



# New proposals to improve air quality

Consultation and information document

October 2016

**MAYOR OF LONDON**



**TRANSPORT  
FOR LONDON**  
EVERY JOURNEY MATTERS

## **About Transport for London**

Part of the Greater London Authority family of organisations led by Mayor of London Sadiq Khan, we are the integrated transport authority responsible for delivering the Mayor's strategy and commitments on transport.

As a core element in the Mayor's overall plan for London, our purpose is to keep London moving, working and growing, and to make life in our city better. We reinvest all of our income to run and improve London's transport services and to make it more modern and affordable for everyone.

Our operational responsibilities include London Underground, London Buses, Docklands Light Railway, London Overground, TfL Rail, London Trams, London River Services, London Dial-a-Ride, Victoria Coach Station, Santander Cycles and the Emirates Air Line.

On the roads, we regulate taxis and the private hire trade, run the Congestion Charging and Low Emission Zone schemes, manage the city's 580km red route network, operate all of the Capital's 6,300 traffic signals and work to ensure a safe environment for all road users.

We are delivering one of the world's largest programmes of transport capital investment, which is building the Elizabeth line, modernising Tube services and stations, transforming the road network and making it safer, especially for more vulnerable road users, such as pedestrians and cyclists.

We work hard to make journeys easier through effective use of technology and data. We provide modern ways to pay through Oyster and contactless payment cards and provide information in a wide range of formats to help people move around London.

Real-time travel information is provided directly by us and through third party organisations, which use the data we make openly and freely available to power apps and other services.

We listen to, and act upon, feedback and complaints to constantly improve our services and work with communities, representative groups, businesses and many other stakeholders to shape transport provision in London.

Improving and expanding transport in London is central to driving economic growth, jobs and housing throughout the United Kingdom. Under the Mayor's housing strategy, we are using our surplus land to provide thousands of new, affordable homes. Our own supply chain creates tens of thousands of jobs and apprenticeships across the country.

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## **Part 1: Background and overview**

Air pollution is one of the most significant challenges facing London. The equivalent of around 9,400 deaths per year are attributed to air quality related illnesses.

As part of the Mayor's pledge to help improve air quality and health for all Londoners, he is proposing to introduce an Emissions Surcharge (ES), more commonly known as the 'T-Charge', on 23 October 2017. This will target the older, more polluting vehicles driving into and within central London.

Detailed statutory proposals for the ES, which will be paid in addition to the Congestion Charge, are set out in Part 2 of this document. The introduction of the ES will involve changes to the current Congestion Charge scheme order, subject to this consultation. The Mayor will consider representations received and decide whether or not to approve them (with or without modifications) in early 2017.

Transport for London (TfL) is also seeking views on the following:

- Bringing forward the introduction of the Ultra Low Emission Zone (ULEZ) to 2019, instead of 2020
- Extending the ULEZ London-wide for heavy vehicles (heavy goods vehicles (HGVs), buses and coaches) as early as 2019, but possibly later
- Extending the ULEZ from central London up to the North and South Circular roads for all vehicles<sup>1</sup> as early as 2019, but possibly later

The ULEZ would require most vehicles entering central London to meet specified exhaust emissions standards or pay a daily charge. It is currently scheduled to start in September 2020. This document sets out the Mayor's current thinking for significantly improving the ULEZ, and builds on his Clean Air Action Plan<sup>2</sup>, announced in July, which outlines his commitment to addressing London's poor air quality. He wants to develop proposals for the ULEZ with the active involvement of Londoners and relevant stakeholders.

Part 3 of this document provides further detail behind these potential future options. The Mayor wants to hear your feedback, to gauge whether we are moving in the right direction. Proposals for the future of the ULEZ will then be developed for further statutory public and stakeholder consultation in 2017.

We invite you to provide your views. A summary of the consultation and a short questionnaire can be found at: [tfl.gov.uk/airquality-consultation](http://tfl.gov.uk/airquality-consultation)

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<sup>1</sup> The term 'all vehicles', as used here, refers to all the vehicles currently subject to the ULEZ in central London, which is due to start in September 2020

<sup>2</sup> [www.london.gov.uk/press-releases/mayoral/mayor-unveils-action-plan-to-battle-toxic-air](http://www.london.gov.uk/press-releases/mayoral/mayor-unveils-action-plan-to-battle-toxic-air)

## **Structure of this document**

This document is in three parts:

- **Part 1** provides the context for the Mayor's air quality proposals and the rationale for addressing road transport emissions in London to improve air quality and public health.
- **Part 2** looks at the proposed ES. It contains detailed information on the development of this proposal and looks at the other options that were assessed. It describes the options for reducing emissions from each vehicle type and the effects of changing the key features of the scheme. It also sets out the costs of compliance (buying compliant vehicles), likely impacts and next steps for implementation. Part 2 is a formal statutory consultation on specific proposals for the ES that would be implemented by making changes set out in a variation order to the Congestion Charging scheme. These changes will only come into effect if the Mayor confirms the proposal (with or without modifications). He is expected to make this decision in February 2017, after reviewing public and stakeholder responses from this consultation and other relevant considerations.
- **Part 3** focuses on potential future options for the ULEZ, which in turn has implications for the existing London Low Emission Zone (LEZ). It presents options for bringing forward the start date for the ULEZ, expanding it to inner London (up to the North and South Circular roads) and extending ULEZ emission standards for heavy vehicles London-wide (up to the existing LEZ boundary), together with emerging evidence on their potential impacts. It also sets out the next steps for developing these into formal detailed statutory proposals next year, if the Mayor decides to pursue them following feedback from this consultation. The public and stakeholders will therefore have a further opportunity to submit their views.

## Summary of consultations

This consultation is part of a series relating to the Mayor’s new proposals to tackle air quality. It is at the second stage (a summary of the expected stages is shown below).

<p><b>Stage 1 (5–29 July 2016):</b> A consultation hosted on the Talk London website on initial ideas to tackle air quality. The results are now here: <a href="http://data.london.gov.uk/dataset/clean-air-consultation-july-2016">http://data.london.gov.uk/dataset/clean-air-consultation-july-2016</a></p>	<p><b>COMPLETE</b></p>
<p><b>Stage 2 (10 October–18 December 2016):</b> A process incorporating a statutory consultation to introduce the ES, and a non-statutory consultation on ideas for how the ULEZ could be improved. Following this, the Mayor will make a decision on whether or not to confirm the introduction of the ES, with or without modifications.</p>	<p><b>THIS CONSULTATION</b></p>
<p><b>Stage 3:</b> A more detailed statutory consultation on proposed alterations to the ULEZ, developed after taking into consideration feedback from the stage 2 consultation. The Mayor will then make a decision on whether or not to confirm the alterations to the ULEZ, with or without modifications.</p>	<p><b>EXPECTED IN 2017</b></p>

### Stage 1 consultation results

Londoners were able to share their views via the online Talk London portal and a representative poll (the ‘TNS poll’). The results are summarised in Table 1. A more detailed report is available at <http://data.london.gov.uk/dataset/clean-air-consultation-july-2016>

There were 16,122 participants in the Talk London Clean Air Survey, of which 14,289 submitted fully completed responses. A total of 1,822 were partially completed.

**Table 1: High level summary of results**

	Talk London	TNS poll
Number of responses	14,800	1,650 ( <i>fixed</i> )
Agree London has a pollution problem	75%	67%
Agreed with ES (T-Charge) proposal	81%	62%
Agreed ULEZ should be brought forward to 2019	79%	58%
Agreed with ULEZ expansion	71%	63%

The response to the stage 1 consultation showed strong support for more action on air quality and raised some issues that respondents felt needed further clarity and explanation. These are addressed within this document and have been used to inform the development of the proposals.

### **Stage 1 Stakeholder responses**

Further engagement took place alongside the surveys, including direct emails to more than 600 stakeholders and meetings with:

- **Boroughs:** North, south, west and east sub-regional panels, London Councils
- **Business:** London First, London Chamber of Commerce and Industry, Federation for Small Business, London City Airport
- **Transport:** Campaign for Better Transport, Living Streets, London Travelwatch
- **Coaches:** Confederation of Passenger Transport, London Tourist Coach Operators Association (LTCOA)
- **Freight:** Freight Transport Association
- **Vehicle rental:** British Vehicle Rental and Leasing Association (BVRLA), Society for Motor Manufacturers and Traders (SMMT)
- **Equality and accessibility:** Community transport groups, Independent Disability Advisory Group

Formal responses were received via email and the Talk London survey. In total, 45 stakeholder responses were received from<sup>3</sup>:

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<sup>3</sup> Document corrected November 2016 to update number of stage 1 stakeholder responses received



<ul style="list-style-type: none"> <li>• Age UK</li> <li>• Better Transport</li> <li>• BVRLA</li> <li>• Caroline Pidgeon AM</li> <li>• City of London</li> <li>• Client Earth</li> <li>• Confederation of Passenger Transport</li> <li>• Cycling UK</li> <li>• DHL</li> <li>• Environmental Protection UK</li> <li>• Freight Transport Association</li> <li>• Friends of the Earth</li> <li>• General Motors</li> <li>• GMB pro drivers union</li> <li>• Islington UKIP</li> <li>• Lambeth for a Cool Planet</li> <li>• London Assembly Environment Committee</li> </ul>	<ul style="list-style-type: none"> <li>• London Borough of Barnet</li> <li>• London Borough of Brent</li> <li>• London Borough of Croydon</li> <li>• London Borough of Ealing</li> <li>• London Borough of Enfield</li> <li>• London Borough of Hackney</li> <li>• London Borough of Hounslow</li> <li>• London Borough of Islington</li> <li>• London Borough of Lambeth</li> <li>• London Borough of Richmond-upon-Thames</li> <li>• London Borough of Redbridge</li> </ul>	<ul style="list-style-type: none"> <li>• London Borough of Tower Hamlets</li> <li>• London Borough of Waltham Forest</li> <li>• London Borough of Wandsworth</li> <li>• London Councils</li> <li>• London Cycling Campaign</li> <li>• London First</li> <li>• London Sustainability Exchange</li> <li>• Living Streets</li> <li>• London TravelWatch</li> <li>• LTCOA</li> <li>• Royal Borough of Greenwich</li> <li>• Royal Mail</li> <li>• SMMT</li> <li>• Sustrans</li> <li>• Toyota</li> <li>• Uber</li> <li>• Westminster City Council</li> </ul>
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Stakeholder views were more mixed with environmental groups showing strong support, while representatives of small businesses and the coach industry voiced concern about the affordability of meeting the new standards. Feedback also included:

- Some stakeholders saying a lack of information affected their ability to make informed representations
- Requests that policies are evidence based
- Boroughs being largely supportive, but raising concerns about the North and South Circular roads acting as a boundary for the inner London ULEZ and cutting boroughs in half
- Concern from the coach industry about the impact on businesses owing to the cost and availability of compliant vehicles
- Requests that any revenue raised as a result of the scheme is invested in walking, cycling and public transport
- Calls that, when considering pedestrianisation, a balance is struck between the need to improve air quality and the delivery requirements of retailers, businesses and local authorities
- Requests for further action to tackle the impact of engine idling
- Responses saying a reduction in road traffic is essential

- Requests for rapid charge points and infrastructure to help private hire drivers become early adopters of electric vehicles

Responses relating to the ES and alterations to the ULEZ have been considered during the development of the proposals and this consultation.

### **Direct Vision Standard for Heavy Goods Vehicles**

The Mayor has now launched TfL's first Direct Vision Standard along with proposals for how it might be applied, including banning the most dangerous 'off-road' lorries from the capital's roads by January 2020<sup>4</sup>. The standard assesses and rates how much an HGV driver can see directly from their cab in relation to other road users.

The Standard will categorise HGVs using a five star rating system, ranging from zero stars for vehicles with the lowest direct vision, three stars for good levels of vision, to five stars for the highest levels. The plan is that only HGVs meeting 3 stars as part of the new standard will be allowed on London's roads by 2024.

The Direct Vision Standard will be subject to consultation. We will continue to work with vehicle manufacturers, regulators, the Department for Transport and freight operators to ensure that the proposed Direct Vision Standard is as far reaching as practicable within current legislation. This standard is the key to getting ever greater numbers of safer lorries operating on the streets of London.

This announcement should be borne in mind when considering the air quality proposals set out in this consultation as it has relevant implications for decisions about vehicle and fleet replacement.

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<sup>4</sup> <https://tfl.gov.uk/info-for/deliveries-in-london/delivering-safely/direct-vision-in-heavy-goods-vehicles>

## Chapter 1 – The case for further intervention

### 1.1 Air pollution and public health

While the Mayor has a duty to help achieve the legal limits for air pollutants in Greater London, the real driver for tackling pollution is the benefit to public health. It is also a social justice issue for more vulnerable people as well as a health and environmental concern, particularly given the high number of schools, hospitals and care homes affected by poor air quality.

The two pollutants causing the greatest concern in London are<sup>5</sup>:

- **Nitrogen dioxide (NO<sub>2</sub>):** At high concentrations, NO<sub>2</sub> causes inflammation of the airways. Long-term exposure is associated with an increase in symptoms of bronchitis in asthmatic children and reduced lung development and function
- **Particulate matter (PM):** Long-term exposure contributes to the risk of developing cardiovascular and respiratory diseases, including lung cancer. Research shows that particles with a diameter of 10 microns and smaller (PM<sub>10</sub>) are likely to be inhaled deep into the respiratory tract. The health impacts of particles with a diameter of 2.5 microns or smaller (PM<sub>2.5</sub>) are especially significant as smaller particles can penetrate even deeper

The extent of the negative effects of air pollution on health depends on an individual's level of exposure and other conditions they may be vulnerable to, or suffering from. Knowledge in this area is continually increasing as research progresses.

In 2015, the Greater London Authority (GLA) published its assessment of the combined health impacts of PM<sub>2.5</sub> and NO<sub>2</sub><sup>6</sup>. Air pollution is one of the most significant challenges facing the Capital, with the equivalent of around 9,400 deaths a year attributed to air quality related illnesses. A baby born in London in 2010, who was exposed to 2010 air quality levels for its entire life, would see its life expectancy reduced by 2.2 years (if male) and two years (if female).

In addition to the long-term impacts, NO<sub>2</sub> is proven to have a dramatic effect on the development and function of the lungs in the young. A six-year study found that children living in highly polluted parts of London have up to 10 per cent less lung capacity than normal.<sup>7</sup>

Air pollution also causes birth defects. A 2013 study in California showed that, for women with the highest NO<sub>2</sub> exposure, the risk of having a pregnancy affected by

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<sup>5</sup> [www.who.int/mediacentre/factsheets/fs313/en/](http://www.who.int/mediacentre/factsheets/fs313/en/)

<sup>6</sup> [www.london.gov.uk/WHAT-WE-DO/environment/environment-publications/understanding-health-impacts-air-pollution-london](http://www.london.gov.uk/WHAT-WE-DO/environment/environment-publications/understanding-health-impacts-air-pollution-london)

<sup>7</sup> [sro.sussex.ac.uk/56496/](http://sro.sussex.ac.uk/56496/)

anencephaly (where babies are born missing part of the brain and skull), was nearly three times greater than for women with the lowest exposure.<sup>8</sup>

Our understanding of the effects associated with sudden peaks in air pollutant concentrations is also improving. Air pollution is now believed to play a significant role in some cardiovascular episodes, for instance heart attacks, and in a range of health conditions ranging from asthma to dementia.

Analysis carried out on behalf of the GLA and published in 2016<sup>9</sup> shows the health effects of air pollution are seen disproportionately in the most vulnerable and deprived communities. Among the top 10 per cent of London's most deprived areas, half have NO<sub>2</sub> levels exceeding legal limits. For the 10 per cent least deprived areas, only one per cent experience illegal NO<sub>2</sub> concentrations.

## **1.2 London's responsibility – air quality**

The Air Quality (Standards) Regulations 2010 set legal limits (called 'limit values') for concentrations of pollutants in outdoor air. These are based on European Union (EU) directives<sup>10</sup>, which will remain in force regardless of the UK leaving the EU, unless specifically repealed.

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<sup>8</sup> [med.stanford.edu/news/all-news/2013/03/air-pollutants-linked-to-higher-risk-of-birth-defects-researchers-find.html](http://med.stanford.edu/news/all-news/2013/03/air-pollutants-linked-to-higher-risk-of-birth-defects-researchers-find.html)

<sup>9</sup> [www.london.gov.uk/WHAT-WE-DO/environment/environment-publications/analysing-air-pollution-exposure-london](http://www.london.gov.uk/WHAT-WE-DO/environment/environment-publications/analysing-air-pollution-exposure-london)

<sup>10</sup> [Ambient Air Quality Directive \(2008/50/EC\)](#) and [Directive 2004/107/EC](#)

**Table 2: Legal limits for pollutants of most concern in London<sup>11</sup>**

Pollutant	Concentration (limit value) Micrograms per cubic metre	Averaging period	Targets and limit values	Number of permitted exceedences each year	Compliance assessment for 2015 in Greater London <sup>12</sup>
PM <sub>2.5</sub>	25 µg/m <sup>3</sup> <sup>13</sup>	1 year	Target value came into force on 1 January 2010 Limit value came into force on 1 January 2015	n/a	Compliant
PM <sub>10</sub>	50 µg/m <sup>3</sup>	24 hours	Limit value came into force on 1 January 2005 (time extension granted to June 2011)	35	Compliant <sup>14</sup>
	40 µg/m <sup>3</sup>	1 year	Limit value came into force on 1 January 2005	n/a	Compliant
NO <sub>2</sub>	200 µg/m <sup>3</sup>	1 hour	Limit value came into force on 1 January 2010	18	Not compliant
	40 µg/m <sup>3</sup>	1 year	Limit value came into force on 1 January 2010	n/a	Not compliant

<sup>11</sup> Taken from [ec.europa.eu/environment/air/quality/standards.htm](http://ec.europa.eu/environment/air/quality/standards.htm)

<sup>12</sup> The Department for Environment, Food and Rural Affairs (Defra) reports on compliance to the European Commission on behalf of the UK, in accordance with the Air Quality Directive. The most recent compliance assessment is for 2015 <http://uk-air.defra.gov.uk/library/annualreport/index>

<sup>13</sup> An obligation to reduce exposure to concentrations of fine particles also came into force from 2015

<sup>14</sup> Following the subtraction of natural sources in accordance with the Directive

The Department for Environment, Food and Rural Affairs (Defra) has reported PM compliance limits for 2015 across England and Wales, with most ‘non-reportable’ sites<sup>15</sup> in London falling below the legal limits. However, there are no safe limits for PM<sub>2.5</sub> which is more damaging to health than PM<sub>10</sub>. Health evidence suggests that further emissions reductions, will bring about improvements in health for Londoners. Without further action there is the prospect of PM<sub>2.5</sub> emissions increasing if traffic levels rise.

Crucially, large sections of the Capital continue to exceed both the annual mean and hourly legal limits for NO<sub>2</sub> and this is likely to continue beyond 2020, so more action needs to be taken. Within the first six days of 2016, Putney High Street breached hourly legal limits in terms of number of times pollution episodes are allowed. Further information on pollutant concentrations in London is provided in section 1.3 on page 16.

Improving air quality in the Capital is a shared responsibility. Under the Greater London Authority (GLA) Act 1999, the Mayor must prepare a London Environment Strategy (LES) looking at, among other things, the Capital’s air quality and how it can be enhanced to meet legal limits. The Mayor leads on the implementation of measures in the city to tackle pollution emissions, reduce exposure, raise awareness and integrate air quality and public health.

For local authorities, a bespoke Local Air Quality Management system is in place for London (LLAQM), in order to reflect the unique challenges, opportunities, and policies within London, and to enable an enhanced focus on and co-ordination of local authority air quality work.

The basic statutory framework is put in place for local air quality management by national Air Quality Regulations and Part IV of the Environment Act 1995 (“the 1995 Act”, as amended, and “Part IV functions”). This remains in place and is applicable to London’s 32 boroughs and the City of London. However, it has been agreed with the Department for the Environment Food and Rural Affairs (Defra) that the relevant local air quality management policy and technical guidance for London should be different from that in the rest of the country in recognition of the particular challenges London faces.

Defra have agreed that this should be issued by the Mayor in the context of the new LLAQM system and in recognition of his London-wide supervisory role. This reflects the Secretary of State’s own statutory guidance. As a result, London boroughs need only refer policy and technical guidance issued by the Mayor from time to time rather than national statutory guidance<sup>16</sup>.

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<sup>15</sup> ‘Non-reportable sites’ are air quality monitoring sites that are not part of the official monitoring used to determine compliance with legal limits values for air pollution

<sup>16</sup> [https://www.london.gov.uk/sites/default/files/llaqm\\_policy\\_guidance\\_llaqm.pg\\_16.pdf](https://www.london.gov.uk/sites/default/files/llaqm_policy_guidance_llaqm.pg_16.pdf)

## **The London Plan**

At present, the Mayor is reviewing the London Plan. The current document (published in March 2016) will apply until a new plan is launched.

London Plan Policy 7.14 states that the Mayor will work with strategic partners to ensure that spatial, climate change, transport and design policies support the implementation of his air quality and transport strategies to achieve reductions in pollutant emissions and minimise public exposure to pollution.

## **Mayor's Transport Strategy**

The Mayor is developing a revised Mayor's Transport Strategy (MTS) for London. It is expected that policies to reduce emissions will form part of this. Until the new strategy is launched, the current MTS (published in 2010) applies.

The existing MTS contains policies and proposals to tackle poor air quality resulting from transport, and to permit vehicle charging based on exhaust emissions. One of its six goals is to 'enhance the quality of life for all Londoners' with the associated outcome of 'reducing air pollutant emissions from ground-based transport, contributing to EU air quality targets'.

MTS Policy 15 states that the Mayor, through TfL, will seek to reduce emissions of air pollutants from transport. This policy is carried forward through (among others) proposals 95 and 129 of the MTS.

Proposal 95 of the MTS states that 'the Mayor will consider further tightening of the standards of the current LEZ, as well as the introduction of further emissions control schemes to encourage the use of cleaner vehicles in London.'

Proposal 129 covers the Congestion Charging scheme, and states that the Mayor will keep it under review. The policy permits variations to the Congestion Charge to ensure (among other things) it helps deliver the desired outcomes of the MTS, including a reduction in air pollutant emissions from ground-based transport, contributing to EU air quality targets and legal limits.

Further goals of the 2010 MTS, which the ULEZ will assist in achieving, include:

- Supporting economic development through stimulating the low emission vehicle market
- Improving transport opportunities for all through the promotion of sustainable travel with increases in cycling, walking and public transport journeys and reduced congestion
- Reducing transport's contribution to climate change through a reduction in carbon dioxide (CO<sub>2</sub>) emissions from ground-based transport, contributing to a London-wide 60 per cent reduction target by 2025, compared with 1990 levels.

## **Mayor's Air Quality Strategy**

The Mayor is in the process of creating a new London Environment Strategy, which will supersede the Mayor's Air Quality Strategy (MAQS). Until this is launched, the current MAQS (published in 2010) applies.

The existing MAQS<sup>17</sup> sets out policies and proposals for improving the Capital's air quality and therefore the health of Londoners. It was developed in conjunction with the MTS, London Plan, Climate Change Mitigation and Energy Strategy, Climate Change Adaptation Strategy and the Municipal Waste Strategy.

Transport policies in the MAQS cover five categories: smarter choices and sustainable travel behaviour; technological change and cleaner vehicles; priority locations and local measures; public transport; and emission control schemes such as the LEZ.

It is recognised that action through the Mayor's measures alone is not sufficient to achieve compliance with legal limits. This is partly down to the fact that London's air quality is affected by emissions from elsewhere, but also because the Mayor has limited powers to influence significant emissions sources such as airports and industry. Therefore, the strategy includes actions to be taken by others including the EU, Government and London boroughs. The boroughs take the MAQS into account when developing their air quality action plans and the Mayor supports borough-specific measures to improve air quality through the Mayor's Air Quality Fund.

### **1.3 Update on London's air quality**

#### **Current position**

London is now broadly compliant with legal limits for PM. However, further reductions are needed (especially to PM<sub>2.5</sub> levels) to protect human health.

Annual average PM<sub>10</sub> concentrations are considered within the legal limits, however modelling (Figure 2) still predicts some hotspot locations where the daily average value for PM<sub>10</sub> is exceeded (for example kerbside at some junctions in central London, or within the road space itself). Annual mean concentrations of PM<sub>2.5</sub> are also well within the legal limit value of 25ug/m<sup>3</sup>. Although compliance has officially been achieved, by reducing PM concentrations even more, the health benefits will be even greater.

