fully accessible for wheelchair users, so offers a vital travel option for passengers with accessibility needs or heavy luggage, or when public transport is not suitable. They are also designed specifically for London’s streets. As they are specialist vehicles, drivers have a limited choice of models.

Unfortunately, current taxis are heavy diesel vehicles and we now know they are a significant contributor to poor air quality, particularly in central London. They were responsible for an estimated two per cent of total NOx, and four per cent of road transport NOx, in Greater London in 2013. In central London, they accounted for eight per cent of total NOx and 15 per cent of road transport NOx.
This is why the Mayor is committed to supporting the trade by phasing out diesel vehicles and establishing the Capital’s taxi fleet as the greenest in the world. The new emissions requirement for taxis provided an opportunity for vehicle manufacturers to improve the existing features in taxis or for new manufacturers to enter the London taxi market. As well as being ZEC the new taxi that has been developed by the London Electric Vehicle Company (LEVC) also includes a number of other features including a front facing wheelchair space, phone charging facilities and USB ports. A conversion of Nissan e-NV200 is also being undertaken by a company called Dynamo which will provide London taxi drivers with a new choice of vehicle.

There has been concern about the cost of the new taxis however, through Transport for London funding of up to £12,500 is available to support drivers who purchase a ZEC taxi.

The taxi trade has embraced the switch to ZEC, in part because cleaning up London’s air will make a noticeable difference for taxi drivers who are exposed to the toxic emissions for long periods each day.

Supporting infrastructure has been the one key area where the taxi and private hire trades have expressed concern. Transport for London is delivering 150 rapid charge points by 2019 of which 90 will be for the sole use of the taxi trade. This is based on detailed modelling and research into the driving and working patterns of taxi drivers. However, the taxi and private hire trades want a greater number of charge points will be required than is presently proposed. We are working with the trades to reassure them that enough charging infrastructure will be provided for their needs, and keep the overall number of charging points needed under review. There have been a number of challenges faced when trying to install rapid chargers including ensuring that there is a sufficient power supply, getting planning agreement from local authorities and finding suitable locations.

**What are GLA’s hopes for how the newly introduced T-Charge will help build on what has already been done with LEZs? How might the Ultra Low Emission Zone expand on this?**

The T-Charge is a key plank in the Mayor’s ambitious programme to reduce air pollution from Transport. To the best of our knowledge it sets the most stringent emissions standards of any city worldwide. It is also the first emissions restriction in the country that includes cars. It’s also a key precursor to the even more ambitious Ultra Low Emission Zone, preparing Londoners, raising awareness and accelerating behaviour change and vehicle replacement.

The ULEZ will replace the T-Charge from April 2019 and set a significantly more stringent emissions limit for diesel vehicles, apply 24/7 and have fewer discounts and exemptions available. We estimate that this will lead to a 20 per cent reduction in Londonwide road transport NOx emissions in 2020 and nearly a 30 per cent reduction by 2021.
Whilst the LEZ has proved an effective deterrent against the older, more PM polluting heavy vehicles, there is a need to strengthen the standard to match the ULEZ standard (Euro VI for diesel vehicles). We are currently consulting (from 30 November 2017 – 26 February 2018) on proposals to change the LEZ standard as well as expand the ULEZ. From 2020, the standard for heavy vehicles would change from a Euro IV standard for PM, to a Euro VI standard for both NOx and PM.

We are also consulting on an expansion of the ULEZ to an area roughly 18 times the size of the current ULEZ in 2021. This would apply the ULEZ standards to all cars, vans and motorcycles (Heavy vehicles being managed by the stronger LEZ which will also use the ULEZ standard).

We estimate that the combined impact of the LEZ and ULEZ changes in 2021 would be a 28 percent reduction in NOx emissions London wide, a 77 percent reduction in people living in areas exceeding legal limits and a 71 percent reduction in schools in areas exceeding legal air pollution limit