In contrast, annual average NO<sub>2</sub> concentrations still exceed the legal limit across much of inner London, as well as in the vicinity of Heathrow and near major roads in outer London (Figure 1). Meeting the NO<sub>2</sub> limit poses a huge challenge for many cities in the UK and across Europe. One of the key reasons why ambient levels of NO<sub>2</sub> remain higher than had been previously expected is driving conditions in urban areas, and concerns over the performance of the more recent Euro emissions standard (see Appendix A for more information on Euro Standards) for some diesel vehicles. In general, Euro standards have failed to reduce oxides of nitrogen (NO<sub>x</sub>)<sup>18</sup>

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<sup>17</sup> The MAQS forms part of the London Environment Strategy

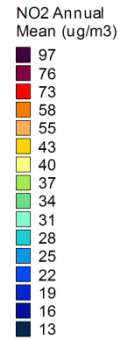
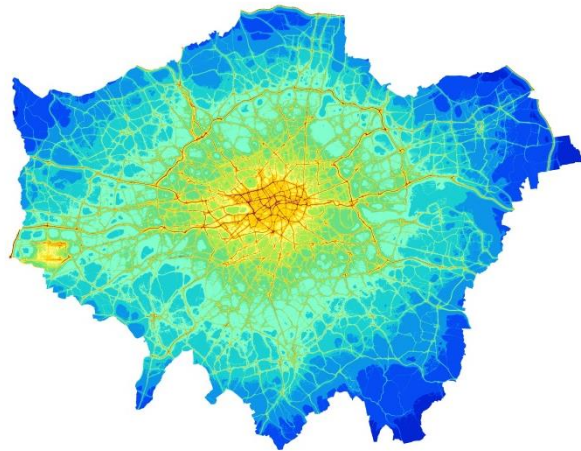
<sup>18</sup> Vehicle emissions are measured in terms of total NO<sub>x</sub>. NO<sub>x</sub> is made up of nitrogen oxide (NO) and NO<sub>2</sub>, although the NO is subsequently converted into additional NO<sub>2</sub> by interaction with ozone in the atmosphere – this reaction being dependent on the availability of ozone



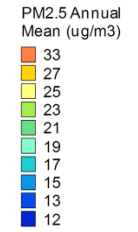
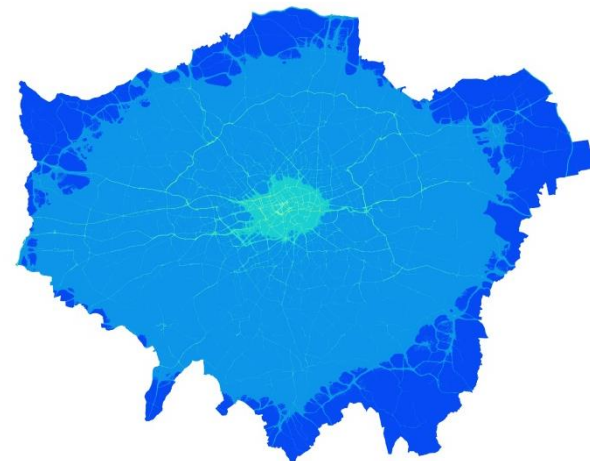
emissions from light duty diesel vehicles (eg cars and vans), despite tightening emission standards for oxides of nitrogen (NO<sub>x</sub>). However, Euro VI (for heavy vehicles) is performing well and the standard for light vehicles is still bringing about a significant reduction, albeit not as much as it should.

Figure 1: Concentrations of annual average NO<sub>2</sub> and PM<sub>2.5</sub> in 2013 and 2020 (source: London Atmospheric Emissions Inventory 2013)

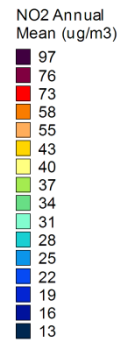
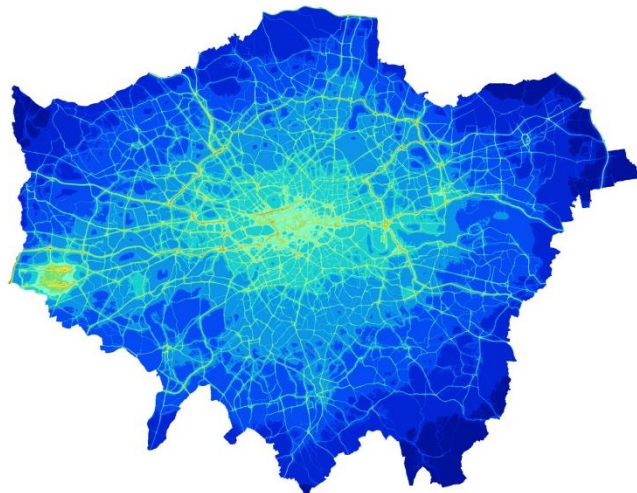
NO<sub>2</sub> annual mean – 2013



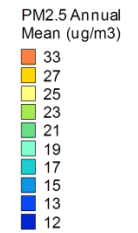
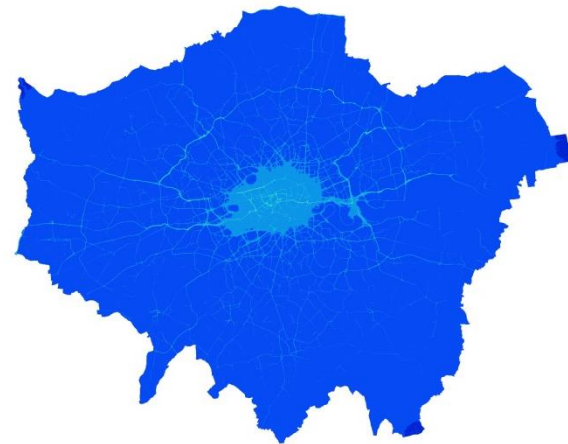
PM<sub>2.5</sub> annual mean – 2013



NO<sub>2</sub> annual mean – 2020



PM<sub>2.5</sub> annual mean – 2020



## **Future year estimates of London's air quality**

The Capital's air quality is expected to improve by 2020, although further and more urgent action is required (Figure 1). Emissions from all sources are projected to decrease thanks to technological advances in vehicle design, as well as policies and legislation already in place to reduce emissions across London, the UK and Europe. Specifically, the roll out of a new emission standard for vehicles (eg Euro 6/VI) is anticipated to be more successful at reducing pollutants in urban driving conditions. Although it is expected that PM emissions will remain within legal limits, levels of NO<sub>2</sub> will continue to exceed these limits in some areas, even with the ULEZ in place.

Further PM<sub>10</sub> and PM<sub>2.5</sub> reductions by 2020 will mean that annual average concentrations should remain below the legal limits. However, there is a strong case to continue cutting PM concentrations to ensure health benefits, and a compelling need to accelerate the pace of change to achieve this even sooner.

The proportion of the Capital where annual average NO<sub>2</sub> concentrations exceed the legal limit is also expected to decrease by 2020, in part due to the introduction of the currently agreed ULEZ. However, modelling indicates that, if nothing further is done, concentrations will continue to exceed the limit in central and inner London, in the vicinity of Heathrow Airport and near construction sites and major roads in outer London.

The Government produced a revised NO<sub>2</sub> action plan in late 2015 in response to a UK Supreme Court ruling<sup>19</sup>. This brought forward the projected date of compliance with legal air pollution limits to 2025 (from after 2030) in the Capital and to 2020 in the rest of the UK. It includes a framework for Clean Air Zones to be implemented in several UK cities, including London.

This plan is currently subject to a legal challenge on the grounds that compliance with legal limits for NO<sub>2</sub> can be achieved earlier, and that the Government has not taken all reasonable steps to ensure this.

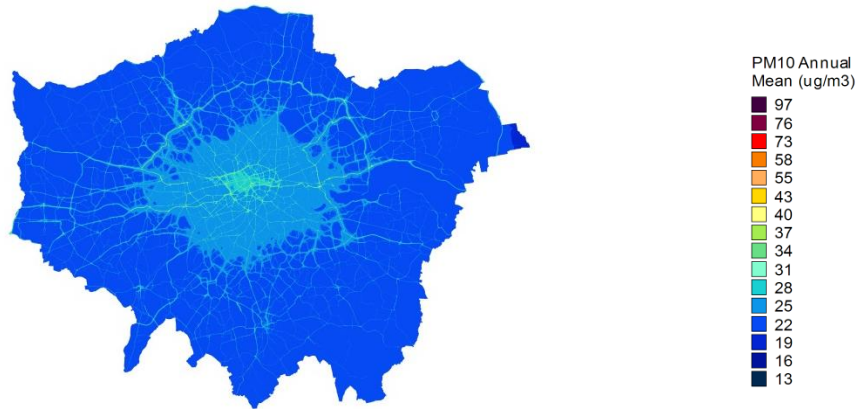
The Mayor does not believe it is not appropriate to wait until 2025 to reach compliance. Strong measures in the Capital, as proposed within this consultation, and decisive action at national government level is needed to further reduce exposure in areas that are currently compliant, so as to realise the health benefits as soon as possible.

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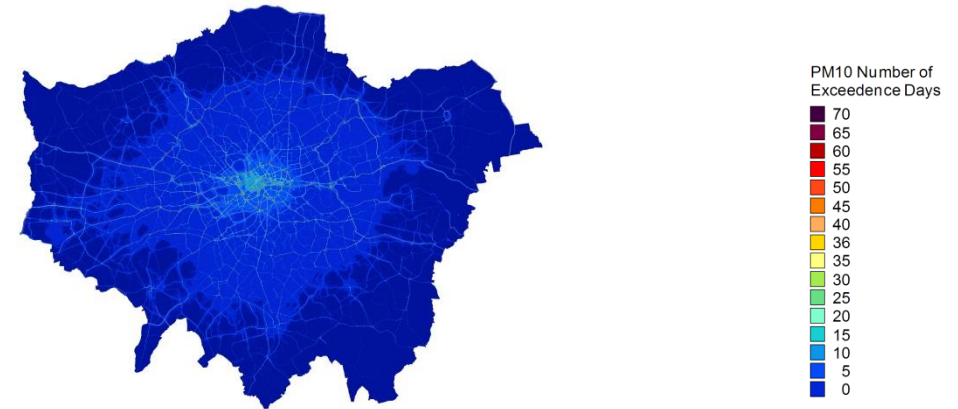
<sup>19</sup> [www.supremecourt.uk/cases/uksc-2012-0179.html](http://www.supremecourt.uk/cases/uksc-2012-0179.html)

Figure 2: Concentrations of annual and daily average PM<sub>10</sub> in 2010 and 2020 (source: LAEI 2013)

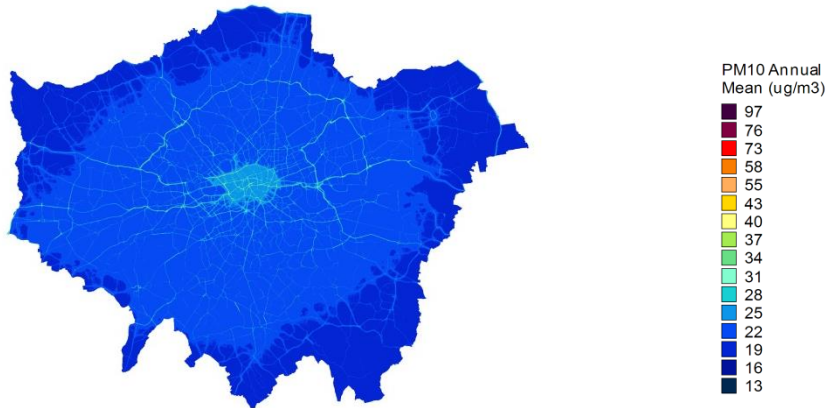
PM<sub>10</sub> annual mean – 2013



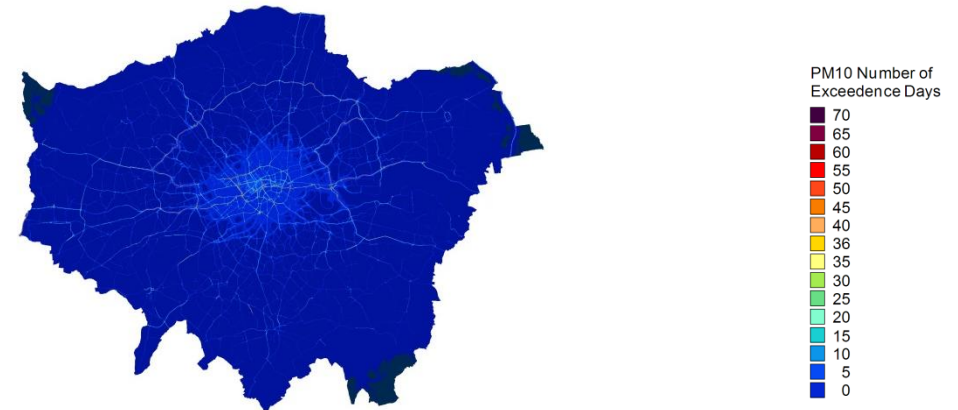
PM<sub>10</sub> number of exceedence days – 2013



PM<sub>10</sub> annual mean – 2020



PM<sub>10</sub> number of exceedence days – 2020



## Emissions sources in London

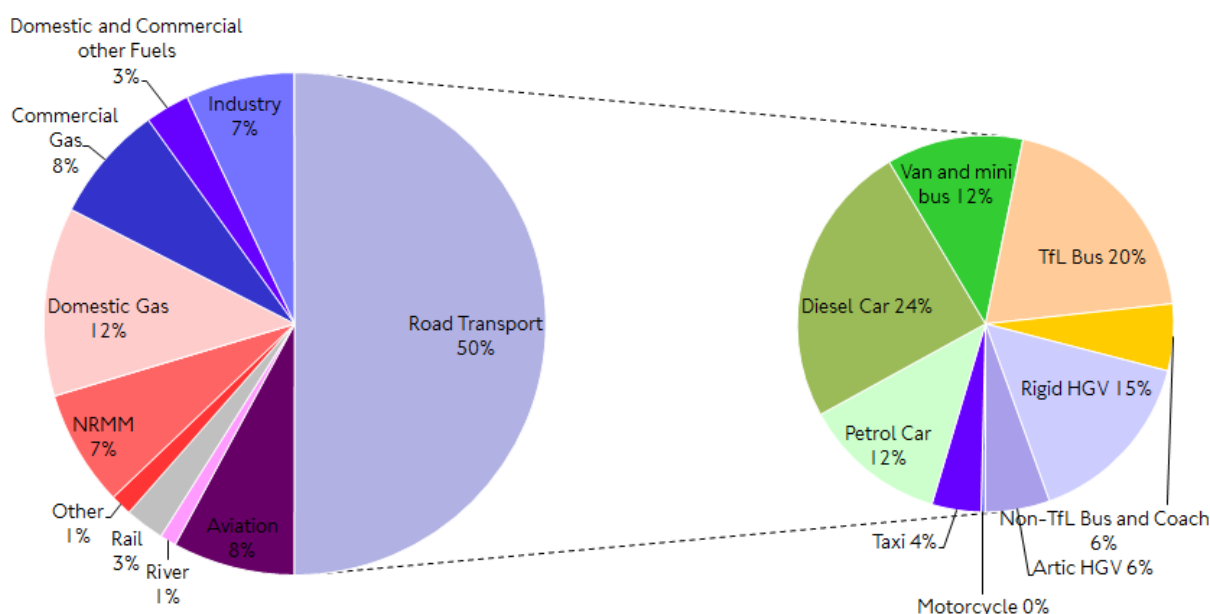
These are calculated using the London Atmospheric Emissions Inventory (LAEI). The varying topographies, traffic flows and composition across the Capital affect the levels and proportion of emissions on a geographic basis. This section outlines the London-wide emissions sources of NO<sub>2</sub> (NO<sub>x</sub> emissions).

Vehicle emissions are measured in terms of total NO<sub>x</sub>, which is made up of NO and NO<sub>2</sub>. However, the NO is subsequently converted into additional NO<sub>2</sub> by interaction with ozone in the atmosphere – this reaction being dependent on the availability of ozone.

Vehicle emissions standards refer to total NO<sub>x</sub> emissions but air quality limit values refer to ambient concentrations and are set for NO<sub>2</sub> and not NO<sub>x</sub> as this is the harmful component of NO<sub>x</sub>. It is also important to note that diesel engines, by the nature of their design, produce higher engine NO<sub>x</sub> emissions than petrol engines.

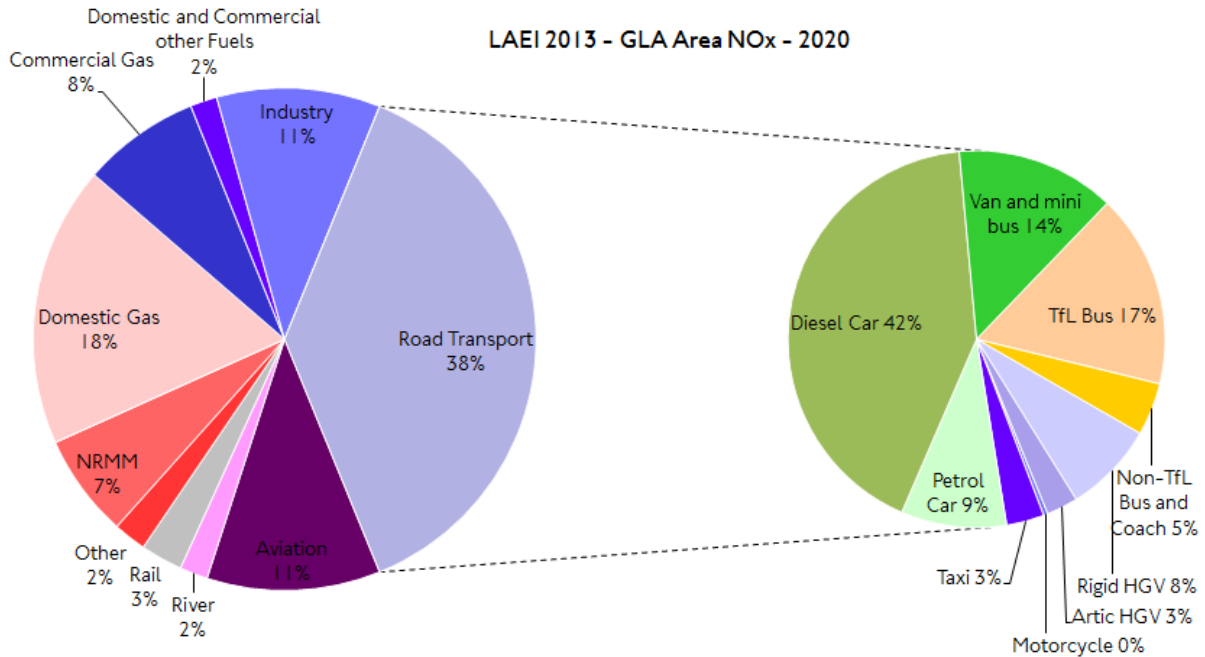
In 2013, road transport was estimated to be responsible for 50 per cent of NO<sub>x</sub> emissions in Greater London (Figure 3). This is projected to fall to 38 per cent in 2020 (Figure 4), although a greater proportion will still be observed by the roadside in local hotspots. Looking at the sources, it is clear that diesel vehicles generally emit a greater level of NO<sub>x</sub> as size and engine capacity increases. The number of kilometres being driven is also a factor.

**Figure 3: NO<sub>x</sub> sources in Greater London in 2013 (LAEI 2013)<sup>20</sup>**



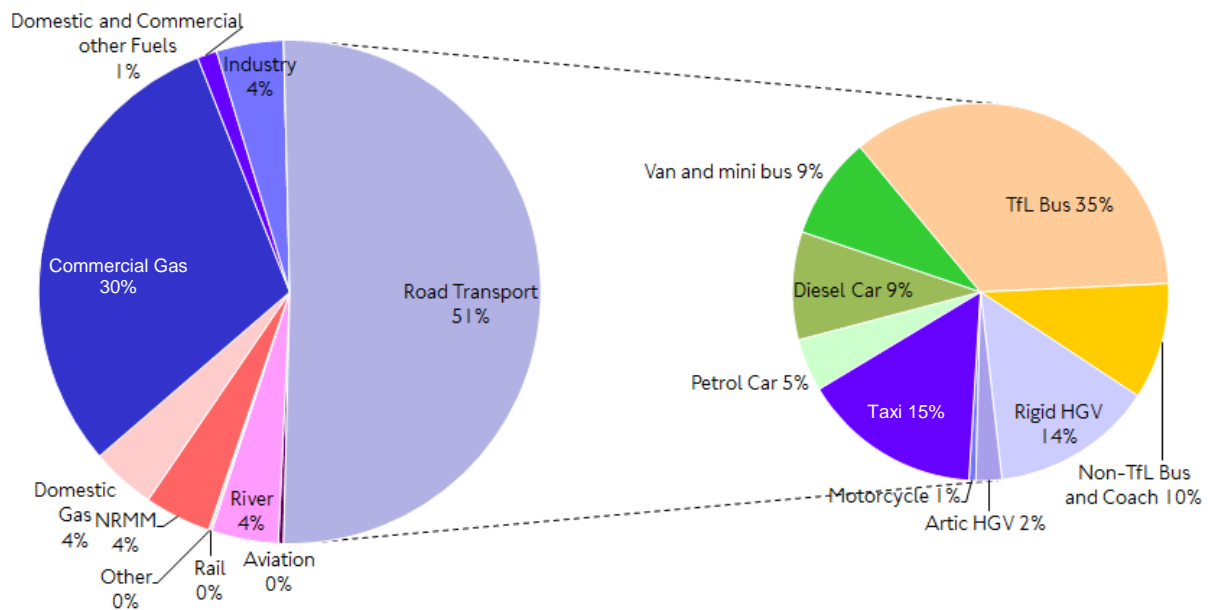
<sup>20</sup> NRMM stands for Non-Road-going Mobile Machinery (eg cranes and diggers). The charts may not total 100 per cent due to rounding

**Figure 4: NO<sub>x</sub> sources in Greater London in 2020 (LAEI 2013)<sup>21</sup>**



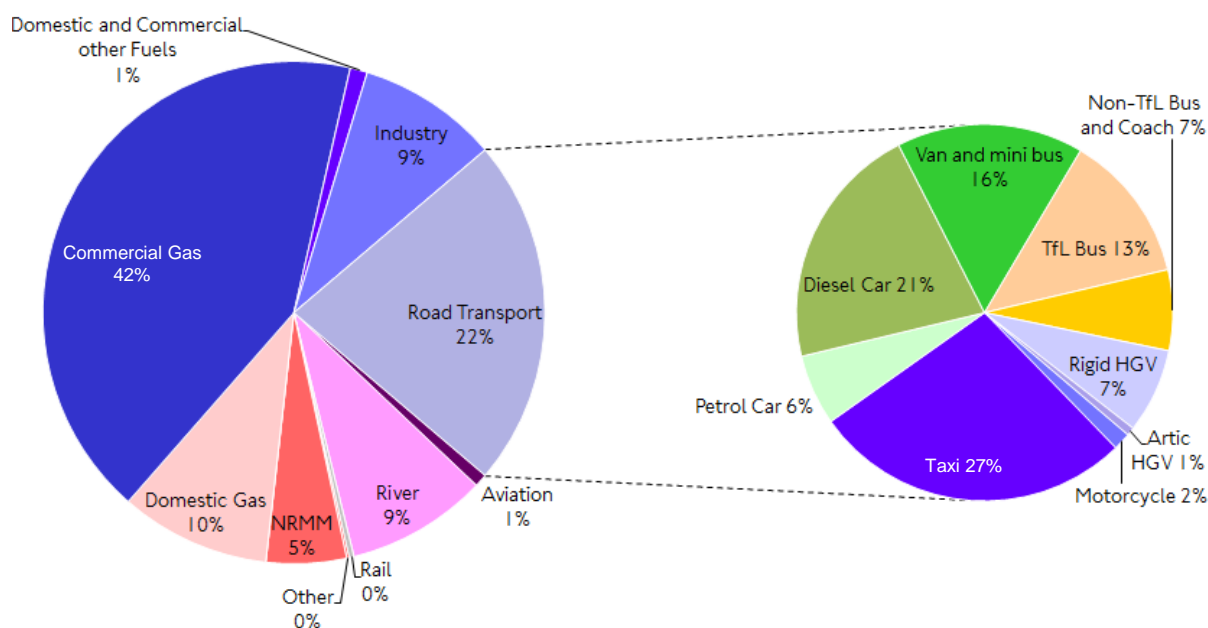
In central London, road transport was responsible for 51 per cent of NO<sub>x</sub> emissions in 2013. Largely owing to the impact of the ULEZ, this is projected to fall to 22 per cent by 2020. The impact of the ULEZ in reducing NO<sub>x</sub> by 49 per cent in central London in 2020, demonstrates that delivering the scheme earlier and over a greater area of London is likely to bring about wider and more immediate benefits.

**Figure 5: NO<sub>x</sub> sources in central London in 2013 (LAEI 2013)<sup>21</sup>**



<sup>21</sup> The charts may not total 100 per cent due to rounding

**Figure 6: NO<sub>x</sub> sources in central London in 2020 (LAEI 2013)<sup>21</sup>**



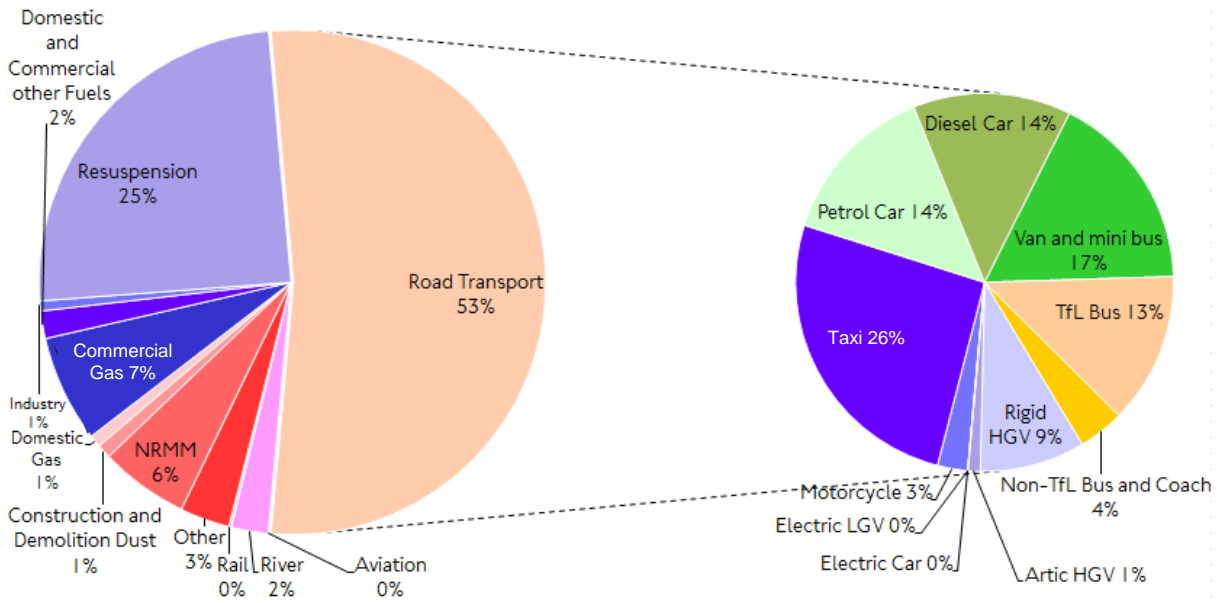
### PM<sub>10</sub> emissions

In 2013, road transport was estimated to be responsible for half of all PM<sub>10</sub> emissions in London, with a projected rise to 52 per cent in 2020. This is down to some reductions in non-transport sources, especially in non-road mobile machinery (NRMM)<sup>22</sup>, but no decrease in emissions from vehicle tyre and brake wear (owing to the lack of a technical standard for these emissions). It also assumes some corresponding growth in traffic.

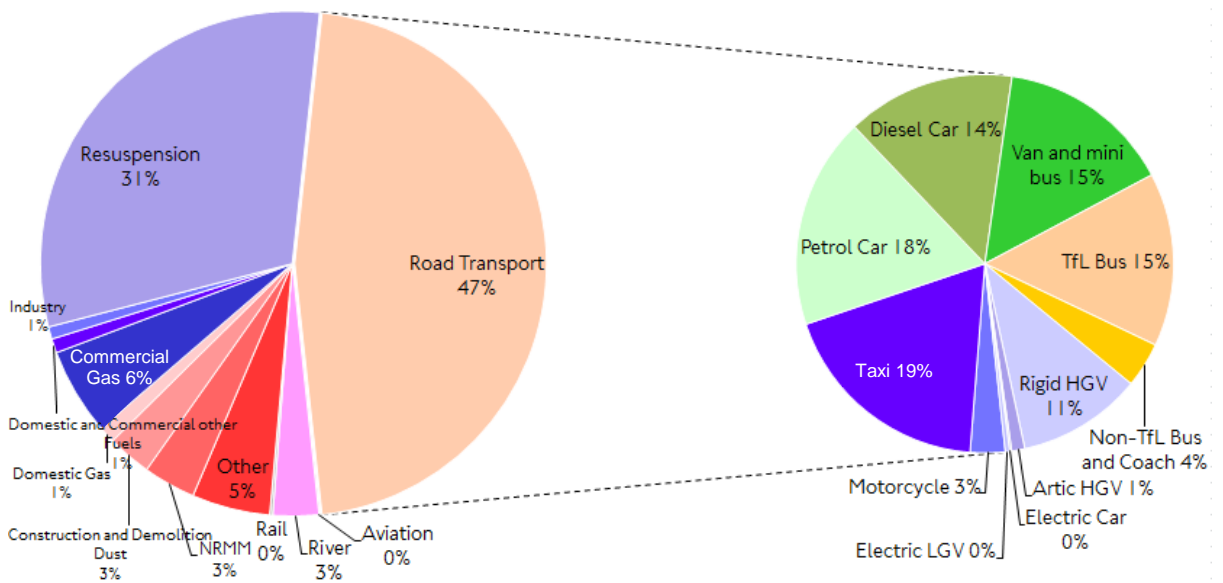
Further action will be needed to tackle tyre and brake wear in the long term. In addition, for older diesel vehicles, exhaust PM is a significant issue that needs tackling to help reduce overall PM emissions.

<sup>22</sup>NRMM is defined as any mobile machine, item of transportable industrial equipment, or vehicle that has a combustion engine and is not intended for carrying passengers or goods on the road. Examples include mobile cranes and forklift trucks

**Figure 7: PM<sub>10</sub> sources in central London in 2013 (LAEI 2013)<sup>21</sup>**



**Figure 8: PM<sub>10</sub> sources in central London in 2020 (LAEI 2013)<sup>21</sup>**





## Chapter 2 – Existing air quality initiatives

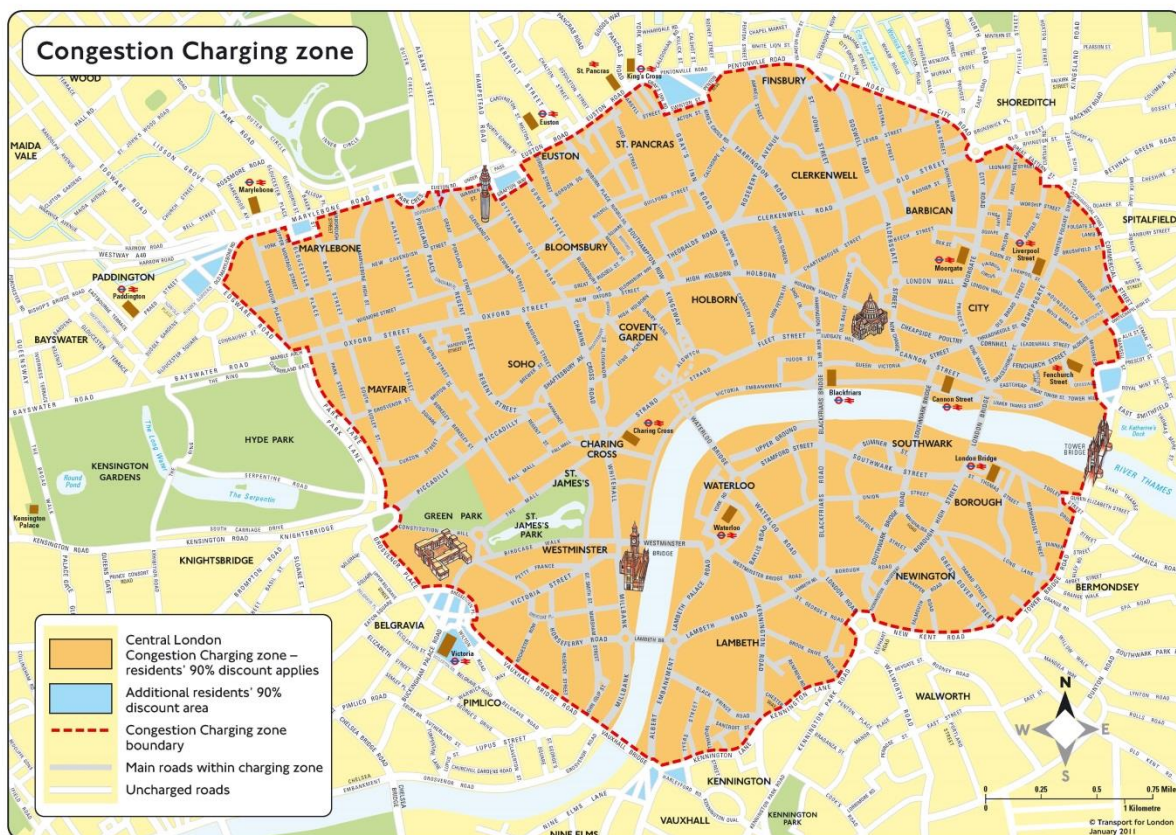
In line with the MTS and MAQS, a number of measures are in place to lower emissions from road traffic, by reducing overall vehicle numbers and cleaning up the fleet.

### 2.1 The Congestion Charge

Although the Congestion Charge is primarily intended to reduce traffic congestion, it also has an important role to play in improving air quality in central London. By lowering overall traffic levels in the zone, it has led to a decrease in emissions.

The £11.50 daily Congestion Charge is paid by those driving a vehicle within the specified zone between 07:00 and 18:00, Monday to Friday (the zone is shown in Figure 9). The Ultra Low Emission Discount is a 100 per cent discount on the Congestion Charge for low emission plug-in hybrid and electric vehicles. The proposed ES would operate as part of the Congestion Charging scheme.

Figure 9: Congestion Charging zone



## 2.2 The Ultra Low Emission Zone

From September 2020, all cars (except taxis, which are subject to environmental requirements through the taxi licensing system), motorcycles, vans, minibuses, buses, coaches and HGVs will need to meet exhaust emission standards (ULEZ standards), or pay a daily charge, when travelling in central London.

Table 3 is a summary of the ULEZ standards and daily charges. See Appendix A for more details on the Euro standards.

**Table 3: ULEZ emissions standards**

Vehicle type (includes hybrid vehicles)	ULEZ minimum emission standards <sup>23</sup>	Date from which newly registered vehicles must meet the new emission standards (usually a year earlier for earlier adopters. See Appendix A)	Daily charge if vehicle is not compliant with ULEZ standards <sup>24</sup>
Motorcycle, moped etc – category L	Euro 3	From 1 July 2007	£12.50
Car and small van – categories M1 and N1 (I)	Euro 4 (petrol) Euro 6 (diesel)	From 1 January 2006 From 1 September 2015	£12.50
Large van and minibus – categories N1 (II and III) and M2	Euro 4 (petrol) Euro 6 (diesel)	From 1 January 2007 From 1 September 2016	£12.50
HGV – categories N2 and N3	Euro VI	From 1 January 2014	£100
Bus/coach – category M3	Euro VI	From 1 January 2014	£100

The ULEZ standards are in addition to any Congestion Charge or LEZ charges that are already applied. The ULEZ will operate 24 hours a day, every day of the year, including weekends and public holidays.

<sup>23</sup> Euro standards for heavy-duty diesel engines use Roman numerals (I–VI) and light-duty vehicle standards use Arabic numerals (1–6)

<sup>24</sup> This is payable in addition to any applicable LEZ and/or Congestion Charge

It will cover the same area as the Congestion Charge zone, which is clearly signposted (see Figure 9 on page 25). There will be no barriers or toll booths. Cameras will read vehicle number plates as they are driven into and within the zone to check against a database and establish whether or not a vehicle is compliant with the requirements of the scheme<sup>25</sup>.

If a vehicle does not meet the ULEZ emissions standards and the daily ULEZ charge is not paid, a Penalty Charge Notice (PCN) will be issued. This penalty, which must be paid by the vehicle's registered keeper or operator, is in addition to any Congestion Charge or LEZ penalties received. For motorcycles, cars, vans and minibuses this will be £130 (reduced to £65 if paid within 14 days). For HGVs, coaches and buses it will be £1,000 (reduced to £500 if paid within 14 days).

The ULEZ is forecast to approximately halve NO<sub>x</sub> emissions from transport in central London in 2020 and significantly reduce the proportion of the population living in areas exceeding legal air quality limits. However, more still needs to be done.

**Table 4: Transport emissions impact in 2020 from the currently planned ULEZ scheme**

Emission	ULEZ	Inner London	Outer London	London-wide
CO <sub>2</sub>	-14%	-3%	-0.5%	-2%
NO <sub>2</sub>	-47%	-18%	-10%	-14%
NO <sub>x</sub>	-49%	-18%	-10%	-14%
PM <sub>10</sub> (exhaust)	-47%	-13%	-1%	-8%
PM <sub>2.5</sub> (exhaust)	-48%	-13%	-2%	-8%
PM <sub>10</sub> (total)	-11%	-2%	-0.1%	-1%
PM <sub>2.5</sub> (total)	-16%	-3%	-0.2%	-1%

**Table 5: Proportion of population living in areas of exceeding NO<sub>2</sub> limits in 2020**

Area	Estimated population in 2020	Proportion of population living in areas exceeding NO <sub>2</sub> limits in 2020	
		Without ULEZ	With ULEZ
ULEZ	200,000	63%	17%
Inner London	3,400,000	13%	6%
Outer London	5,500,000	2%	1%
London-wide	9,100,000	7%	3%

### 2.3 The London Low Emission Zone

The LEZ is an existing scheme, introduced in phases from 2008, that aims to reduce PM from large commercial vehicles. It covers most of Greater London and operates

<sup>25</sup> The database will be compiled using information from the Driver and Vehicle Standards Agency, vehicle manufacturers and drivers and operators who have registered with TfL

24 hours a day, every day of the year including weekends and public and Bank Holidays.

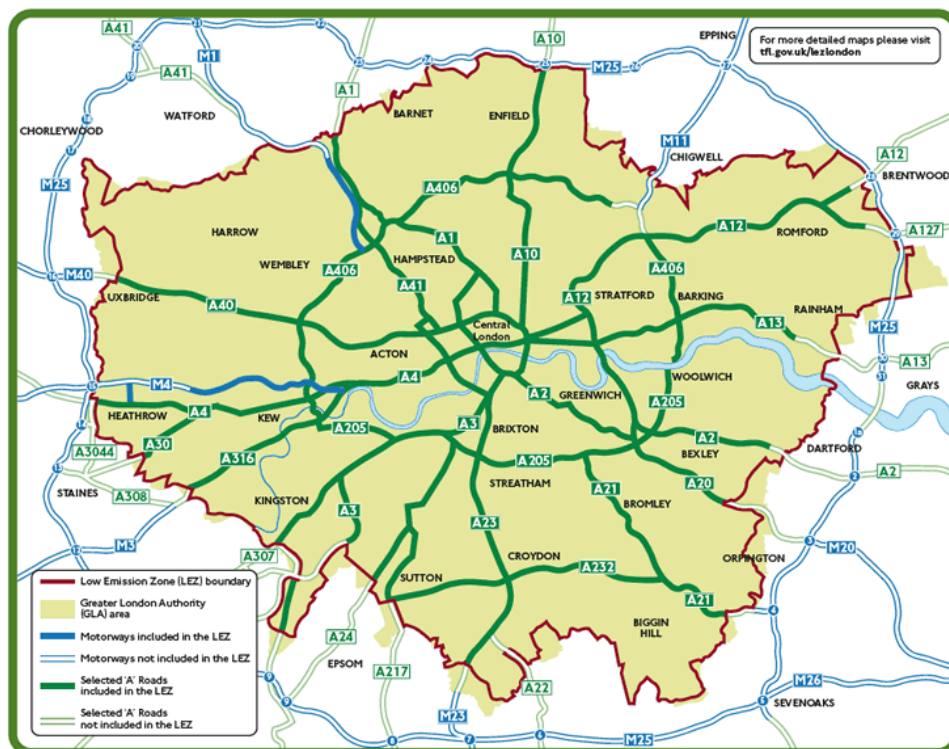
Vehicles need to meet emissions standards or pay a daily charge of between £100 and £200. Table 6 lists the vehicles affected by the LEZ.

**Table 6: LEZ emissions standards and charges**

Vehicle	Weight	Emissions standard	Charge	Implementation
Lorries, horseboxes, motor caravans and other specialist vehicles	>3.5T	Euro IV for PM	£200	February 2008 – Euro III for HGV >12T July 2008 – Euro III for other vehicles January 2012 – Euro IV
Buses and coaches with 9+ seats	>5T	Euro IV for PM	£200	July 2008 – Euro III January 2012 – Euro IV
Large vans, and other specialist vehicles	1.2–3.5T	Euro 3 for PM	£100	January 2012
Motor caravans and ambulances	2.5–3.5T	Euro 3 for PM	£100	January 2012
Minibuses with 9+ seats	<5T	Euro 3 for PM	£100	January 2012

If the standards are not met and a LEZ charge is not paid, a penalty is payable – £1,000 for lorries and coaches, and £500 for large vans, motor caravans and minibuses (reduced to £500 and £250 respectively if paid within 14 days).

**Figure 10: The area covered by the LEZ**



According to the most recent monitoring report, 99 per cent of heavy vehicles and 98 per cent of large vans entering the Capital are compliant with the current LEZ standards, and this is helping to remove the oldest more polluting vehicles from Greater London.

## **2.4 Key additional action on air pollution**

Some of the additional actions and measures in place to reduce air pollution are outlined in this section. They do not form part of this consultation, but the information is provided for context.

### **The bus fleet**

Buses operating TfL services accounted for an estimated 10 per cent of total NO<sub>x</sub>, and 20 per cent of road transport NO<sub>x</sub>, in Greater London in 2013. In central London, they were responsible for 18 per cent of total NO<sub>x</sub> and 35 per cent of road transport NO<sub>x</sub>.

All buses in Greater London currently meet a minimum Euro IV standard for NO<sub>x</sub> and PM and in many instances they exceed this.

To support the ULEZ, all double-decker buses operating in the Congestion Charging zone will be hybrid electric vehicles and all single-decker buses in the zone will emit nothing from their engine exhaust (eg they will be full electric or hydrogen models). This means our fleet will account for only 13 per cent of road transport emissions in central London by 2020, compared with 35 per cent in 2013.

The Mayor has asked us to introduce further improvements to reduce emissions from buses. This includes:

- Ensuring all of our buses in central London are compliant with the ULEZ Euro VI emission standard ahead of its introduction (by 2019) and a commitment that our double-decker buses operating in the area will be hybrid
- Implementing up to 12 'Low Emission Bus Zones' across London – tackling the worst pollution hotspots by concentrating cleaner buses on the dirtiest routes. The first zones will be delivered in Putney High Street and Brixton/Streatham from 2017
- Expanding an innovative Euro VI bus retrofit programme to 3,000 vehicles by 2020 (up from 800) and to more than 5,000 by 2021
- An ambition to purchase only hybrid or zero emission double deck buses from 2018

### **Taxis (black cabs)**

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 NO<sub>x</sub>, and four per cent of road transport NO<sub>x</sub>, in Greater London in 2013. In central London, they accounted for eight per cent of total NO<sub>x</sub> and 15 per cent of road transport NO<sub>x</sub>.

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 Taxi and Private Hire Action Plan<sup>26</sup>, which the Mayor launched in September 2016, includes the following measures to support licensed taxi drivers and improve London's air quality:

- From 1 January 2018, no more new diesel taxis will be licensed in London and all newly registered taxis must be zero emission capable (ZEC)<sup>27</sup>
- A £3,000 grant towards the first 9,000 ZEC taxis licensed in London, to help reduce the cost for drivers, and lobbying the Government to guarantee the plug-in car grant for these vehicles, enabling up to £7,500 in grants in total
- A rapid charging network from 2017 so drivers can maximise fuel savings and operate mostly in zero emission mode, with locations dedicated to the trade
- A scrappage scheme for the oldest taxis from 2017. Up to £5,000 will be available to drivers who choose not to license their vehicle in London, with the exact amount depending on the age of the taxi
- Recognising that the newest taxis today will be the last remaining diesel vehicles in the fleet and exploring options to convert them to a cleaner fuel, such as liquid petroleum gas
- Rewarding drivers who pioneer green technology by offering exclusive access to certain facilities, for example, 'zero emission' ranks, and working with boroughs to explore areas where taxis and other vehicles must operate in zero emission mode

### **Private hire vehicles**

All private hire vehicles (PHVs) will need to comply with the ULEZ standards and charges (see Table 3 on page 26) and are subject to a maximum 10-year age limit for licensing.

Several milestones will ensure that London's PHVs reduce their emissions:

- From 2018 all PHVs presented for licensing for the first time must meet either:
  - Euro 6 (diesel/petrol) standards
  - At least Euro 4 (petrol-hybrids) emissions standards
- From 2020:

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<sup>26</sup> [tfl.gov.uk/corporate/publications-and-reports/taxi-and-private-hire](http://tfl.gov.uk/corporate/publications-and-reports/taxi-and-private-hire)

<sup>27</sup> A maximum 15-year age limit remains in place for all taxis. The ZEC requirement for taxis is ≤50 g/km CO<sub>2</sub> and a minimum zero emission range of 10 miles

- All newly manufactured PHVs (less than 18 months old) presented for licensing for the first time must be ZEC<sup>28</sup>
- From 2023:
  - All PHVs presented for licensing for the first time must be ZEC

As a result of the policies for taxis and PHVs, all these vehicles will be zero emission capable by 2033 at the latest.

The Mayor's Taxi and Private Hire Action Plan, which sets out to enhance the trade for both drivers and customers, includes a number of measures to reduce emissions. For more information, go to [tfl.gov.uk/corporate/publications-and-reports/taxi-and-private-hire](http://tfl.gov.uk/corporate/publications-and-reports/taxi-and-private-hire)

## **LoCITY**

This is our initiative for lowering emissions caused by London's commercial vehicles. It is an industry-led, collaborative programme that encourages early compliance with ULEZ standards and encourages the uptake of alternatively fuelled vans and HGVs. Further information can be found at [locity.org.uk](http://locity.org.uk)

## **Ultra Low Emission Vehicles**

In 2015, we published the Ultra Low Emission Vehicle (ULEV) Delivery Plan setting out 15 key actions needed to support the uptake of ULEVs in London<sup>29</sup>.

Recognising that the electric vehicle charging infrastructure is a barrier to adoption of ULEVs in urban areas, we are investing to improve this. Working with the private sector, we will create a network of 150 rapid charge points throughout London by 2018 to support the uptake of electric vehicles in commercial fleets and encourage taxi and private hire drivers to choose ZEC models.

In January 2016, London was awarded £13m from the Government through the Go Ultra Low City Scheme.

This will enable us to work with partners including the boroughs to deliver a network of residential charge points for people without access to off-street parking. It will also provide 1,000 new charge points for car clubs and establish eight area-based schemes, called 'Neighbourhoods of the Future', that will promote innovative charging infrastructure, policies and initiatives and encourage the use of ULEVs.

As well as investing in the charging infrastructure, the ULEV Delivery Plan includes actions to promote ULEVs and incentivise more Londoners to adopt them. For example, vehicles emitting  $\leq 75$ g/km of CO<sub>2</sub> and that meet the Euro 5 emission standard are eligible for the Ultra Low Emission Discount, a 100 per cent discount on the Congestion Charge.

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<sup>28</sup> For PHVs the ZEC requirement is  $\leq 50$  g/km CO<sub>2</sub> with a minimum zero emission range of 10 miles or  $\leq 75$  g/km CO<sub>2</sub> and 20 miles minimum zero emission range. This aligns with the Office for Low Emission Vehicle (OLEV) criteria

<sup>29</sup> Available at [www.tfl.gov.uk/transport-emissions](http://www.tfl.gov.uk/transport-emissions)

## **Low Emission Neighbourhoods**

Five ‘Low Emission Neighbourhoods’ are being set up across eight boroughs, with pollution-busting measures including strict new penalties for the more polluting vehicles, car-free days, green taxi ranks for zero emission-capable cabs and parking reserved for the cleanest vehicles. More information about Low Emission Neighbourhoods is available here: <https://www.london.gov.uk/press-releases/mayoral/pollution-fund-to-tackle-london-toxic-air-hotspots>

## **Walking and cycling**

We are investing to make London’s streets healthy, safe and attractive places to walk and cycle. Enabling more journeys to be made on foot or by bike can help reduce private vehicle use and associated emissions.

Initiatives to encourage walking and cycling include:

- Continued investment in Cycle Superhighways, Quietways, the Central London Grid and Mini-Hollands to create a network of safe cycle routes and improve conditions for walking
- Working with London’s boroughs to deliver public realm enhancements and improve the walking and cycling experience in town centres
- Working with schools, business and communities to promote walking and cycling

Further proposals will be developed as part of the forthcoming MTS review.

## **Car clubs**

We have worked with the car club industry, representative bodies, London Councils and other partners to form the ‘Car Club Coalition’, with the aim of supporting car clubs as an alternative to private vehicle ownership.

The coalition jointly developed and published the Car Club Strategy for London in May 2015<sup>30</sup>. This set out an ambition to grow the Capital’s car club industry, achieving a million members, served by 10,000 vehicles, by 2025. The ULEV Delivery Plan later outlined a target for half of London’s car club fleet to be ULEVs by 2025. These targets have been agreed across all car club models (back-to-base, floating and point-to-point).

## **Increasing rail capacity**

We continue to invest in enhancing rail capacity across London to support a rising number of journeys by public transport, and this includes the opening of the Elizabeth line in 2019. The Four Lines Modernisation Programme will increase capacity on the Metropolitan, District, Circle and Hammersmith & City lines by 33 per cent in 2023, and Jubilee line services will reach frequencies of up to 32 trains per hour by the end of 2020. Electrification of the Gospel Oak to Barking line will boost capacity on the route by 90 per cent. London Trams will see significant

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<sup>30</sup> <http://tfl.gov.uk/modes/driving/car-clubs/how-car-clubs-work>



improvements with upgraded vehicles, ‘double-tracking’ and a new platform at Wimbledon by 2020.

### **Diesel scrappage**

Diesel vehicles are a major contributor to poor air quality so the Mayor has asked us to investigate a diesel scrappage scheme. He believes this is a national problem that requires a central government-led solution. In the stage 1 consultation, 66 per cent of respondents in the representative TNS Poll (see Table 1 on page 7) and 77 per cent of Talk London respondents agreed that the Government should fund such a scheme.

### **Vehicle Excise Duty devolution and reform**

The Mayor is calling on the Government for a national reform of Vehicle Excise Duty (VED), which is sometimes referred to as ‘road tax’, to do more to incentivise low emission vehicles. He is also asking for devolved powers to set VED in the Capital. This would enable him to introduce different rates that take into account air pollutants as well as CO<sub>2</sub> emissions. It would also remove the inequity, whereby VED is ring-fenced for trunk roads outside London. Currently, the Capital contributes to VED, but receives no funding from this. The majority of respondents to the stage 1 consultation agreed that London should be given greater control.

### **Other emission sources**

Improving London’s air quality cannot be done through a reduction in road transport emissions alone – non-transport sources account for a high percentage of the total. While the ULEZ will focus on transport emissions, the GLA family will continue to work closely together, and with stakeholders, on further initiatives that address other emission sources including buildings, construction sites and energy and waste facilities. This includes measures such as further retrofitting homes and buildings, Combined Heat and Power (CHP) /biomass emissions standards, and providing guidance on the application of ‘air quality neutral’ in the planning system, ensuring that new developments do not worsen air quality.

The Mayor plans to use his other powers to complement the introduction of the ULEZ. For example, in 2015 the GLA introduced new standards to reduce emissions from construction sites and equipment (non-road mobile machinery). These will be strengthened in 2020. More information on this is available at <http://nrmm.london/>

Non-road emissions sources are less well understood than traffic emissions and the Mayor is supporting a number of research projects to close this evidence gap. These include the London Low Emissions Construction Partnership (<http://www.llecp.org.uk/>) which works with industry to identify best practice on construction sites, academic research into the local and regional impacts of Combined Heat and Power and working with the Port of London to understand the impacts of river traffic on pollution.

He also recognises the importance of working with other cities and the EU. A report published by the GLA<sup>31</sup> estimated that external sources from continental Europe are responsible for just under half of the deaths associated with NO<sub>2</sub>. It also estimated that 75 per cent of the cardiovascular hospital admissions associated with PM<sub>2.5</sub> result from sources outside London.

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<sup>31</sup> [www.london.gov.uk/WHAT-WE-DO/environment/environment-publications/understanding-health-impacts-air-pollution-london](http://www.london.gov.uk/WHAT-WE-DO/environment/environment-publications/understanding-health-impacts-air-pollution-london)

## Part 2: The Emissions Surcharge

### Chapter 3 – Options and description

This chapter discusses the ES proposal. Subject to this statutory consultation, the Mayor will decide whether or not to implement the scheme, with or without amendments. He is likely to make this decision early in 2017.

An Integrated Impact Assessment (IIA) has been carried out to understand the likely significant impacts of the ES on the environment, health, equalities and the economy. This is available in Appendix B.

#### 3.1 Scheme description

A new ES (more commonly known as the ‘T-Charge’) is proposed in central London to discourage the use of older, more polluting vehicles. It is also intended to act as a stepping stone ahead of the full introduction of the ULEZ (see section 3.8 on page 43), when tighter vehicles emissions standards will come into force.

The stage 1 consultation showed strong support for implementing an ES, with 81 per cent in favour. This section outlines the detailed proposals.

The ES will be an additional daily £10 supplement to the Congestion Charge, payable by owners of a specific category of vehicles who drive in the Congestion Charging zone during charging hours<sup>32</sup>. It will cover older diesel and petrol vehicles that do not meet the Euro 4/IV<sup>33</sup> emissions standard for NO<sub>x</sub> and PM emissions<sup>34</sup>. Pre-Euro 4 vehicles are generally those registered in 2005 and older. Proposals for discounts and exemptions are explained in section 3.4 on page 36.

It will mean that:

- All vehicles subject to the daily £11.50 Congestion Charge<sup>35</sup> (eg not entitled to an exemption or discount) that do not meet the Euro 4/IV standard (Euro 3 for L-category vehicles, see section 3.5 below) would qualify for an additional daily £10 ES, meaning a total payment of £21.50
- All vehicles that qualify for a ‘nine or more seats’ 100 per cent Congestion Charge discount (e.g. minibuses, coaches) and do not meet the Euro 4/IV standard would be subject to a daily £10 ES (total payment)

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<sup>32</sup> Monday-Friday, 07:00-18:00, excluding Bank and public holidays and the period between Christmas and New Year

<sup>33</sup> Euro 4 refers to a standard for light vehicles (eg cars) and Euro IV refers to a standard for heavy vehicles (eg lorries, buses and coaches). See Appendix A for more information on Euro standards

<sup>34</sup> The PM limit would only apply to diesel vehicles as there is no PM emission standard set for Euro 4 petrol vehicles

<sup>35</sup> The Congestion Charge is £10.50 for people who register for Auto Pay

- If the vehicle is subject to the LEZ charge, the ES would be paid in addition to this
- Non-payment of the Congestion Charge or ES will result in a penalty charge of £130 (reduced to £65 if paid within 14 days). This is in addition to any penalty charges for not paying the LEZ charge, if applicable

It is proposed that the ES would come into operation on 23 October 2017. We have made a variation order<sup>36</sup> outlining changes to the Congestion Charging zone scheme order<sup>37</sup> to reflect the proposals for the ES discussed in this chapter (see [tfl.gov.uk/airquality-consultation](http://tfl.gov.uk/airquality-consultation) for a copy of the variation order). These changes will not come into effect unless, and until, the Mayor confirms the variation order (with or without modifications). He is expected to make this decision in February 2017, taking into account public and stakeholder responses from this consultation and other relevant considerations.

### **3.2 Hours of operation**

The Emissions Surcharge would form part of the existing Congestion Charge scheme, with the same hours (Monday-Friday, 07:00-18:00, excluding public holidays and the period between Christmas and New Year). This will enable it to be implemented quickly and efficiently, making use of existing signage and operation systems. It will also mean that it would apply during times of the day when more people are exposed to poor air quality.

The stage 1 consultation responses to the Talk London survey showed that 42 per cent of respondents agreed with the ES operational hours, with 39 per cent calling for longer hours.

### **3.3 Location**

The ES is part of the Congestion Charge scheme and therefore would apply to the same area, as shown in Figure 9 on page 25.

### **3.4 Discounts and exemptions**

#### **Residents**

Any registered resident who pays their Congestion Charge using Auto Pay would only pay £2.05 a day in total (90 per cent discounted ES of £1 plus 90 per cent discounted Congestion Charge of £1.05) to drive in the Congestion Charging zone during charging hours, with a vehicle that does not meet the ES standard. It is proposed that residents would continue to pay a discounted ES until their 3 year 100

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<sup>36</sup> The Greater London (Central Zone) Congestion Charging (Variation) Order 2016

<sup>37</sup> The Greater London (Central Zone) Congestion Charging Order 2004 ('the Scheme Order') made by Transport for London ('TfL') on 30 September 2004 and confirmed with modifications by the then Mayor of London on 1 November 2004. The Scheme Order has been subsequently varied by further Orders made by TfL and confirmed by subsequent Mayors

per cent 'sunset period' discount for the ULEZ ends. Please see section 3.8 on page 43 for further details including the proposed start and end date.

Vehicles that remain parked will not be charged for that day. Residents with non-compliant vehicles registered for the Congestion Charge discount will automatically be registered for the ES discount.

The stage 1 consultation Talk London survey showed 34 per cent of respondents were in favour of a 90 per cent discount, with 49 per cent preferring no discount. However, the representative TNS Poll (see Table 1 on page 7) showed 44 per cent in favour of a 90 per cent discount with 23 per cent preferring no discount.

### **Vehicle discounts and exemptions**

It is proposed that the same discounts and exemptions that apply to the Congestion Charge will also apply to the ES, except for:

- Non-TfL buses, coaches and other 9+ seater vehicles (these will be subject to the ES)<sup>38</sup>.
- Vehicles with a historic tax class (40 years and older) and/or commercial vehicles manufactured before 1973 that qualify for the Congestion Charge (these will be exempt from the ES)
- Specially constructed or modified Showmans vehicles, that are currently subject to the Congestion Charge (these will receive 100 per cent discount from the ES)

Historic vehicles are exempt because of their unique status, cultural importance and limited number. It would also be unreasonable to expect them to comply with the Euro 4/ IV emission standard as it is likely the alterations required would result in a significant loss of historic character (eg the engine largely replaced with a modern one). However, they are currently subject to the Congestion Charge and there are no plans to change this.

A relatively small number of 9+ seater vehicles (buses, coaches and minibuses) will be affected by the proposal. These are currently eligible for a 100 per cent discount of the Congestion Charge. Although small in numbers, on a per vehicle basis, buses and coaches are one of the largest contributors to NO<sub>x</sub> emissions, so it is right that these should be covered by the ES. However, vehicles that meet other conditions for exemption, such as modified vehicles with a disabled vehicle taxation class, will be exempt. We are seeking views on whether discounts for light duty 9+ seater vehicles such as minibuses should be considered.

There was strong agreement during the stage 1 consultation that these vehicles should pay the ES, with 82 per cent of respondents to the Talk London survey in favour.

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<sup>38</sup> Since the start of 2016, all TfL buses in London meet the Euro IV standard for NO<sub>x</sub>, meaning they already comply with the minimum requirements of the ES

**Table 7: Proposed discounts and exemptions for the ES**

Vehicle	Discount/exemption
Two-wheeled motorbikes (and sidecars) and mopeds	Exempt
Emergency service vehicles, such as ambulances and fire engines	Exempt
NHS vehicles that are exempt from VED	Exempt
Vehicles used by disabled people that have a disabled taxation class, eg Dial-a-Ride and modified vehicles	Exempt
Specialist off-road vehicles, eg tractors and mobile cranes	Exempt
Vehicles with a historic tax class (40 years and older)	Exempt
Commercial vehicles constructed before 1973	Exempt
Taxis	Exempt
Ministry of Defence vehicles	Exempt
Private hire vehicles	Exempt
Specially constructed or modified Showmans vehicles	100% discount
Accredited breakdown vehicles	100% discount
Roadside recovery vehicles	100% discount
Blue Badge holders	100% discount
Residents living in the Congestion Charging zone or in a designated area next to the zone	90% discount
9+ seater vehicles	No discount or exemption

### Reducing emissions from taxis and PHVs

We confirmed new taxi and PHV licensing conditions last year. The Mayor has also recently published his action plan to improve the trade, which includes measures to reduce emissions. For more information, go: <https://tfl.gov.uk/corporate/publications-and-reports/taxi-and-private-hire>

PHV's are subject to a 10-year licensing age limit. All PHVs that meet this, comply with the Euro 4 emissions standard. There are some limited extension periods to the age limit for wheelchair accessible vehicles, special needs transportation and other specially adapted vehicles.

### Taxis

Taxis are already subject to a 15-year licensing age limit. Given the requirement for taxis to accept any fare up to 12 miles within Greater London, drivers are unable to avoid the Congestion Charging zone.

There is a licensing requirement that all new taxis are ZEC from 1 January 2018 and we are working with manufacturers, infrastructure providers and the trade to ensure rapid uptake of these vehicle types. We consider this to be the best way to reduce emissions from the taxi fleet and support the industry (see section 2.4 on page 29). Taxis will therefore be exempt from the ES.

## **Buses**

Since the start of 2016, all TfL buses in London meet the Euro IV standard for NO<sub>x</sub>, and PM meaning they already comply with the minimum requirements of the ES. Further improvements to the fleet are being made in preparation for the ULEZ and are detailed in section 2.4 on page 29.

## **3.5 Emissions standard**

The proposed minimum emissions standard will be Euro 4/IV for both petrol and diesel vehicles and Euro 3 for category L vehicles (see page 41). This has been set as an introductory or transitional standard ahead of the ULEZ starting. It adopts the same petrol standard as the ULEZ, but acknowledges that 2017 is too soon to expect high levels of compliance with a diesel Euro 6/VI standard, as planned for the ULEZ.

The stage 1 consultation showed that 53 per cent of respondents to the Talk London survey were in favour of a minimum Euro 4 standard for the ES.

A Euro 5/V standard for diesel vehicles has been considered in response to stakeholder feedback. This would present similar issues to setting a Euro 6/VI standard and would create the additional complexity of introducing a third emission standard that does not align to ULEZ standards. Additionally, there is evidence that across some vehicle types the Euro 5/V standard emits more NO<sub>x</sub> than the Euro 4/IV standard, although PM levels are lower.

The standard would require vehicles to meet the Euro 4/IV emission limits for both NO<sub>x</sub> and PM<sup>39</sup>, so differs from the current London-wide LEZ standard for heavy vehicles that only requires vehicles to meet PM limits.

Table 8 compares the estimated proportion of vehicle kilometres driven in London in 2017 that would not meet the ES standard (Euro 4/IV for both petrol and diesel) and the ULEZ standard (Euro 4 petrol and Euro 6/VI diesel). These figures are roughly equivalent to the percentage of vehicles driven into the Congestion Charging zone on an average day.

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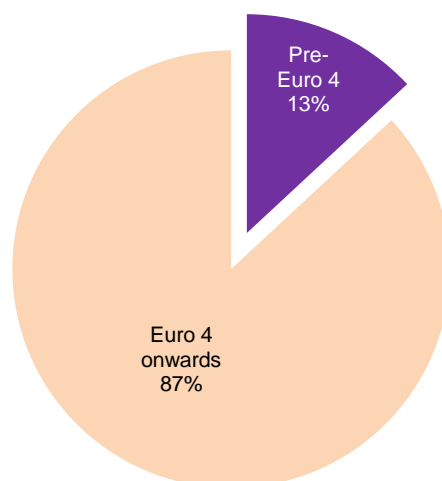
<sup>39</sup> The PM limit would only apply to diesel vehicles as there is no PM emission standard set for Euro 4 petrol vehicles

**Table 8: Proportion of vehicle km driven that would not meet the Euro 4/IV or 6/VI standard in 2017**

	Emissions Surcharge Euro 4/IV standard	ULEZ Euro 4 petrol Euro 6/VI diesel standard
Petrol car	26%	26%
Diesel car	15%	86%
Van	10%	82%
HGV	6%	51%
Non-TfL bus or coach	3%	67%

Figure 11 shows the projected proportion of NO<sub>x</sub> emissions that come from the oldest vehicles in 2017. Pre-Euro 4 vehicles (generally those registered in 2005 and older) are responsible for 13 per cent of NO<sub>x</sub> emissions during a year.

**Figure 11: Ratio of NO<sub>x</sub> in central London between pre-Euro 4 and Euro 4 onward**



Pre-Euro 4 vehicles are disproportionately more polluting across individual vehicle categories. For example, 54 per cent of emissions from petrol cars are from pre-Euro 4 vehicles, but they account for only 26 per cent of kilometres covered by these vehicles.

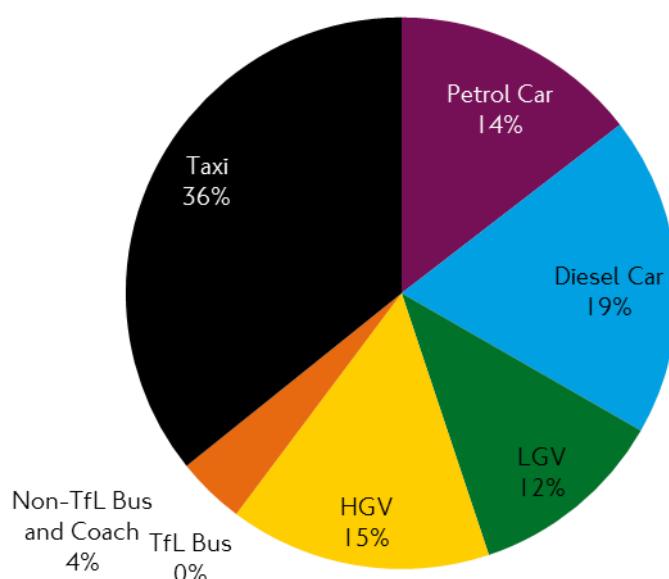


**Table 9: Emissions compared to kilometres driven by pre-Euro 4/IV vehicles**

	Proportion of vehicle emissions from pre-Euro 4/IV vehicles	Proportion of vehicle km from pre-Euro 4/IV vehicles
<b>Petrol car</b>	54%	26%
<b>Diesel car</b>	19%	15%
<b>LGV</b>	16%	10%
<b>HGV</b>	14%	6%
<b>Non-TfL bus and coach</b>	5%	3%
<b>Taxi</b>	26%	17%

Figure 12 refers to NO<sub>x</sub> emissions from pre-Euro 4/IV vehicles in central London and highlights the percentage attributed to each vehicle type. As expected, diesel vehicles are large contributors. More surprising, perhaps, is that 14 per cent comes from petrol cars. While pre-Euro 4 petrol cars emit less NO<sub>x</sub> than their diesel equivalents on an average per vehicle basis, there are more of them.

**Figure 12: Relative proportion of emissions by vehicle type from pre-Euro 4 vehicles**



### **L-category vehicles (excluding motorcycles, mopeds and scooters)**

The Euro standards for L-category vehicles (motorised three-wheeled vehicles and quadricycles) are less developed than for other categories. Euro 4 is the latest standard and is being introduced in phases through to 2017, so only the newest L-category vehicles will comply.

As a result, it is proposed that the emission standard for L-category vehicles that are currently subject to the Congestion Charge will be set at Euro 3. This is equivalent to vehicles registered after 2007 and is in line with the agreed standards for the ULEZ.

Two-wheeled motorcycles, mopeds and scooters are currently exempt from the Congestion Charge. It is proposed they will also be exempt from the ES.

### 3.6 Number of vehicles affected

Our most recent data (2016) indicates that, on average, around 14,000 vehicles entering the Congestion Charging zone during charging hours are registered in 2005 and before (around 12 per cent of the total). Of these, 4,000 will qualify for the various discounts and exemptions available.

The remaining 10,000 are likely to be impacted by the ES and are shown by vehicle type in Table 10 below. We expect the numbers to be lower by 2017 as a result of natural changes to the vehicle fleet and once consideration of those makes and models that adopted Euro 4 standards early have been taken into account.

**Table 10: Approximate number of vehicles affected by the ES**

Vehicle type	Affected vehicles per day
Cars	7,000
Vans	2,000
HGV	400
Non-TfL bus and coach	600
Powered three-wheelers and quadricycles	<50

Of these, around 1,000 are likely to be owned by residents of the Congestion Charging zone, so will be eligible for the proposed residents' discount (see section 3.4 on page 36).

### 3.7 ES level

To ensure effective action ahead of the introduction of the ULEZ, the ES proposals need to be simple to communicate and operate. For the ULEZ scheme there are two levels of charge for non-compliance – £100 for heavy vehicles and £12.50 for light vehicles. However, for the ES, it is proposed there is a single charge.

The level needs to be high enough to encourage regular car and van users to change their vehicle or travel patterns, while still enabling occasional trips to be made in non-compliant vehicles. It is proposed that this is £10, although it is recognised it will have a smaller impact on heavy vehicle trip patterns into the zone.

In response to the stage 1 consultation, 41 per cent of Talk London respondents supported a £10 charge level and 26 per cent thought it should be higher.

A low level charge of between £1 and £5 was considered. This would make it more affordable, but would be an insufficient deterrent. This is based on our understanding of driver behaviour from our original ULEZ development work.

A higher level charge of £12.50 was also looked at. However, this would make it less affordable. In addition, it would be the same as the ULEZ charge for cars and vans, so could create confusion.

### **3.8 Proposed start and end date**

It is proposed that the ES will be implemented on 23 October 2017. The Mayor will be asked to decide in February 2017 whether or not he wants the proposal to proceed (with or without modification). He will make this decision taking into account feedback from the consultation. This provides an eight-month notice period ahead of the proposed ES scheme starting.

It is proposed that the ES will be superseded by the ULEZ emission standards and charges when it comes into operation, currently scheduled for 7 September 2020 (although this may change, subject to the outcome of statutory consultation on bringing forward the start date, as described in Chapter 4). Any ULEZ charge is in addition to the Congestion Charge.

Under the current approved ULEZ scheme, residents living in the zone and registered with TfL will receive a three-year, time-limited 100 per cent discount (from September 2020 to September 2023). This is referred to as a 'sunset period' and means they will not have to pay the ULEZ charge. After September 2023, residents will pay the full charge of £12.50 if they drive a vehicle in the ULEZ that does not meet the relevant ULEZ emissions standards.

To align these schemes, we are proposing that the ES will continue exclusively for residents at the discounted rate (90 per cent) until the expiry of their sunset period for the ULEZ. This is to provide continuity during the three years when the ES will end for non-residents' vehicles but the sunset period is still active. If the ES stopped when ULEZ starts (currently September 2020), residents with older, more polluting vehicles, would pay nothing for these three years.

**Table 11: ES and ULEZ charges that would apply to a non-compliant vehicle**

	Resident		Non-resident	
	ES <sup>40</sup>	ULEZ charge <sup>40</sup>	ES <sup>40</sup>	ULEZ charge <sup>40</sup>
October 2017 to September 2020	£1	-	£10	
September 2020 to September 2023 <sup>41</sup>	£1	-	-	£12.50
September 2023 <sup>41</sup> onward	-	£12.50	-	£12.50

### 3.9 Paying the ES

We will adopt the same payment and operational systems that we use for the Congestion Charge. We will identify whether a vehicle is subject to the ES and the driver will pay for this and the Congestion Charge (if applicable) in the same transaction. This includes drivers registered for Congestion Charge Auto Pay<sup>42</sup>.

Nine-plus seater vehicles that do not meet the standards will only need to pay the £10 ES and this will be done through the same payment channels. We propose that these drivers of these vehicles would be able to register for Auto Pay.

#### Checking your vehicle

Your registration document (also known as the V5C) will show if your vehicle will be subject to the ES. The emission standard can usually be determined by the date it was first registered with the Driver and Vehicle Licensing Agency, which can be found in section B of the document. If you do not have this, you can check the date at [www.vehicleenquiry.service.gov.uk](http://www.vehicleenquiry.service.gov.uk).

For newer vehicles, the Euro standard may be listed on the V5C in section D.2. The ES will apply for vehicles that do not meet at least the Euro 4/IV standard (Euro 3 for L-Category vehicles). Pre-Euro 4 vehicles are generally those registered in 2005 and older.

Table 12 below shows the date from which all manufacturers needed to meet the Euro standard.

<sup>40</sup> In addition to the Congestion Charge

<sup>41</sup> Subject to consultation on the start date of ULEZ, these dates might be brought forward

<sup>42</sup> CC Auto Pay is an automated payment system that records the number of charging days a vehicle travels within the Congestion Charging zone each month and bills the registered keeper's debit or credit card, or takes a direct debit payment

**Table 12: Introduction dates for relevant Euro standards**

Vehicle type (includes hybrid vehicles)	Minimum emission standards	Date from which manufacturers must register new vehicles meeting the new emission standards (usually a year earlier for new vehicle models)
Category L – Quadricycle or motorised tricycle	Euro 3	From 1 July 2007
Car and small van - Category M1 and N1 (I)	Euro 4	From 1 January 2006
Large van and minibus - Category N1 (II and III) and M2	Euro 4	From 1 January 2007
HGV - Category N2 and N3	Euro IV	From 1 October 2006
Bus/coach - Category M3	Euro IV	From 1 October 2006

A small number of vehicles registered prior to these dates will also have NO<sub>x</sub> and PM emissions that meet Euro 4/IV standard or better. These are referred to as ‘early adopters’ and would not be subject to the ES. Prior to the implementation of the scheme we would offer a means of identifying compliant vehicles on the TfL website.

### **NHS reimbursement**

Currently, patients who are clinically assessed as too ill to travel to a NHS appointment on public transport may be eligible to claim back the Congestion Charge from treating hospitals. We propose that this reimbursement would also be available for the ES.

### **3.10 Impact on emissions**

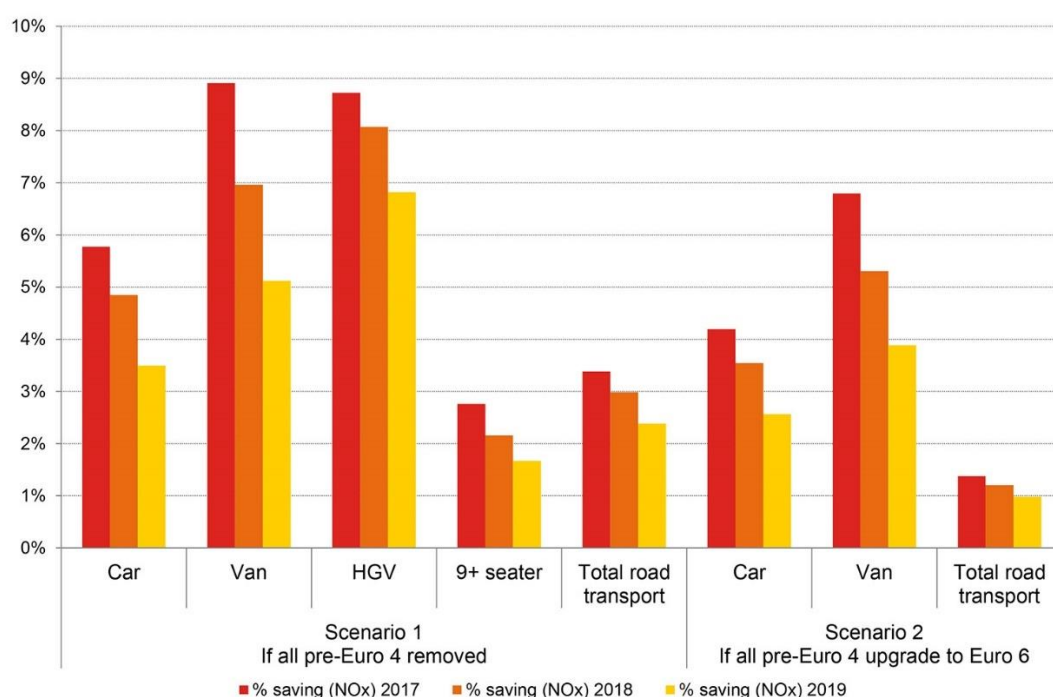
As with all impact assessments, there is a degree of uncertainty as to how people may respond, especially when taking into consideration the preparation vehicle owners will be doing ahead of the central London ULEZ launch, currently scheduled for September 2020.

The proposed £10 charge could encourage some drivers to stop travelling into the zone. Equally, it is sufficient for some owners of light vehicles, particularly those who frequently drive in central London, to consider buying a newer vehicle – one that is also likely to be compliant with the ULEZ standards.

To establish a range of emissions impacts, two high savings scenarios have been estimated, along with a mid-level one. They take into account the combined impact of these two behaviour choices:

- **Scenario 1**, Figure 13 shows the maximum savings that could be achieved if all non-compliant vehicles stop travelling into the zone – an almost nine per cent saving in some vehicle categories with an overall three per cent decrease in road transport NO<sub>x</sub> in the first year
- **Scenario 2**, Figure 13 shows the maximum savings that could be achieved if all non-compliant light vehicles upgrade to Euro 6 – nearly a seven per cent saving in the van fleet and a one per cent reduction in overall road transport NO<sub>x</sub> in the first year

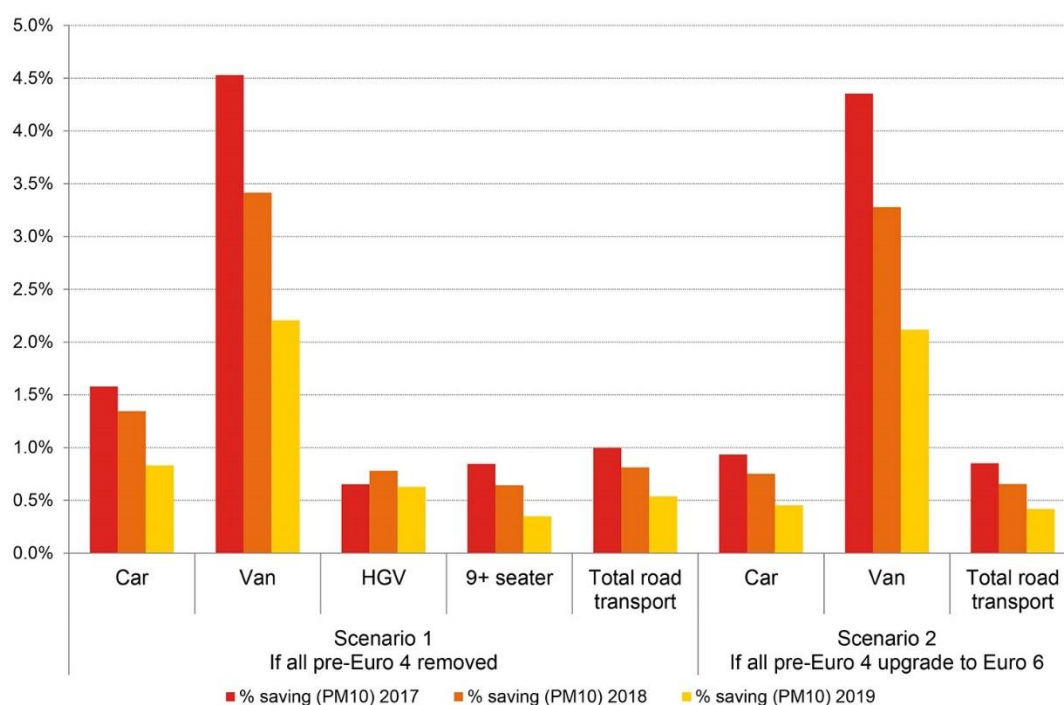
Figure 13: Percentage reduction in NO<sub>x</sub> emissions by category



The impact on PM<sub>10</sub> for the same scenarios have also been established.

- **Scenario 1**, shows a potential 4.5 per cent saving for vans with an overall one per cent decrease in road transport PM<sub>10</sub> in the first year
- **Scenario 2**, shows similar levels of savings, as exhaust PM is significantly lower at Euro 6 standard

**Figure 14: Percentage reduction in PM<sub>10</sub> emissions by category**



The reality will be that different people will do a mixture of things, including continuing to drive into the zone. The mid-range estimate assumes 40 per cent upgrade and seven per cent stop travelling into the zone. This leads to emissions savings from cars of two per cent for NO<sub>x</sub> and one per cent for PM<sub>10</sub>. For total road transport the total emission saving is 0.5 per cent for NO<sub>x</sub> and 0.3 per cent for PM<sub>10</sub>. This is the saving that would be achieved across the entire first year. During the hours that the ES operates, the emissions savings, as a proportion of total emissions during those hours, would be higher.

### 3.11 Cost of compliance with ES

This is the cost to drivers of paying the daily ES to enter the Congestion Charging zone with a non-compliant vehicle (for those that enter more frequently the annual cost would be higher), or paying to upgrade to a compliant vehicle. This indicates the likely financial impact of the charge on keepers of non-compliant vehicles.

Table 13 shows, for each vehicle type, the approximate purchase price, excluding any 'trade-in' value<sup>43</sup> received on the previous vehicle.

To calculate this cost, the average price of a new vehicle of each type is used, then an amount of depreciation is calculated across the life of the vehicle. The rate of depreciation varies for each vehicle type, but mirrors the data used by Defra.

The value of a car is based on the sales-weighted average list price<sup>44</sup> of a new car in the UK. The goods vehicles and coaches cover such a broad spectrum of vehicle types that calculated values are approximate.

<sup>43</sup> The money they receive for the sale of their old vehicle

**Table 13: Minimum cost of a compliant vehicle by vehicle type**

Vehicle type	2017	
	Age (years)	Cost (£)
Car	11	2,400
LGV	10	3,000
Rigid HGV	11	5,000
Artic HGV	11	7,000
Coach	11	22,000

### 3.12 Integrated Impact Assessment

An IIA has been carried out to examine the likely significant impacts of the ES proposal on the environment, health, equalities and the economy. This was complementary to the full IIA carried out for the ULEZ, when it was consulted on in 2014. The ES is a lower impact scheme than the ULEZ, applying only to a small proportion of the vehicles that pass through or within the Congestion Charging zone, which is a small area within Greater London.

Rather than repeat a full IIA, the impacts identified in the IIA for the ULEZ have been considered in terms of whether they will apply for the ES and to what degree. Consideration was also given to whether there are further, additional impacts owing to the new charge.

The full assessment is provided in Appendix B and its key findings are shown in Table 25 on page 95. In summary, the proposed ES will result in an overall positive impact, particularly when considering the contribution towards environmental and health objectives. There were a few ‘negligible negative’ impacts identified, as well as one ‘minor negative’ impact that relates to small and medium sized enterprises (SMEs), owing to the cost of upgrading vehicles or paying the charge.

Overall, the assessment concludes that the ES will have a minor positive impact London-wide in the short term. Its purpose is to act as a stepping stone ahead of the full introduction of the ULEZ (see section 3.8 on page 43), when tighter vehicle emissions standards will come into force. It is made clear that, with this scheme, the Mayor intends to take action quickly on air quality.

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<sup>44</sup> ‘List price’ is the advertised price of vehicles. An average is then calculated across all vehicles within each type (eg car) based on how much each make and model is sold for



## **Positive and neutral impacts of the ES**

These are listed below:

- A minor positive improvement in air quality, particularly in central London
- There may be a further indirect reduction in CO<sub>2</sub> through an anticipated small reduction in traffic
- There would be a positive impact on the way London is perceived nationally and internationally as a 'green' and 'clean' city
- The ES is likely to have a positive impact on noise as some drivers will switch to compliant vehicles, which generally have quieter engines
- Improved health will reduce impacts on the NHS, which will benefit the economy. The monetised health outcomes of the scheme is estimated to be in the region of between £2m and £5m over three years

## **Negative impacts**

This IIA also recognises that there are likely to be some potentially negative consequences of introducing the ES. They are:

- Waste materials produced during the disposal of non-compliant vehicles
- A differential impact on some equality groups, although these are expected to be negligible
- An economic disadvantage felt by some SMEs as well as private coach and minibus drivers, owing to the cost of compliance
- The impact on groups that rely on charitable or voluntary services to access central London, owing to their use of 9+ seater vehicles such as minibuses, which will be subject to the ES

## **Part 3: Ideas for the future of the ULEZ**

The Mayor considers that far-reaching action is needed to address London's poor air quality, and while the current ULEZ scheme will make a valuable contribution, he thinks it can be significantly improved.

The ULEZ will require all vehicles driving within the zone to meet specific emissions standards, or pay a daily charge. As things stand, it will come into force in September 2020 and cover the same area as the Congestion Charging zone.

Part 3 of this document puts forward the Mayor's current thinking on the future of the ULEZ and reflects engagement with Londoners during the stage 1 consultation on air quality.

No formal proposals for the future of the ULEZ are being put forward at this stage. Instead, the Mayor wants to develop his proposals with the active involvement of Londoners and relevant stakeholders by considering:

- Bringing forward the introduction of the ULEZ to 2019 (currently planned for 2020)
- Extending the ULEZ London-wide for heavy vehicles (HGVs, buses and coaches) as early as 2019, but possibly later
- Extending the ULEZ from central London up to the North and South Circular roads for all vehicles<sup>45</sup> as early as 2019, but possibly later

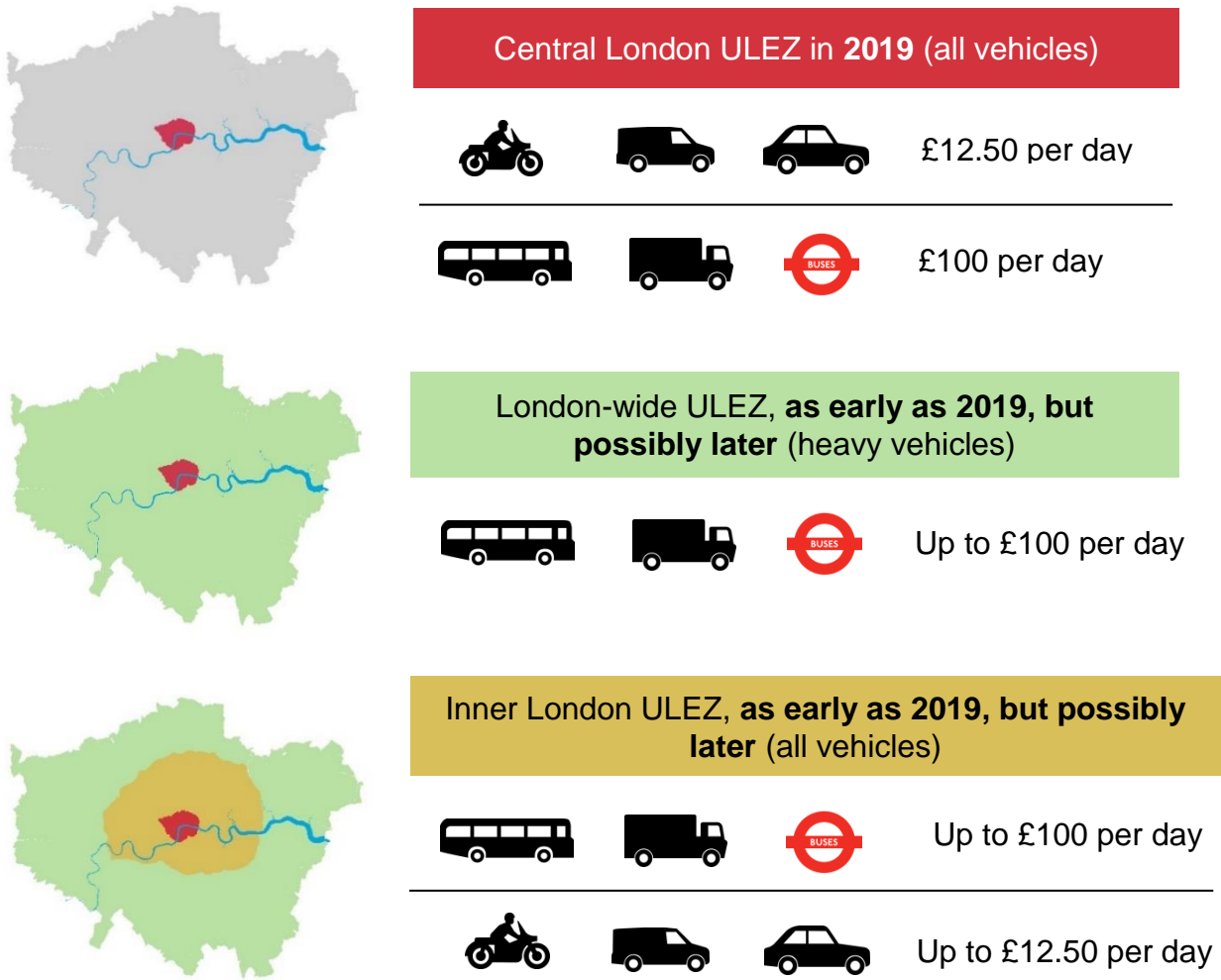
Depending on feedback gathered during this consultation, and continuing feasibility work, the Mayor will decide whether these options should be pursued. If so, he will ask us to develop definitive proposals that the public and stakeholders can comment on during consultation in 2017. People will therefore have a further opportunity to share their views.

A summary of the proposals is provided in Figure 15.

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<sup>45</sup> The term 'all vehicles', as used here, refers to all the vehicles currently subject to the ULEZ in central London, which is due to start in September 2020

Figure 15: Summary of ideas for the future of the ULEZ



**ULEZ standards:** Petrol – Euro 4; Diesel – Euro 6/VI; Motorcycle and L-Cat – Euro

## Chapter 4 – Bringing forward the ULEZ in central London

### 4.1 Introduction

Currently, the ULEZ will apply in the same area as the Congestion Charging zone and is scheduled to start in September 2020. It is likely we can improve air quality in London sooner by bringing forward this launch date.

A 2019 start date is being considered and this would still provide sufficient time to ensure it is operational. It also gives vehicle owners enough notice so they can prepare.

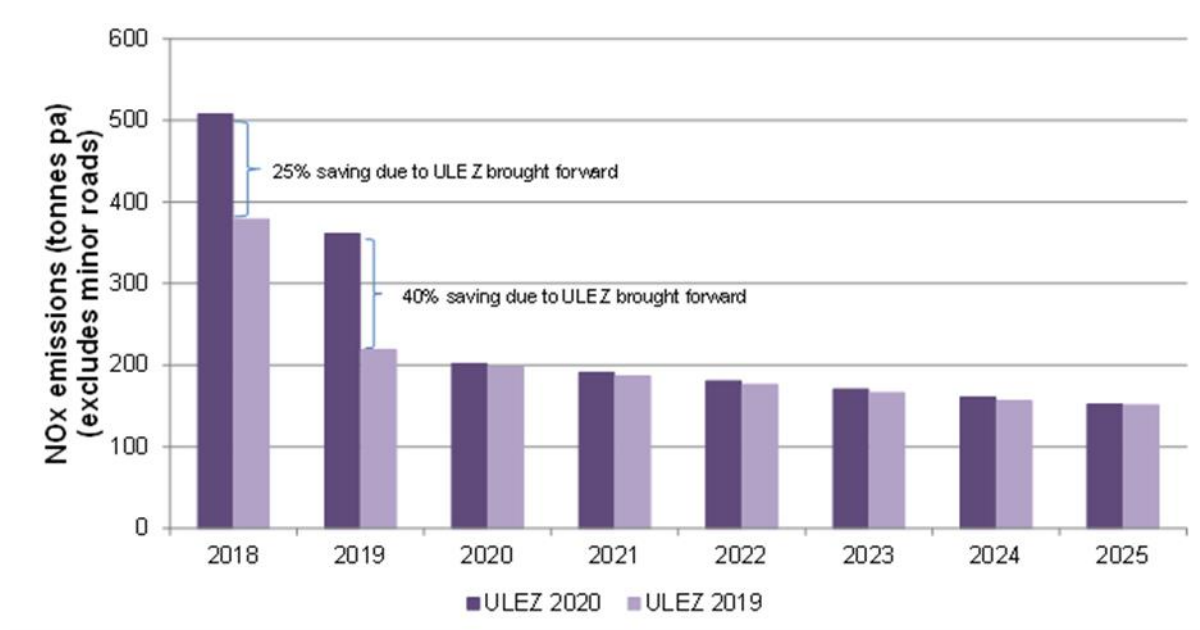
As mentioned previously, no formal proposals for implementing this option are being put forward at this stage. Depending on feedback from this consultation and ongoing feasibility work, the Mayor will decide whether it should be pursued for further statutory consultation. The public and stakeholders will therefore have a further opportunity to comment.

### 4.2 Impact on emissions

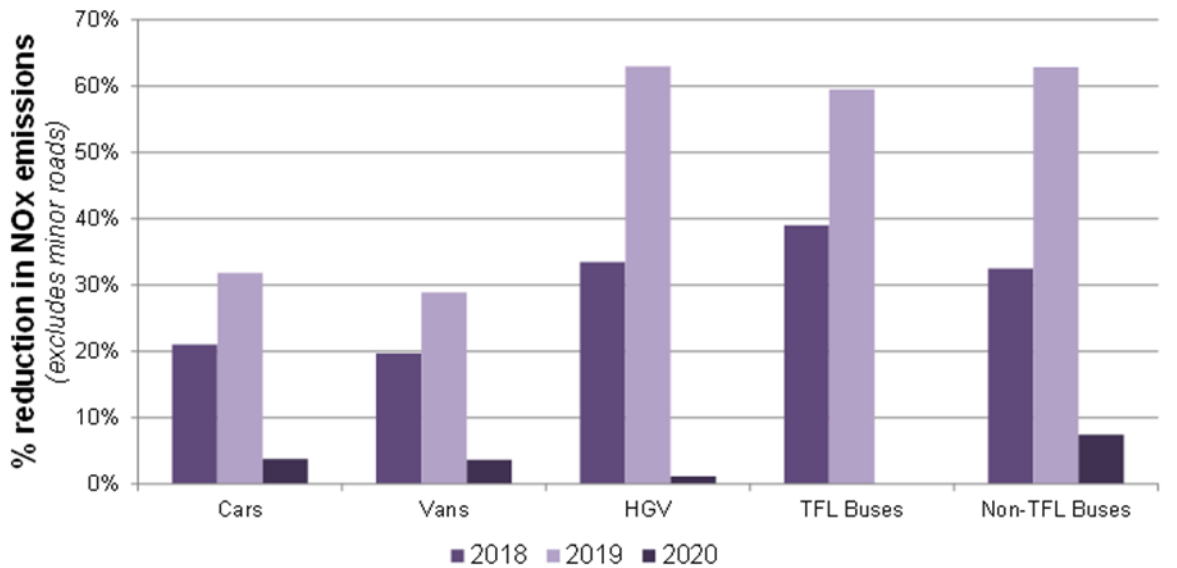
An earlier implementation of the ULEZ would mean Londoners see the emissions and health benefits sooner. If the scheme was introduced in 2019, there would be a 25 per cent reduction in NO<sub>x</sub> in 2018, as people started to comply early in preparation for the launch, then a 40 per cent reduction in 2019 on top of what would already have been achieved by ULEZ implementation in 2020.

Emissions savings would then continue in line with those estimated for ULEZ in 2020 (ie nearly a 50% reduction in Central London road transport NO<sub>x</sub> emissions in 2020).

**Figure 16: Emissions impact of introducing the ULEZ in central London in 2019 compared with 2020**

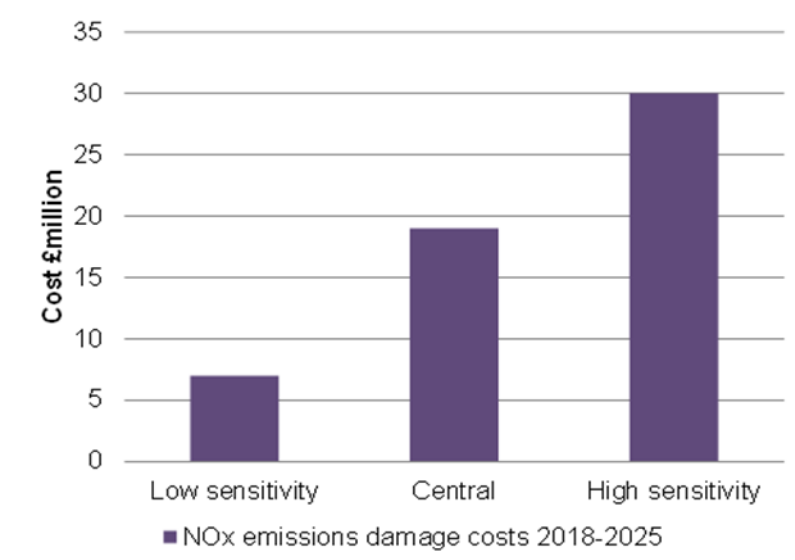


**Figure 17: Percentage reduction in emissions from each vehicle category as a result of bringing forward the ULEZ to 2019 from 2020 (this is in addition to the savings expected from ULEZ in 2020)**



Damage costs have been calculated by Defra to represent the monetary value of the changes in air pollution and are based on an estimate of costs to society as a whole (including environmental, social and economic impacts). These were issued in 2015<sup>46</sup> and have been used to monetise the emissions savings of NO<sub>x</sub> as a result of bringing the ULEZ forward to 2019. They range from £7m to £30m depending on whether a low, central or high cost is used. Further details will be provided in the next stage of consultation and will take account of any additional guidance from Defra on monetisation of air pollution at the time.

**Figure 18: Defra NO<sub>x</sub> emissions damage costs from bringing forward the ULEZ to 2019**



<sup>46</sup> [www.gov.uk/guidance/air-quality-economic-analysis](http://www.gov.uk/guidance/air-quality-economic-analysis)

The proportion of people living in central London areas that exceed air quality limits is expected to fall by around 70 per cent with the ULEZ starting in 2020, so these benefits would be brought forward if it was implemented earlier. In addition, there are 43 schools in areas of the ULEZ zone where limits are being exceeded – children who attend these could experience cleaner air sooner.

Predicted air quality concentrations and analysis of changes in population exposure to air pollution will be provided during the statutory consultation in 2017 if the Mayor decides to take this forward.

### 4.3 Cost of compliance for ULEZ

For each potential launch year for the ULEZ, the costs of compliance (see section 3.11 on page 47 for an explanation of cost of compliance) have been calculated. These are set out in Table 14

The motorcycle valuation is based upon a 125cc commuter bike, the most popular type of powered two-wheeler in the UK.

**Table 14: Indicative costs of a compliant vehicle over a range of years (values are rounded)**

Vehicle type	2019		2020		2021		2022		2023	
	Age (years)	Cost (£)	Age (years)	Cost (£)	Age (years)	Cost (£)	Age (years)	Cost (£)	Age (years)	Cost (£)
Petrol car	13	1,700	14	1,400	15	1,200	16	1,000	17	800
Diesel car	4	8,000	5	6,700	6	5,700	7	4,800	8	4,000
Diesel Van	3	11,000	4	8,900	5	7,300	6	6,000	7	4,900
Rigid HGV	5	18,000	6	14,000	7	12,000	8	9,700	9	8,000
Artic HGV	5	24,000	6	19,000	7	16,000	8	13,000	9	11,000
Coach	5	73,000	6	60,000	7	49,000	8	41,000	9	33,000
Motorcycle	12	200	13	200	14	100	15	100	16	100

### 4.4 Included vehicles, discounts and exemptions

It is unlikely that any changes will be proposed to the discounts and exemptions already agreed as part of the approved ULEZ scheme<sup>47</sup>.

#### Residents' and disabled tax class vehicles

The original ULEZ scheme proposed that residents' vehicles would receive a three-year sunset period. The same applies to vehicles with a disabled tax class, eg those

<sup>47</sup> See [tfl.gov.uk/modes/driving/ultra-low-emission-zone/check-your-vehicle](http://tfl.gov.uk/modes/driving/ultra-low-emission-zone/check-your-vehicle) for a full description of the ULEZ discounts and exemptions

that have been specially adapted or modified to carry disabled people, which are exempt from vehicle tax.

If it were launched a early in 2019, this would bring forward the requirement to comply with the ULEZ standards, from 2023 to 2022.

### **TfL service requirements**

For TfL buses we are proposing that, in addition to meeting the Euro VI standard,<sup>48</sup> double-decker vehicles in central London would also need to meet a hybrid standard from 2019.

It is proposed that single-decker buses would need to meet at least Euro VI standards in 2019, and will need to be zero-emission at tailpipe by 2020, as per the original ULEZ proposals. This is to provide a sufficient lead time to manufacture vehicles and charging infrastructure.

These requirements will be implemented as a minimum, regardless of whether the ULEZ launch date is brought forward.

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<sup>48</sup> As in the original ULEZ, there is likely to be a small number of Euro V 'New Routemaster' buses, which have around four times lower NO<sub>x</sub> emissions than other Euro V conventional diesel and diesel-electric hybrid buses, bringing them much closer in performance to the Euro VI. These will eventually be re-engineered to meet the Euro VI standard

## Chapter 5 – London-wide ULEZ standards for heavy vehicles

### 5.1 Description

The Mayor is considering options for expanding the ULEZ London-wide for all heavy vehicles. This would require them to meet Euro VI emission standards or pay a daily charge.

No formal proposals are being put forward at this stage. Depending on feedback from this consultation, the Mayor will decide whether it should be pursued, and if so, will ask us to develop definitive proposals for consultation in 2017. The public and stakeholders will therefore have a further opportunity to submit their comments.

Currently, the LEZ sets only PM emissions standards for all commercial vehicles. Table 15 shows the vehicle classes that are defined as heavy vehicles.

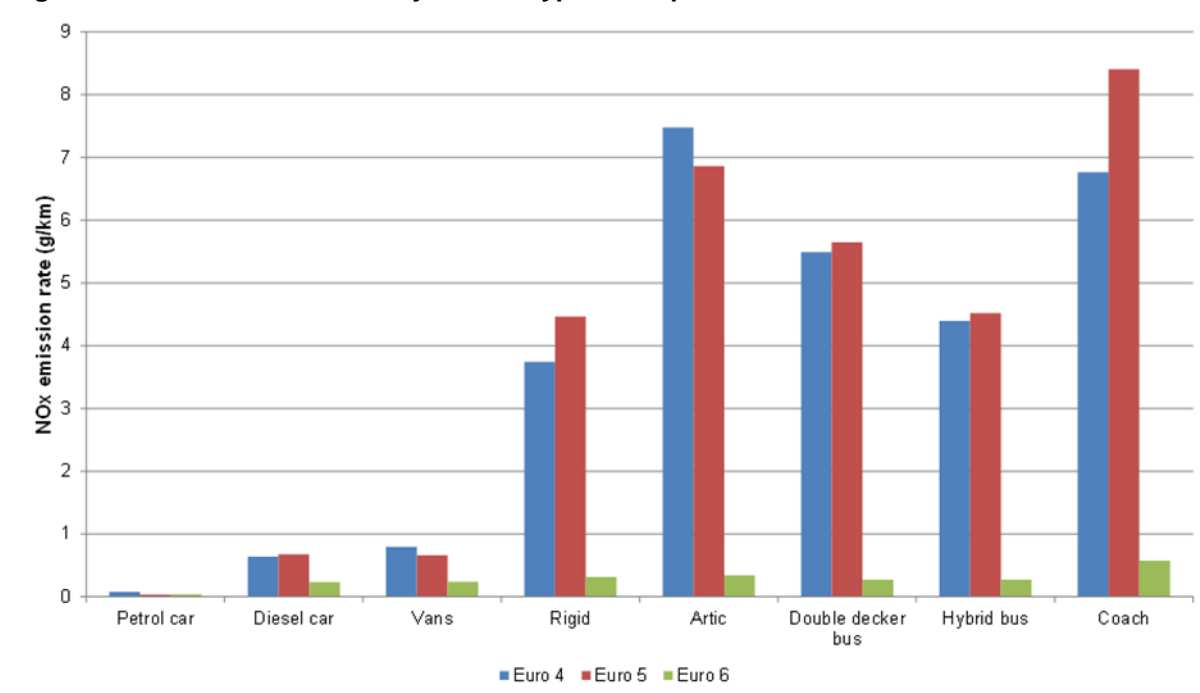
**Table 15: Vehicles defined as ‘heavy’**

Vehicle type	Weight
<ul style="list-style-type: none"> <li>• Lorries</li> <li>• Motor caravans</li> <li>• Motorised horseboxes</li> <li>• Breakdown and recovery vehicles</li> <li>• Snow ploughs</li> <li>• Gritters</li> <li>• Refuse collection vehicles</li> <li>• Road sweepers</li> <li>• Concrete mixers</li> <li>• Fire engines</li> <li>• Tippers</li> <li>• Removal lorries</li> <li>• Other specialist vehicles</li> </ul>	More than 3.5 tonnes gross vehicle weight
<ul style="list-style-type: none"> <li>• Buses</li> <li>• Coaches (with 8+ passenger seats)</li> </ul>	More than 5 tonnes gross vehicle weight

Expanding the ULEZ London-wide for heavy vehicles is being considered because they are, on average, the most polluting, as shown in Figure 19. In addition, unlike in central London, the locations of high pollution in outer London mostly occur along the main roads, where most heavy vehicle kilometres are driven, and where there is a higher proportion of these vehicles. It is also in line with the Government’s Clean Air Zone framework (see ‘Future year estimates of London’s air quality’ in section 1.3).



Figure 19: NO<sub>x</sub> emission rates by vehicle type at 30kph



## 5.2 Emissions standard

A Euro VI equivalent standard is being considered, in line with the rest of the ULEZ. It is likely that if these proposals were taken forward, the standard would be consistent with the Defra proposed Clean Air Zones outside London.

## 5.3 Year of implementation

The Mayor would like to hear suggested dates for when an extended zone could be implemented. Table 16 shows the estimated daily percentage of vehicles that would be affected across a range of implementation years.

Table 16: Proportion of vehicle kilometres that would be affected by extending the ULEZ London-wide for heavy vehicles in different implementation years

	Non-compliant levels (average day)	
	HGV	Coach
2019	31%	49%
2020	24%	40%
2021	20%	29%
2022	16%	21%
2023	13%	13%

## **5.4 Boundary**

If a London-wide scheme were to be taken forward, it would follow the current LEZ boundary. This is well-established and has infrastructure and systems in place to operate the scheme. See Figure 10 on page 28 for a map of the LEZ area. If the standards are not met and a LEZ charge is not paid, a penalty is payable – £1,000 for lorries and coaches, and £500 for large vans, motor caravans and minibuses (reduced to £500 and £250 respectively if paid within 14 days).

## **5.5 Charge level, discounts and exemptions**

Charge levels and the appropriate discounts and exemptions for an extended London-wide zone for heavy vehicles will be considered further as part of the development of policy options over the next year. It is expected that these will broadly be the same as exemptions to the current LEZ, but consideration on the interaction with LEZ and central London ULEZ charges, discounts and exemptions will also need to be given.

The Mayor is not putting forward any proposals on charge levels, exemptions and discounts at this stage. However, he welcomes and will consider any comments made as part of this consultation.

## **5.6 Indicative emissions impact**

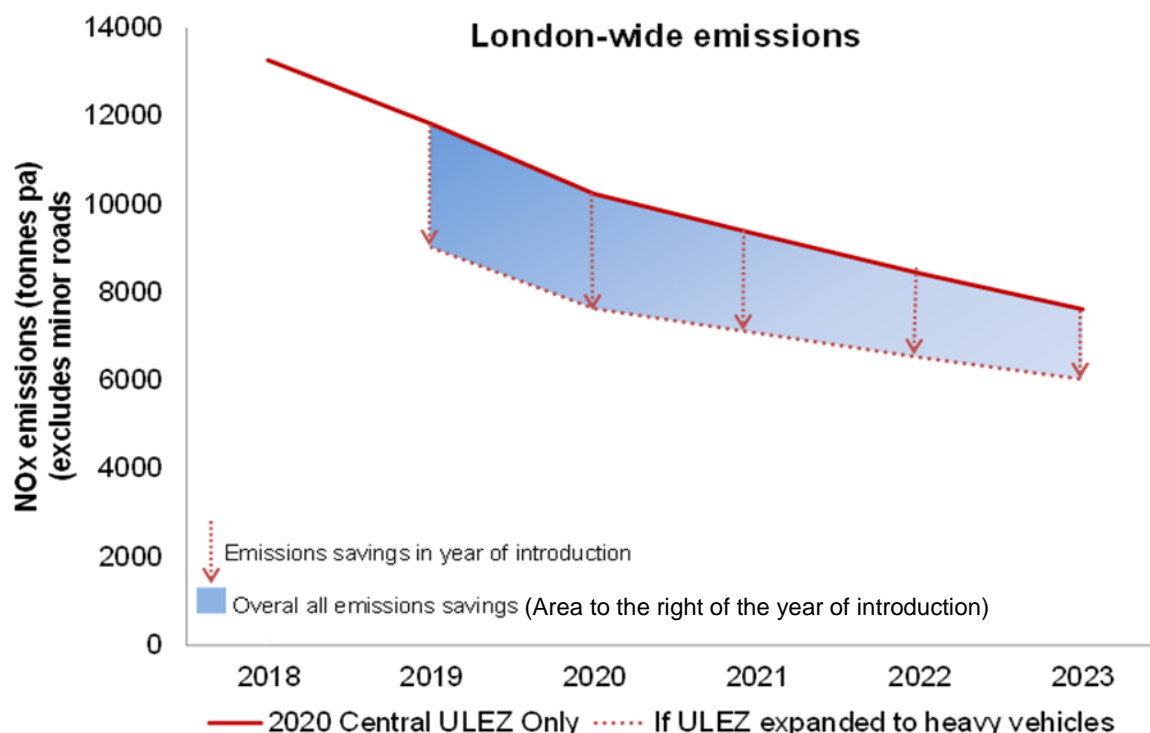
Early indications are that the outer zone will experience significant emissions reductions, assuming levels of compliance are on a par with those forecast for the central zone.

Heavy vehicles are forecast to contribute around 35 per cent of road transport NO<sub>x</sub> emissions across the Capital, in 2020, equivalent to around 3,800 tonnes (major roads only). A London-wide zone for Euro VI heavy vehicles would reduce emissions from these vehicles by up to 60 per cent (or around 30 per cent from total road transport emissions).

Earlier implementation of the scheme means emissions savings for more years and greater health benefits across London. Figure 20 shows the total NO<sub>x</sub> emissions from heavy vehicles and how much this is reduced as a result of implementing a heavy vehicle standard London-wide (assuming the currently planned central London ULEZ is in place in 2020).

These estimates will be refined as the policy develops and will be updated for the statutory consultation in 2017.

Figure 20: Total NO<sub>x</sub> emissions from heavy vehicles across the Capital, showing the savings brought about from implementing a heavy vehicle standard London-wide.



### Concentrations and health impact

Across the Capital, there are 360 primary schools projected to be in areas exceeding legal NO<sub>2</sub> limits in 2020. A London-wide Euro VI standard for heavy vehicles will significantly reduce emissions of road transport NO<sub>x</sub>, helping to improve air pollution concentrations sooner than currently forecast. This will contribute to health benefits throughout the Capital, not just in central London.

Damage costs estimates for a London-wide scheme in 2019 range from £350m to £1,410m, and this drops slightly to between £270m and £1,070m if the scheme is implemented in 2020.

Subject to the outcome of this consultation and ongoing feasibility work, information on the impacts of the proposal on NO<sub>2</sub> and PM concentrations, and the resulting health impacts, will be available for the next stage of consultation in 2017.

## **Chapter 6 – Expanding the ULEZ to the North and South Circular roads**

### **6.1 Description**

The Mayor is considering expanding the ULEZ to inner London for all vehicles. Emissions standards that apply for the central London ULEZ (see Table 3 on page 26) would therefore be extended across a wider area, broadly speaking up to the North and South Circular roads.

Again, no formal proposals for this option are being put forward at this stage. Depending on feedback from this consultation, the Mayor will decide whether this option should be pursued and if so, will ask us to develop definitive proposals for consultation in 2017. The public and stakeholders will therefore have a further opportunity to share their views.

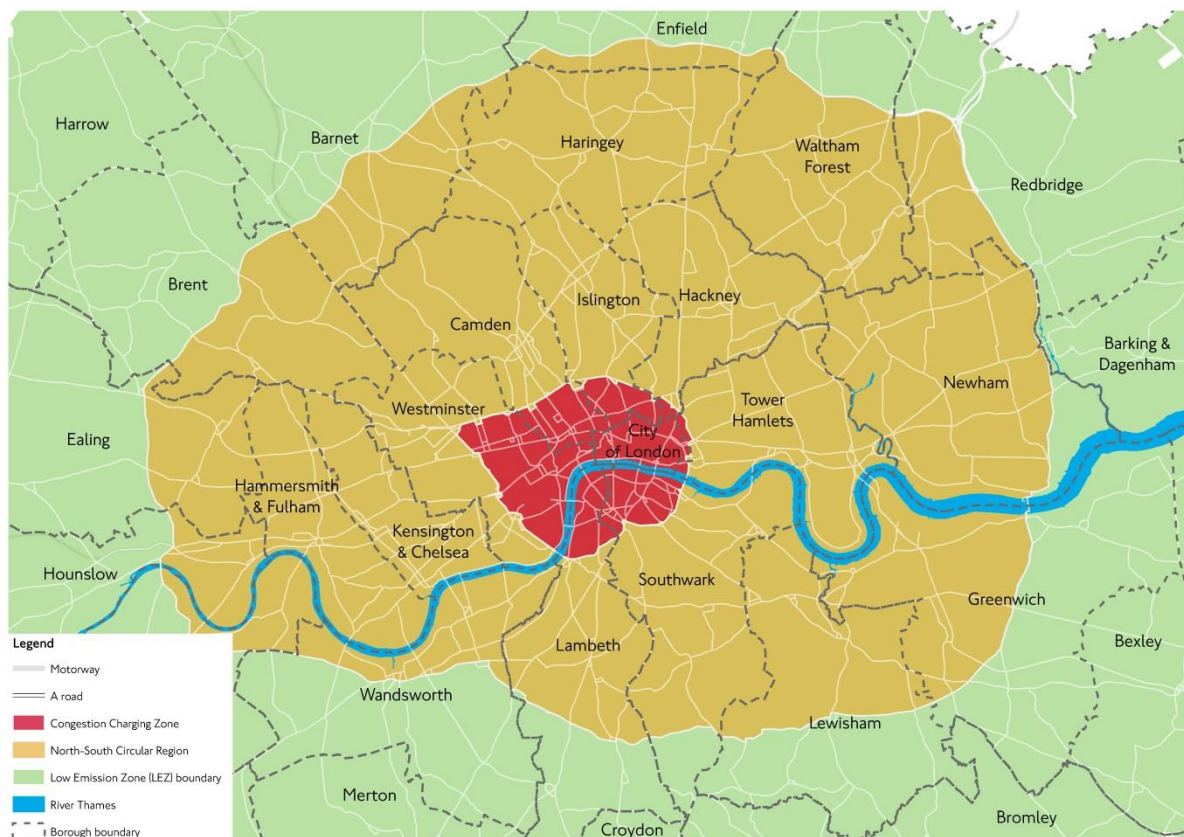
This section provides an overview of the potential impact of expanding the ULEZ to inner London. More detailed information on the benefits and impacts will be developed should the Mayor choose to proceed to a further consultation next year.

Any estimates provided will be refined as the policy develops and will be updated for the consultation in 2017.

### **6.2 Boundary**

An expansion of the ULEZ to inner London would see it cover the area up to, but not including, the North and South Circular Roads (A205 and A406). A precise boundary would be provided in the event of a consultation in 2017 and comments are welcome at this time. An approximate boundary is shown in Figure 21.

**Figure 21: Approximate boundary of a possible inner London ULEZ to the North and South Circular roads**



As with all road user charging schemes, consideration must be given to the most appropriate 'boundary route' for drivers opting to avoid the zone. This needs to be a good quality, clearly signed and easily navigable diversion that is simple to follow and understand. It is considered that the North and South Circular roads would provide the most appropriate boundary route for an inner London ULEZ and there would be no charge for using them.

Inner London contains areas with significant NO<sub>2</sub> levels where there is high population exposure to concentrations above health limits. It is estimated that if the ULEZ is introduced in 2020 as currently planned, this would fall by around 50 per cent in central London. Expanding the ULEZ zone would mean that significantly more people would benefit from improvements in air quality.

Including the North and South Circular roads in the extended ULEZ would mean they could not be used as diversion routes. Also, initial traffic modelling has indicated this would lead to diversions along less suitable residential roads.

Last year, we established a working group with the boroughs and London Councils on the technicalities of extending the ULEZ. While some stakeholders have requested an 'opt-in' scheme for the boroughs, the current consensus is that this would not necessarily provide a workable solution because of the need for a clear enforcement strategy and understandable diversion route away from the expanded zone. However, discussions are continuing and include looking at alternative boundary options.

Modelling of the currently planned ULEZ shows there will be benefits to locations outside its central London zone. This is because vehicles travelling through these areas, to access central London, will upgrade to meet the ULEZ standards. On the boundary route itself, the negative impacts will be low because the number of vehicles that use the route to avoid paying the charge will be offset by those who choose to take public transport instead or decide not travel at all.

Similarly, it is expected that any extension of the ULEZ to the North and South Circular roads would benefit outer London boroughs because of vehicles that travel in outer London to access inner London being upgraded to meet the ULEZ emission standard.

At a local level, there may be a few locations where emissions increase, but the net effect outside the zone is expected to be an overall reduction in emissions. Full highway assignment modelling would be carried out should the Mayor choose to proceed to a statutory consultation on the expansion of the ULEZ.

Although the North and South Circular are a defined strategic network of roads, we are aware that there are specific issues around the Woolwich Ferry, Wandsworth gyratory (in view of the proposed changes to Wandsworth town centre) and several other roads that cross, but do not join, the North Circular. If the principle of extending the zone to the North and South Circular roads is pursued, further boundary definition work with relevant stakeholders will begin. As with the London-wide LEZ, these detailed plans would be available as part of a statutory consultation.

### 6.3 Year of implementation

The Mayor is seeking views on the most appropriate implementation date for an inner London zone. In the stage 1 consultation, there was a strong preference for early implementation. To establish an appropriate date, we would need to look at balancing the numbers of vehicles affected and the cost of compliance and implementation with the need to take urgent action on air pollution and progress all other MTS objectives. Table 17 shows the estimated percentage of vehicle kilometres that would be affected in inner London across a range of launch years, assuming implementation of the previously agreed ULEZ in central London in 2020.

**Table 17: Proportion of affected vehicles (by kilometres driven) for different vehicle types and years of implementation**

	Petrol car	Diesel car	Car TOTAL	Van	HGV	Coach	Motorcycle
<b>2019</b>	15%	57%	34%	55%	29%	45%	17%
<b>2020</b>	10%	37%	22%	43%	19%	33%	13%
<b>2021</b>	8%	32%	19%	35%	15%	24%	9%
<b>2022</b>	6%	27%	15%	28%	12%	16%	6%
<b>2023</b>	4%	22%	12%	22%	9%	11%	4%

Table 18 shows the projected daily average number of vehicles that would not meet the ULEZ standards in inner and central London. Data is not currently available for the number of affected powered two-wheelers.

**Table 18: Estimated daily average number of vehicles that would not meet the ULEZ standards in inner and central London for different years of implementation**

	Petrol car	Diesel car	Car TOTAL	Van	HGV	Coach	TOTAL
<b>2019</b>	45,000	140,000	180,000	56,000	5,000	1,600	250,000
<b>2020</b>	30,000	90,000	120,000	44,000	3,300	1,100	170,000
<b>2021</b>	24,000	77,000	100,000	36,000	2,700	800	140,000
<b>2022</b>	17,000	64,000	81,000	29,000	2,100	600	110,000
<b>2023</b>	11,000	51,000	62,000	23,000	1,600	400	87,000

## 6.4 Charge level

We are currently looking at an appropriate charge level for an expanded zone and whether or not it should be in line with the existing agreed ULEZ charges.

In view of the significant increase in the size of the current zone, and fewer options for alternatives to private transport in some areas within the extended area, it may be that a lower level charge for non-compliant light duty vehicles in the inner zone (eg excluding the central zone) is appropriate. The increased complexity of multiple pricing levels, including whether it makes the scheme too confusing for customers, will need to be considered. More detailed investigation and stakeholder engagement on the impacts will form part of the development work for a statutory consultation in 2017.

## 6.5 Discounts and exemptions

We are also looking at the levels of discounts and exemptions that would be appropriate for a zone extended to inner London. The implication for the emissions savings from the central London ULEZ, and how the operation of the two areas might interact, will need to be taken into consideration.

## 6.6 Enforcement

We expect an expansion to the inner zone would mainly be enforced through Automatic Number Plate Recognition (ANPR) cameras, both static and mobile, similar to those used to enforce the Congestion Charge and LEZ. It is possible we would adopt the same payment channels as those used for the Congestion Charge scheme.

## 6.7 Indicative emissions impact

The emissions reductions resulting from changes in the age of the vehicle fleet would vary depending on when an inner zone is implemented. The sooner it is

introduced, the greater the benefits would be, then this would decrease in later years. This is because vehicles are naturally enhanced over time, so fewer need to be changed.

Figure 22 shows how the emissions savings from an inner zone are expected to change depending on the implementation year. A 40 per cent reduction in inner zone road transport NO<sub>x</sub> emissions is estimated if the zone is implemented in 2019 – equivalent to approximately 1,500 tonnes of NO<sub>x</sub>. If it was implemented in 2022, this would fall to around 900 tonnes, decreasing again in later years. The earlier implementations would have emissions benefits in subsequent years, up to around 2030.

Figure 22: Potential savings from an inner London ULEZ for different years of implementation

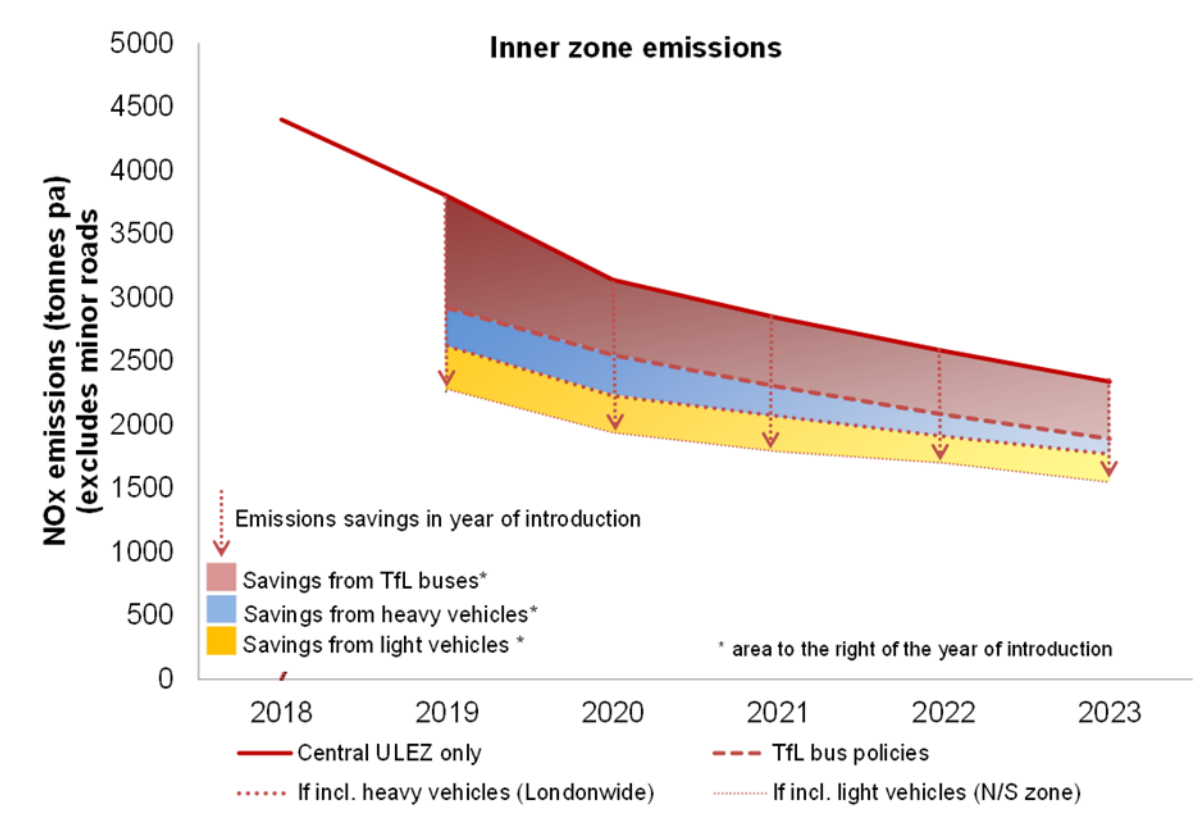


Figure 23 shows that reductions in NO<sub>x</sub> emissions from HGVs and non-TfL buses and coaches are greater than for cars and vans. This is because the Euro VI emissions standards for these vehicle types are already subject to on-highway verification of emissions testing, where the on road performance of the vehicle under real world driving conditions is measured. This has proven very effective in delivering significant NO<sub>x</sub> reductions. Similar regulations for light duty vehicles (known as Euro 6c) will be implemented from 2017 onwards. The relative contributions of different vehicle categories are similar in any year of implementation.



Figure 23: Percentage reduction in emissions of NO<sub>x</sub> by vehicle type – 2020

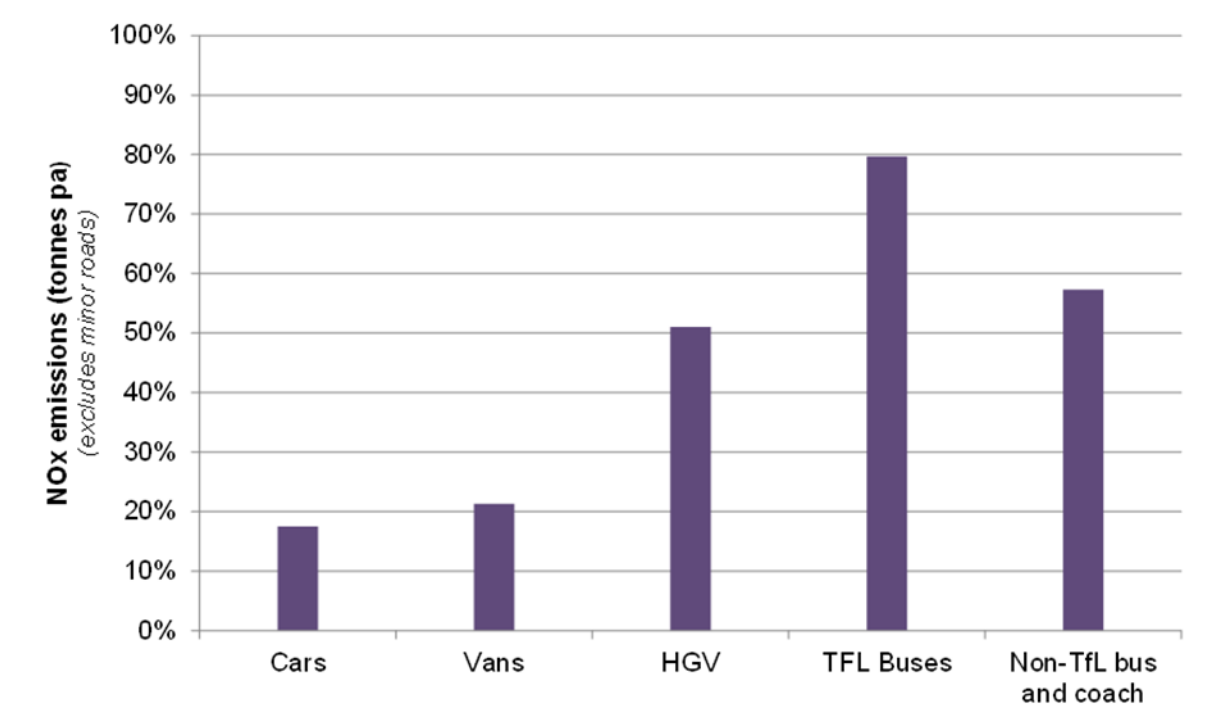
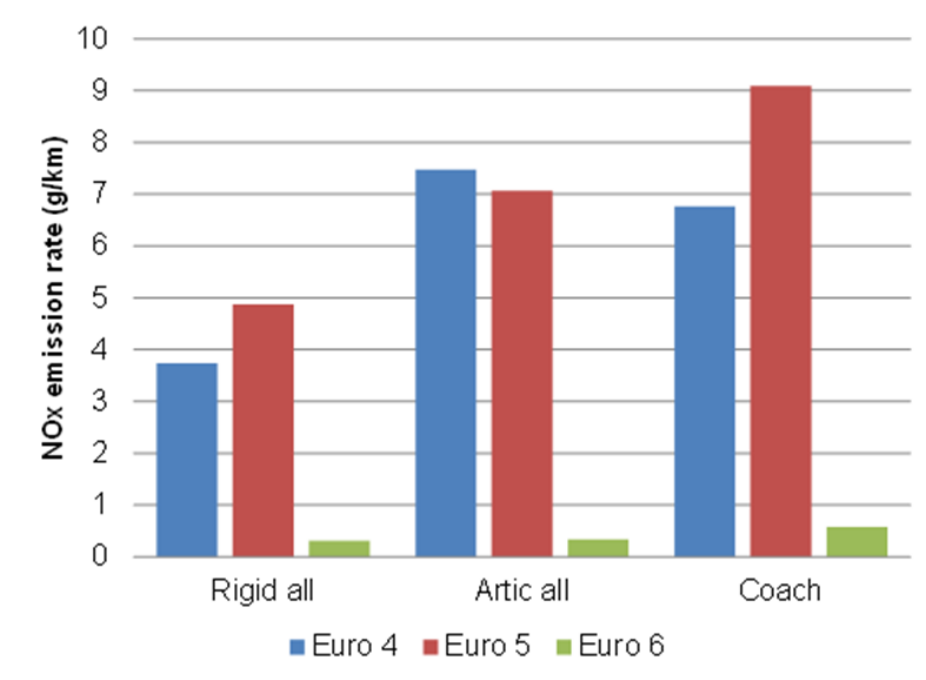


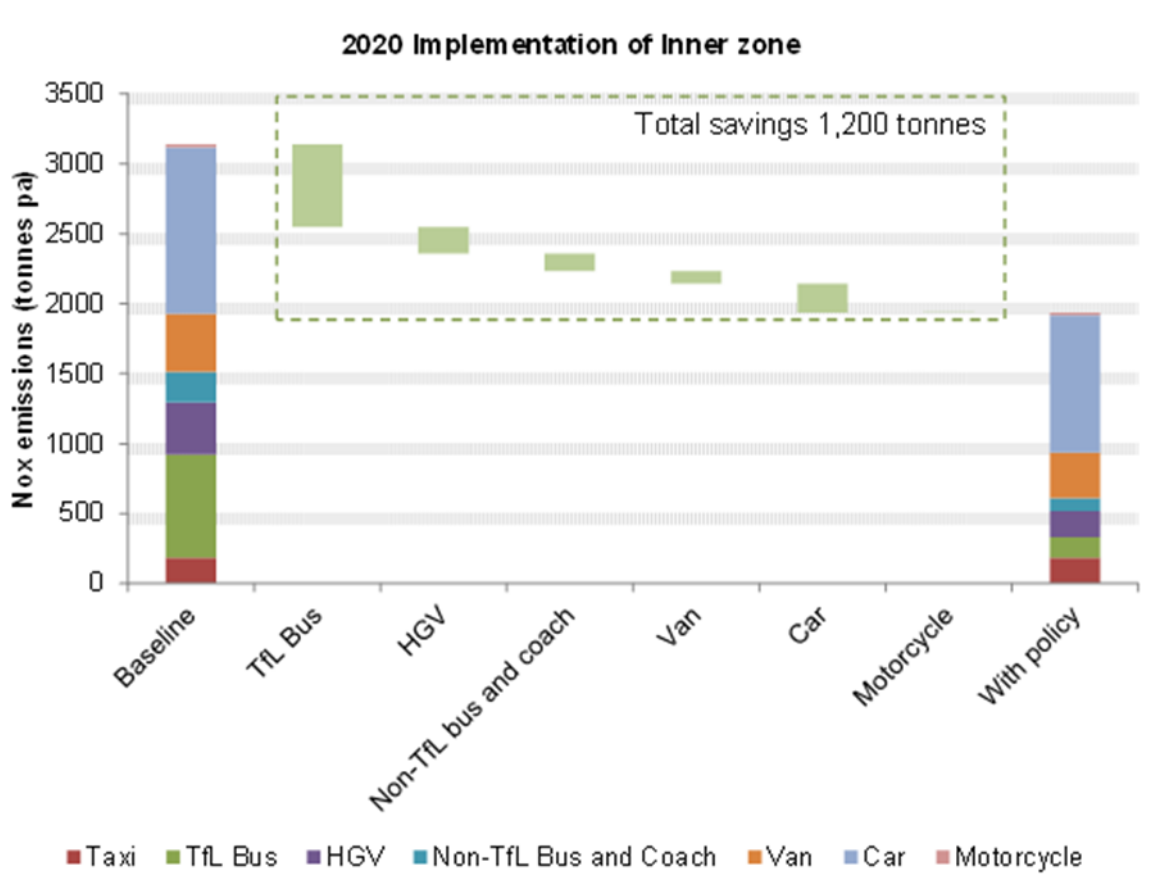
Figure 24 shows the trend in NO<sub>x</sub> emissions from rigid and articulated goods vehicles and coaches of Euro standards IV to VI. Euro VI, supported by on-highway verification of emissions, has demonstrated a substantial reduction in NO<sub>x</sub> emissions from these vehicle types. Emissions are reported on a grams per kilometre (g/km) basis.

Figure 24: The NO<sub>x</sub> emission rate for different types of heavy vehicles



Looking specifically at 2020, Figure 25 shows how the different vehicle categories are estimated to contribute to the overall road transport NO<sub>x</sub> emissions savings of 1,200 tonnes in the inner zone.

**Figure 25: Forecast emissions reductions by vehicle type from an inner London ULEZ introduced in 2020**



This pattern occurs in any year of implementation, although as illustrated by Figure 22 on page 64, the savings decrease in later years.

An earlier introduction of the zone also means people living in these areas will experience the air quality benefits sooner.

**Concentrations and health impact**

Expanding the ULEZ to the North and South Circular roads is expected to cut emissions from road transport significantly and widespread improvements in air quality are anticipated. Within the proposed inner zone, there are 254 primary schools, 57 hospitals and 84 care homes in areas exceeding legal NO<sub>2</sub> limits (based on 2013 data).

The impacts of air pollution can be expressed in monetary terms using damage costs. These are provided by Defra and offer an estimate of costs to society as a whole (including environmental, social and economic impacts) as a result of changes in emissions of different pollutants. These are estimated to range between £160m and £640m for a scheme implemented in 2020.

Subject to this consultation and ongoing feasibility work, further detailed estimates of damage costs details, NO<sub>2</sub> and PM concentrations and the resulting health impacts will be carried out ahead of a stage 3 statutory consultation in 2017. This work will take account of any additional guidance from Defra on monetisation of air pollution including PM.

## **Appendix A: Explanation of vehicle emissions standards**

The Euro standards are a range of successively tightening emissions controls founded in European directives that set limits for air quality pollutants from petrol, gas and diesel engines. Compliance with these limits must be demonstrated as part of the European type-approval process for new vehicles and road vehicle engines. There are also ‘durability’ requirements to demonstrate continued compliance in service.

Light duty vehicles (cars and vans) are subject to whole vehicle emissions testing, whereas engines for heavy duty vehicles (lorries and buses) are emissions tested on a test bench, prior to installation in any vehicle. They may subsequently be fitted to a variety of different vehicle types. For the latest Euro 6/VI emissions standards, these laboratory based tests are verified by an on-highway emissions testing of a completed vehicle.

The limit values are different for each vehicle type, and to indicate which is being referred to, there is a convention that suggests, for instance, that Euro 6 refers to cars and vans (whole vehicle emissions testing), while Euro VI refers to goods vehicles and buses (engine only emissions testing). In each case, the Euro standards set out emissions limits for type approval testing that control four ‘legislated’ emissions – carbon monoxide (CO), hydrocarbons (HC), oxides of nitrogen (NO<sub>x</sub>) and particulate matter (PM<sub>10</sub>).

Euro 1 appeared in 1992 and the standards have progressed to the current Euro 6/VI<sup>49</sup>. This became mandatory for all new heavy duty engines from January 2014 for goods vehicles and buses, September 2015 for cars and light vans, and September 2016 for larger vans up to 3,500kg gross vehicle weight.

Euro standards for motorcycles, mopeds, tricycles and quadricycles (collectively known as category L vehicles) were introduced later than for larger vehicles, with the current standard being Euro 3. In 2017, Euro 4 for category L vehicles will come into force.

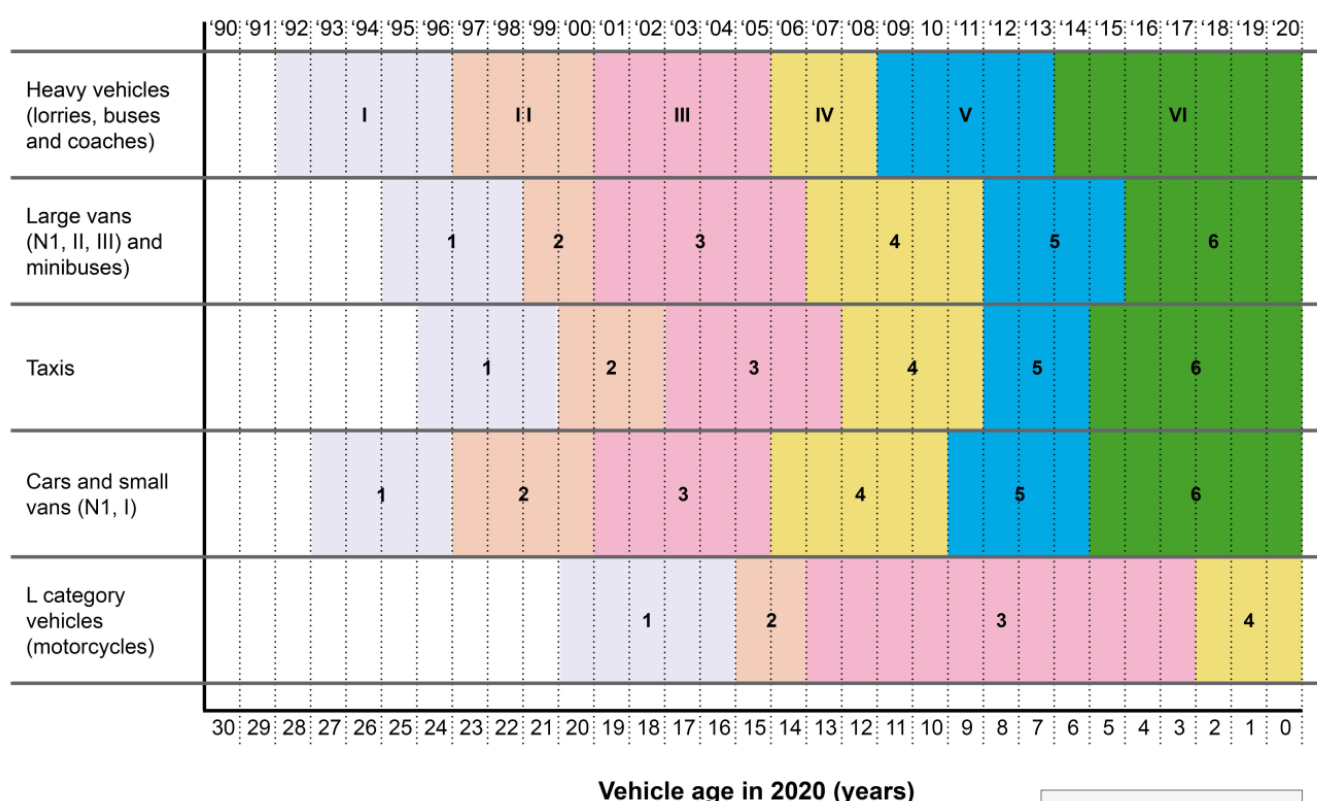
Detailed information for emission standards for light duty vehicles can be found at: <https://www.dieselnet.com/standards/eu/ld.php> and for heavy vehicles at: <https://www.dieselnet.com/standards/eu/hd.php>

The table below sets out the implementation dates for each Euro standard, which differ according to vehicle type, between 1990 and 2020.

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<sup>49</sup> Euro standards for heavy-duty diesel engines use Roman numerals (I–VI) and light-duty vehicle standards use Arabic numerals (1–6)

Year Euro standard introduced (1990 - 2020)



For NOx emissions, light duty vehicles (eg cars and vans) are based on grams per kilometre (g/km) and heavy duty vehicles are based on grams per kilowatt hour (g/kwh) because of the different ways these vehicles are tested. In addition heavy vehicles have both a 'steady state limit' and a 'transient limit'. These vehicles would need to comply with both limits for the ES and ULEZ.

For certain vehicle types, some early Euro standards did not set limits for all pollutants. In this case n/a is entered in the table below. This would mean that your vehicle is effectively compliant in terms of ES or ULEZ for that pollutant. For example, Euro 4 petrol vehicles do not have PM limits, therefore you only need to check if your NOx emissions meet the ES or ULEZ standard to know whether your vehicle is compliant. As described in the main document, TfL will provide a means of checking your vehicle, by entering your registration number, on the TfL website well before the schemes start.

The NOx and PM limits for Euro 4/IV and Euro 6/VI vehicles are summarised in the tables below. The vehicle weights included in brackets are the reference mass of the vehicle at the time of type-approval testing. An LGV category N1 is a light goods vehicle not exceeding 3,500kg maximum mass. An N2 LGV is a light goods vehicle not exceeding 12,000kg maximum mass. A heavy duty vehicle is a goods vehicle, bus or coach with a maximum mass greater than 3,500 kg.

### Euro 4 and 6 emission limits for light duty vehicles (g/km)

	NO <sub>x</sub>	PM
Euro 4 petrol (cars & LGV category N <sub>1</sub> Class 1 ≤ 1305kg)	0.08	n/a
Euro 4 petrol (LGV category N1 Class II 1305-1760 kg)	0.10	n/a
Euro 4 petrol (LGV category N1 Class III > 1760kg)	0.11	n/a
Euro 4 petrol (LGV category N2)	n/a	n/a
Euro 4 diesel (LGV cars & category N <sub>1</sub> Class 1 ≤ 1305kg)	0.25	0.025
Euro 4 diesel (LGV category N1 Class II 1305-1760 kg)	0.33	0.04
Euro 4 diesel (LGV category N1 Class III > 1760kg)	0.39	0.06
Euro 4 diesel (LGV category N2)	n/a	n/a
Euro 6 petrol (cars & LGV category N <sub>1</sub> Class 1 ≤ 1305kg)	0.06	0.005
Euro 6 petrol (LGV category N1 Class II 1305-1760 kg)	0.075	0.005
Euro 6 petrol (LGV category N1 Class III > 1760kg)	0.082	0.005
Euro 6 petrol (LGV category N2)	0.082	0.005
Euro 6 diesel (cars & LGV category N <sub>1</sub> Class 1 ≤ 1305kg)	0.08	0.005
Euro 6 diesel (LGV category N1 Class II 1305-1760 kg)	0.105	0.005
Euro 6 diesel (LGV category N1 Class III > 1760kg)	0.125	0.005
Euro 6 diesel (LGV category N2)	0.125	0.005

### Euro IV and VI emission limits for heavy duty vehicles (g/kwh)

	Steady-State		Transient	
	NO <sub>x</sub>	PM	NO <sub>x</sub>	PM
Euro IV	3.5	0.02	3.5	0.03
Euro VI	0.4	0.01	0.46	0.01

# Appendix B: Integrated Impact Assessment of the Emission Surcharge

## B1: Introduction

We are consulting on the introduction of an ES that would apply to certain vehicles in addition to the Congestion Charge.

The purpose is to discourage the older polluting vehicles from entering the zone in anticipation of the introduction of the ULEZ from 2020. It is a transitional scheme ahead of ULEZ, which would introduce tighter emission standards and operate 24 hours per day, seven days per week.

The ES is described in full in Part 2 of the main document. In summary, the proposal is that vehicles that do not meet the specified emissions standard would be required to pay a daily charge to drive in the Congestion Charging zone.

The ES would be in addition to the Congestion Charge (which would continue to be paid regardless of the vehicle's compliance with the emission standard, subject to other discounts and exemptions) and would follow the same operating hours, 07:00 to 18:00 Monday to Friday. The proposed charge is £10 for all vehicle types. The scheme includes discounts and exemptions for certain users or vehicle types which, with a couple of exceptions, will be the same as for the Congestion Charge.

This IIA has been produced to assess the likely impacts of the proposed ES on the following areas:

- Environment
- Health
- Equalities
- Economy and business

## **B2: Purpose and approach to the IIA**

This document includes an assessment of the proposed ES, outlining what the impacts could be, and the likely scale of these.

However, while this is not a statutory assessment, to ensure consistency the Variation Order has been assessed using a similar approach to that taken on impact assessments to support the MTS and consultations on the Congestion Charge and LEZ Scheme Orders.

The assessment sets out the current baseline conditions, in terms of the key topics – environment, health, economy and equalities – and outlines the alternatives that were considered, before looking in detail at the potential impacts of the preferred option.

It should be noted that this IIA contains only an assessment of the proposed ES. It does not cover other air quality initiatives outlined elsewhere in the consultation.

### **Structure of this appendix:**

- **Section B3** provides further background information on the development of the ES
- **Section B4** shows the methodology and scope of the assessment
- **Section B5** outlines the baseline information
- **Section B6** provides a summary of the assessment against each IIA objective
- **Section B7** summarises the key findings from the assessment



## This IIA and preceding related IIAs

This IIA should be understood in the context of the MTS IIA<sup>50</sup>, the ULEZ IIA (published in 2014)<sup>51</sup> and the subsequent IIA on the modified proposals for changes to taxi and PHV licensing in summer 2015<sup>52</sup>. In total, three IIA assessment documents on the original ULEZ were produced for TfL by Jacobs (consultants). This is set out in Table 19.

**Table 19: Overview of the consultations and IIAs undertaken by Jacobs for the ULEZ**

	Description of consultation	Dates of consultation	Integrated Impact Assessment
1	Consultation on the ULEZ	27 October 2014 to 9 January 2015	IIA summary report and four assessments: <ul style="list-style-type: none"> <li>• Environment (EA)</li> <li>• Equalities (EqIA)</li> <li>• Health (HIA)</li> <li>• Economy and business (EBIA)</li> </ul>
2		As above, but addendum made available in March 2015 as part of our report to the Mayor	Addendum 1 to the IIA (considers modifications to the proposal concerning pre-1973 vehicles and vehicles adapted for disabled people)
3	Modified proposals for changes to taxi and PHV licensing	1 July to 25 August 2015	Addendum 2 to the IIA

In producing this IIA, we have adopted various aspects of the assessments listed above. This ensures continuity and allows a holistic view of the impacts.

In structuring the assessment, Jacobs re-framed the objectives used in the IIA of the MTS to make them more specific to the ULEZ. The topics considered for each assessment, and their associated objectives, are set out in Table 20.

<sup>50</sup> <https://www.london.gov.uk/what-we-do/transport/transport-publications/transport-strategy-integrated-impact-assessment>

[www.london.gov.uk/sites/default/files/mts\\_ia\\_non\\_technical\\_summary.pdf](http://www.london.gov.uk/sites/default/files/mts_ia_non_technical_summary.pdf) and [www.london.gov.uk/sites/default/files/mts\\_ia\\_post\\_adoption\\_statement.pdf](http://www.london.gov.uk/sites/default/files/mts_ia_post_adoption_statement.pdf)

<sup>51</sup> <https://consultations.tfl.gov.uk/environment/ultra-low-emission-zone>

<sup>52</sup> <https://consultations.tfl.gov.uk/environment/ulez-2>

**Table 20: Overview of technical assessments carried out for the ULEZ**

<b>Assessment</b>	<b>Overview</b>
<b>Environmental</b>	Identifies and assesses the impacts across a range of environmental issues as a result of the ES. This includes air quality, noise, climate change, biodiversity, cultural heritage, landscape, townscape and the urban realm, material resources and wastes.
<b>Health</b>	Identifies and assesses the impact on the health and wellbeing of the population of Greater London, and the ability to access health-related facilities and services as a result of the ES. The assessment also addresses equalities issues so has some overlap with the EqIA.
<b>Equalities</b>	Identifies and assesses impacts on equalities issues, in particular those groups of people with protected characteristics or who are socio-economically disadvantaged.
<b>Economy and business</b>	Identifies and assesses impacts on London's economy as a result of the ES, the potential impacts on SMEs and the monetised health benefits of the scheme.

In this IIA for the ES, we have used the same assessment objectives as for the ULEZ. Essentially, the scheme is a precursor to the ULEZ with the same aims (see Table 21 on page 80 for a full list of IIA objectives). As for the previous IIAs, some topics have been scoped out because they will have no associated impacts as a result of the scheme (see section B4 and Table 22 on page 84).

The baseline information used in the most recent IIA has been updated. As outlined in Table 19, these assessments were carried out quite recently and remain mostly relevant. However, there are two pertinent developments to consider – the revised London Atmospheric Emissions Inventory (LAEI 2013) and an update from Defra of the Emissions Factors Toolkit.

The IIA only takes into account confirmed schemes, including the ULEZ from 2020. It does not include emerging proposals such as expanding the ULEZ or introducing it sooner.

## **B3: Development of the Emissions Surcharge**

### **Traffic charging schemes in London**

The Congestion Charge was introduced in 2003 in the central London zone, primarily to reduce traffic congestion. It also plays an important role in mitigating air pollution. The Western Extension Zone (WEZ) was added in 2007, but was subsequently removed in 2010 following a public consultation.

To address emissions from heavier vehicles, the LEZ was introduced in phases from 2008, and unlike the Congestion Charge its zone covers most of Greater London.

The ULEZ was developed and confirmed by the previous Mayor in March 2015. Covering the same area as the Congestion Charging zone, but operational 24 hours a day, it will be launched in September 2020. Non-compliant vehicles will be required to pay a charge in addition to the Congestion Charge (should it apply). For further details see Chapter 2 of the main document. The timeline for these various schemes is summarised below:

- **Congestion Charge** – introduced in February 2003
- **Western Extension Zone (WEZ)** – implemented in February 2007
- **LEZ** – began operating in February 2008
- **WEZ** – removed December 2010
- **ULEZ** – planned for September 2020

### **Options considered for the ES**

The option development process carried out for the ES can be grouped as follows:

- Geographical area
- Hours of operation
- Charging options
- Discounts and exemptions
- Emission standards

In developing the scheme, we set out to strike a balance between numbers and types of vehicles affected and emissions reductions, in the context of it being a 'transitional policy' in preparation for the ULEZ. A summary of the options assessment is provided below, followed by a description of the preferred scheme.

## **Geographical area**

Two geographical areas were considered:

- (a)** The existing Congestion Charging zone, for the following reasons:
- The proposed scheme needs to be established quickly
  - The zone is recognised by the public because it has been in place for a number of years and has been well publicised
  - Operating cost efficiencies can be achieved by using existing Congestion Charging infrastructure (such as ANPR cameras and signage) for enforcement
  - Exposure and levels of air pollution are greatest in central London. It is where most people visiting and living in the Capital are exposed to pollution on a daily basis
- (b)** A London-wide scheme that would achieve a higher overall emission saving. However, it would not be feasible to implement this by 2017 as there is not sufficient time to deliver the infrastructure needed to operate such a scheme

## **Hours of operation**

Two different enforcement periods were considered:

- (a)** 24 hours a day, seven days a week
- The existing London-wide LEZ is enforced 24 hours a day, seven days a week. This acknowledges the fact that vehicle emissions contribute to poor air quality regardless of when the vehicle is being driven
  - Full-time operating hours help ensure good levels of compliance for the LEZ, as does a high charge. However, the ES will require a relatively low charge if it is to be implemented soon (see the section on charge options below), so it is unlikely to be high enough to ensure similar levels of compliance to the LEZ. The other big difference between the two schemes is the LEZ targets heavy and commercial vehicles, so only these drivers will be used to paying a full-time charge. Many people who will pay the ES will only have had experience of the Congestion Charge, which operates during core working hours. Full-time charging would have a much greater impact
- (b)** 07:00 to 18:00, Monday to Friday
- The Congestion Charge is a well-established scheme, so people are familiar with the operating hours. Content on our website, road signage and third-party information (eg maps, satnav and guides to London) have all helped to establish them in users' minds. Particularly given the potentially short period between this consultation and the introduction of the ES, it is considered helpful to retain the same hours to increase driver awareness and compliance

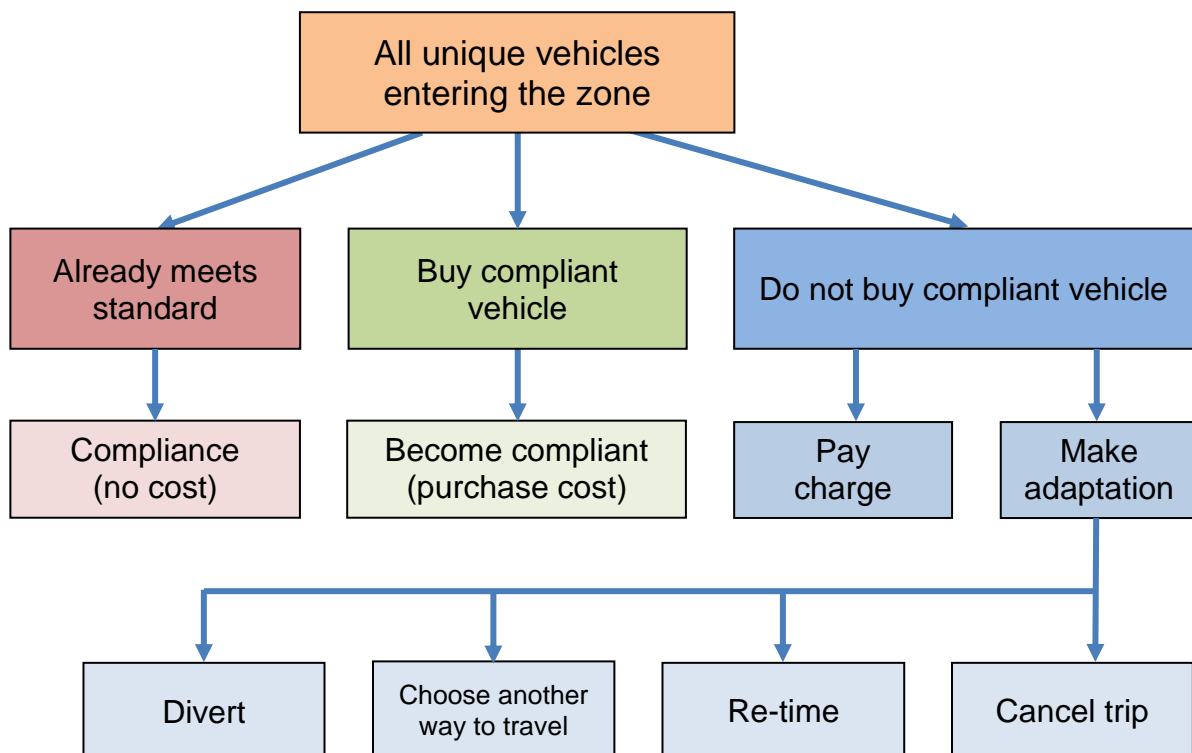
- Applying the ES standards during Congestion Charging hours would ensure the dirtiest, older polluting vehicles are charged or discouraged from driving into the zone when large volumes of people are present. The benefits are likely to be experienced at other times, and outside of the zone, as most journeys do not start and end exclusively within the area or during charging hours

### Charging options

Drivers of vehicles that do not meet the ES standard will need to pay a daily charge in addition to the Congestion Charge (if it applies to them) if they choose to drive within the zone. This would result in differing responses, depending on the level of the charge, from drivers of non-compliant vehicles (see Figure 26).

A flat daily charge for all non-compliant vehicles would apply for the ES, to make the scheme as easy to implement as possible and to mirror the Congestion Charge. This is not the case with the LEZ and the ULEZ, which have different charges depending on the type of vehicle, with heavier vehicles paying more.

Figure 26: Possible behaviours based on charging options



The following options for this flat charge were considered:

**(a) Low charge (£1 to £5)**

- A low charge of between £1 and £5 was considered. This would make it more affordable but may prove an insufficient deterrent. People who pay the Congestion Charge (currently £11.50) are unlikely to change their behaviour in response to such a small price increase. In addition, it would not send the right message, given the severity of the air quality problem. Also there would be a high administration cost of implementing a low charge relative to the revenue generated

**(b) Medium charge (£10)**

- This is similar to the ULEZ and would act as a good transitional charge before it is implemented. It would result in higher compliance, but is unlikely to affect the occasional, charge paying visitor, so would cause minimal disruption

**(c) High charge (£12.50 plus)**

- Compared with the low and medium options, a higher charge would increase compliance through drivers either upgrading their vehicle or adapting their trip (see Figure 26)
- A charge of £12.50 would be the same as the ULEZ for cars, and could therefore create confusion around the introduction of the scheme

### **Discounts and exemptions**

The options all involved keeping the same discounts and exemptions as the Congestion Charge to make it easy to understand (the full list of Congestion Charge exemptions is provided in Section 3.4 on page 36 of the main document). However, some minor variations were considered:

**(a) Same as the Congestion Charge**

- This makes the scheme easy to understand and will minimise the impact on vulnerable groups

**(b) As above, but include 9+ seater vehicles in the ES**

- In this option, 9+ seaters would be subject to the ES, but would remain exempt from the Congestion Charge. This is because they carry groups of passengers, so the use of these vehicles, as an alternative to passenger cars, cuts congestion. However, the objective of the ES is to reduce air pollution emissions. Nine+ seaters are commonly diesel powered with high fuel consumption, so tend to produce more emissions than many other vehicles

**(c) As above, but exclude historic and Showman vehicles in ES**

- These would be exempt from the ES but not the Congestion Charge. It was decided that this would be fairer as it is very difficult to retrofit these vehicles, making compliance unreasonable
- (d) As above, but give residents in the ES zone full exemption or a 90 per cent discount
- Residents have no choice but to travel within the zone so for the Congestion Charge and ULEZ, they have been given a 90 per cent discount. They do not drive more polluting vehicles than others, unlike the 9+ seaters. It was therefore decided the same discount should apply for the ES

### **Emission standards**

The options explored were:

- The same standards as the ULEZ scheme – Euro 4 for petrol and Euro 6/VI for diesel vehicles. Although this would keep it consistent with the ULEZ, it would greatly increase the cost of compliance for diesel vehicles, given how new the Euro 6/VI is and that it has only very recently been made available for light commercial vehicles in particular
- Euro 4 as the standard, regardless of fuel type. This is a simpler option and is easier to communicate, but it is less effective in regards to emissions savings. Given the limited time before implementation of the ES, this is considered the most reasonable approach

### **Preferred scheme taken forward**

The purpose of the ES is to discourage the older more polluting vehicles from entering the zone ahead of the ULEZ being introduced from 2020. It is a transitional scheme running 24 hours a day, seven days a week, and will introduce tighter emissions standards.

The proposed ES would operate in the same area, at the same times and on the same days as the Congestion Charge and would apply to vehicles that do not meet at least the Euro 4/IV emission standard for both NO<sub>x</sub> and PM. It would be a £10 charge for all non-compliant vehicles entering central London and would be in addition to the Congestion Charge.

It would follow similar exemptions and discounts to the congestion charge, but include 9+ seater vehicles, that currently do not pay the congestion charge, and exclude historic and showmans vehicles that currently do pay the congestion charge.

It is less stringent than the ULEZ and would affect far fewer vehicles. The principle of using the Congestion Charge to encourage drivers to choose the least polluting vehicles has already been established by the Ultra Low Emission Discount, which has been operating in various forms since the launch of the Congestion Charge.

The scheme also sends a strong signal that the Mayor is taking action on air quality now. It is building on the work carried out for the ULEZ, LEZ and Congestion Charging zone, and on people's awareness of those schemes. It would be put in place using existing Congestion Charging infrastructure, allowing for minimal implementation costs.

## B4: Methodology and scope of the IIA

### Approach to the IIA

The IIA for the ES is complementary to the full IIA carried out for the ULEZ.

The ES is a much smaller, lower impact scheme that applies only to vehicles that are driven through, or within, the Congestion Charging zone. It is for this reason that a full IIA has not been carried out. Instead, the impacts identified for the ULEZ have been used as a starting point. Consideration has been given to whether they will apply for the ES and to what degree, and whether there will be further impacts as a result of this new charge.

In this assessment, the baseline has been reviewed according to the topics presented in the ULEZ IIA, with further or more recent information added to determine whether the same IIA objectives still apply (see Table 21).

**Table 21: IIA objectives for the ULEZ and ES**

Assessment	IIA Topic	IIA Objective
<b>EA</b>	Air quality	To contribute to a reduction in air pollutant emissions and compliance with EU limit values
	Noise	To reduce disturbance from general traffic noise
	Climate change	To reduce CO <sub>2</sub> emissions and contribute to the mitigation of climate change
	Biodiversity including flora and fauna	To protect and enhance the natural environment, including biodiversity, flora and fauna
	Cultural heritage	To protect and enhance historic, archaeological and socio-cultural environment
	Water	To protect and enhance river spaces and waterways through planning and operation
	Material resources and waste	To promote more sustainable resource use and waste management
	Landscape, townscape and urban realm	To protect and enhance the built environment and streetscape
<b>HIA</b>	Health and wellbeing	To contribute to enhanced health and wellbeing for all within London
<b>EqIA</b>	Population and equality	To enhance equality and social inclusion
<b>EBIA</b>	London's economic competitiveness	Provide an environment that will help to attract and retain internationally mobile businesses
	SMEs	Support the growth and creation of SMEs



The scope of the assessment was determined (see further information below), then it was carried out by topic. A number of TfL colleagues with expert knowledge on health, environment, equalities and business impacts took part in a workshop in August 2016. The same individuals have reviewed the assessment and provided comments.

### **Scope of the IIA**

This section identifies the issues that will be included or excluded from the assessment. The following will be considered:

- IIA objectives in relation to the topic
- The relevant impacts of the ES on the topic
- The timeframe of the impact
- Whether the severity of that impact is likely to be minor positive, negligible positive, neutral, negligible negative or minor negative

Regarding the last point, the impact scale has been altered since the ULEZ IIA as the ES is expected to have far less impact, and for a much shorter time. No medium or major impacts were identified.

The scope includes impacts primarily within the Congestion Charging zone, but also across the whole of London. It considers the Capital's residents as well as other users, such as workers and visitors.

### **Environment**

The environmental assessment identifies potential positive and negative impacts of the proposed ES and provides a basis for exploring interrelated impacts from the other topics.

The ES IIA topics scoped into the environmental assessment are detailed in Table 22 and include:

- Air quality
- Noise
- Climate change
- Biodiversity
- Material resources and waste

The following topics were excluded and full justification can be found in Table 22

- Cultural heritage
- Landscape, townscape and urban realm
- Water and soil

## **Health**

The health assessment is a desk-based update to the ULEZ IIA assessment. It is not classed as a 'rapid' or 'comprehensive' Health Impact Assessment (HIA) and instead looks at the likely health effects of plans, programmes and projects. The impacts assessed relate to the health IIA objective, which is 'to contribute to enhanced health and wellbeing for all within London'.

The purpose of this high-level assessment is to help decision-makers understand the health impacts of the ES. It sets out to do this by:

- Highlighting practical ways to enhance the positive health, health equality and wellbeing effects of a plan
- Avoiding or reducing the negative health, health inequality and wellbeing effects

The scope of this assessment is based on recent legislation and policy changes that are relevant to the implementation of the ES. It also draws on our 'Improving the Health of Londoners' action plan, which was first published in 2014.<sup>53</sup>

## **Economic and business**

One of the Mayor's statutory roles, under Section 30 of the GLA Act, is to promote economic development and wealth creation in Greater London.

This assessment identifies the impact of the ES on the Capital's economy, as well as the potential effects on SMEs, and monetises the health benefits of the proposed scheme.

## **Equalities**

The Equality Act 2010 requires the Mayor to have due regard of the need to eliminate unlawful discrimination, harassment and victimisation. He must also advance equality of opportunity and foster good relations between people who share a protected characteristic and those who do not.

This may involve, in particular, removing or minimising any disadvantage experienced by people who share a relevant protected characteristic, taking steps to meet their needs, and encouraging them to take part in public life or in any other activity where their participation is disproportionately low, to tackle prejudice and promoting understanding.

The protected characteristics and groups that may experience particular barriers when accessing transport are listed below:

- Age
  - Younger (24 and under)
  - Older (65 plus)
- Disability

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<sup>53</sup> <https://tfl.gov.uk/corporate/about-tfl/corporate-and-social-responsibility/transport-and-healthcare>

- Marriage and civil partnership
- Race – black, Asian and minority ethnic (BAME)
- Religion and belief
- Socio-economic/ deprived groups
- Gender reassignment
- Pregnancy and maternity
- Sex
- Sexual orientation

At the workshop, it was felt that marriage and civil partnership, sex and sexual orientation, could be excluded as the proposal would not have any material impact on these groups.

**Table 22: Scope of the IIA**

Topic	Within scope	Out of scope
<b>Environment</b>		
<b>Air quality</b>	<ul style="list-style-type: none"> <li>- Reduction in the levels of NO<sub>x</sub> and PM in the Congestion Charging zone from the implementation of ES in advance of the ULEZ</li> </ul>	<ul style="list-style-type: none"> <li>- PM less than 10 microns in aerodynamic matter occur through the interaction of vehicle tyres with the road surface and from use of the braking system.</li> <li>- Emissions from outside the CCZ has been scoped out as there is a negligible change in emissions</li> </ul>
<b>Noise</b>	<ul style="list-style-type: none"> <li>- Potential impacts of engine noise levels within the Congestion Charging zone</li> </ul>	<ul style="list-style-type: none"> <li>- Owing to the low average speed within the zone where the ES will operate, noise from tyres and interaction with road surfaces has been scoped out of the assessment as it generally occurs at higher speeds. In urban areas noise is generally from engines</li> </ul>
<b>Climate change</b>	<ul style="list-style-type: none"> <li>- Potential for reduction in greenhouse gas (GHG), primarily CO<sub>2</sub>, being emitted within the Congestion Charging and ES zone</li> <li>- Potential for behavioural change as people affected by the scheme may seek alternative sustainable modes of transport</li> </ul>	<ul style="list-style-type: none"> <li>- Motor vehicles are predominantly powered by internal combustion engines that use petroleum based fuels like petrol and diesel. These vehicles also produce other GHGs in the form of methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O). However, these quantities are relatively small and beyond the scope of this assessment</li> </ul>
<b>Biodiversity</b>	<ul style="list-style-type: none"> <li>- There are no sites of importance for nature conservation (SINCs) within the Congestion Charging zone. The assessment will consider local nature reserves up to 1km from the boundary</li> </ul>	<ul style="list-style-type: none"> <li>- The Lee Valley Special Protection Area/Ramsar is more than 5km from the Congestion Charging zone. Epping Forest Special Area of Conservation (SAC) is more than 9kms away, while Wimbledon Common and Richmond Park SACs are also 9km away. As the changes in air quality levels are expected to be low, the potential impacts on these sites were considered to be neutral</li> </ul>
<b>Material resources and waste</b>	<ul style="list-style-type: none"> <li>- Potential for hazardous waste products including plastics, oil and batteries from the disposal of pre-Euro 4/IV vehicles</li> </ul>	<ul style="list-style-type: none"> <li>- Material resources include both primary raw materials such as fossil fuels, aggregates, minerals and secondary manufactured products as well as the production, sourcing, transport, handling, storage and use of materials. It is anticipated that the ES proposals will not have a significant effect on material resources so has been scoped out of the assessment</li> </ul>
<b>Cultural heritage</b>		<ul style="list-style-type: none"> <li>- Acid rain contributes to the deterioration of cultural heritage assets and the pollutants that are principally responsible for causing acid rain are sulphur dioxide (SO<sub>2</sub>) and nitrogen dioxides. However, potential impacts on cultural heritage assets have been scoped out as the likely level of air quality changes resulting in a reduction in SO<sub>2</sub> and NO<sub>2</sub> are not expected to be high enough to have a significant impact</li> </ul>
<b>Landscape, townscape and urban realm</b>		<ul style="list-style-type: none"> <li>- The proposed ES boundary is that of the Congestion Charging zone. We already have an extensive camera enforcement network along this boundary plus associated signage, which we plan to use to enforce the ES. This reduces the risk of additional impacts caused by new infrastructure needed to monitor vehicles entering and leaving the zone</li> <li>- The ES will not require additional signage as we will communicate the scheme via other means. Therefore, this topic has been scoped out</li> </ul>
<b>Water and soil</b>		<ul style="list-style-type: none"> <li>- <b>Soil:</b> It can be a sensitive receptor for air pollution. In the context of the urbanised London study area, and given the likely level of air quality changes anticipated, it was deemed that impacts to soil would be insignificant</li> <li>- <b>Water:</b> Given the nature of the potential ES proposals, no changes to water resources or water quality are expected. Variations, for example, that could arise in the amount of PM from vehicle exhaust emissions being washed into the watercourse, would be difficult to quantify and separate from other sources given the relatively small changes in PM that would result from the scheme</li> </ul>

Health		
<b>Air pollution</b>	- Potential impact on the health of Londoners and in particular those more susceptible to illness within the Congestion Charging zone	
<b>Noise</b>	- Impact of noise on community annoyance and disruption, and any measure to quantify adverse/beneficial health outcomes. Relates, in particular, to those more susceptible to illness	
<b>Active travel</b>	- Impact of the ES on the reduction of road vehicles and the potential increase in active travel	
<b>Crime reduction and community safety</b>	- Impact of the ES on crime and community safety	
Equalities		
<b>Age – (younger) 24 and under</b>	- Students who need to travel into or within the Congestion Charging zone for educational purposes (eg school trips could become unaffordable and are cancelled)	- Younger people in employment are likely to travel by public transport
<b>Age – (older) 65+</b>	- Older people who live outside the ES zone but access health and social care services within it	- Older people in employment are more likely to travel by public transport and would be eligible for a Freedom Pass
<b>Disability</b>	- Disabled people who live outside the ES zone but access health and social care services within it	- Disabled people will have a Blue Badge so would be exempt from the ES
<b>Marriage and civil partnership</b>		- Marriage and civil partnership has been scoped out as the scheme would not have any material impact on these groups
<b>Race (BAME)</b>	- The cost of complying with the ES may have a disproportionate impact on BAME businesses that use vans and commercial vehicles in central London. This is owing to their disproportionate representation in Greater London's retail and wholesale industry; a sector that frequently uses this type of vehicle	
<b>Religion and belief</b>	- Religious groups providing access to faith buildings within the Congestion Charging zone - There is a potential impact on groups that access recreational and social activities using minibuses or coaches operated and funded by charities or volunteers	
<b>Socio-economic/ deprived groups</b>	- People in lower socio-economic groups may be more likely to own an older vehicle with poorer emissions standards. They may also be more likely to work in lower income jobs and are reliant on a car for work-related travel - People living in deprived areas are more exposed to air pollution, often because their homes are situated close to roads with higher concentrations of emissions	
<b>Gender reassignment</b>		- Gender reassignment has been scoped out because the ES would not have any material impact on this group
<b>Pregnancy and maternity</b>	- Pregnant women may have a greater need to travel by car to work. They may also be more susceptible to illness, so may need to attend more medical appointments that could be within the Congestion Charging zone	
<b>Sex</b>	- Men could be more likely to drive older vehicles that are subject to the ES	
<b>Sexual orientation</b>		- Sexual orientation has been scoped out because the ES would not have any material impact on this group
Economy and business		
<b>London's economic competitiveness</b>	- Macro-economic impacts (eg overall impacts on London's attractiveness as a place to do business)	- Individual sectors owing to limited evidence and because most sectors of the economy, for instance financial and business services, do not depend on road transport to operate successfully
<b>SMEs</b>	- SMEs providing niche services within the proposed zone that are dependent on road transport	- SMEs in sectors such as financial and business services that have little dependency on road transport to operate successfully
<b>Health monetisation</b>	- Monetised health benefits as a result of the ES	

## **B5: Baseline**

This section presents baseline information, building on the data presented in the ULEZ IIA. When the baseline was established for the ULEZ, it was assessed to identify any key issues that were important, or critical, to the proposal. This fed into the development of the IIA objectives for the ULEZ.

For the ES, an updated version of the IIA baseline has been used, including revised issues and IIA objectives, where necessary.

### **Environment**

#### Air quality

Road transport is a major source of air pollution in London and the UK. Pollutants such as PM and NO<sub>x</sub> are considered harmful to human health and for PM there are no 'safe' levels (see Chapter 1 of the main document for further information). Pollution concentrations in London are influenced by local and regional factors, including sources outside of London.

Air quality is defined as the condition of the air with respect to the presence (or absence) of pollutants. Emissions from vehicle exhausts contain a number of pollutants including NO<sub>x</sub>, Carbon monoxide (CO), hydrocarbons, CO<sub>2</sub> and PM.

#### Climate change

This is one of the biggest challenges facing the UK and the world today. It poses many environmental risks, including extended periods of dryness and heat in the summer that could lead to drought, and heightened flood risk owing to more intensive and prolonged rainfall, particularly during the winter months.

Approximately 15 per cent of the Capital lies within identified flood risk zones. London is protected by a system of flood defence structures, including walls, gates and barriers. Around 1.5 million people live within these areas, which equates to approximately 500,000 properties.<sup>54</sup>

The main GHG is CO<sub>2</sub>, which accounted for 82 per cent of total UK GHG emissions in 2014. In the same year, UK net emissions of CO<sub>2</sub> were estimated to be 422 Megatonnes (Mt) (Department of Energy and Climate Change (DECC) 2016). Transport was responsible for 23 per cent of total UK GHG emissions in 2014.<sup>55</sup>

CO<sub>2</sub> emissions from road transport in Greater London were 6.6Mt in 2013 (2013 LAEI). This is currently forecast to decrease by 14 per cent by 2030<sup>56</sup>.

#### Noise

See the health baseline section for further information on noise.

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<sup>54</sup> ULEZ IIA Environment Assessment, October 2014, page 42

<sup>55</sup> DECC, February 2016, [www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-national-statistics-1990-2014](http://www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-national-statistics-1990-2014).

<sup>56</sup> LAEI 2013 <http://data.london.gov.uk/dataset/london-atmospheric-emissions-inventory-2013>

## Material resources and waste

In considering material resources and waste management, it is important to define when, under current legislation, a material is considered to be waste. The Waste Regulations (England and Wales) 2011<sup>57</sup> define it as any substance or objects that the holder discharges or is required to discharge.

London produced about 15 million tonnes of waste in 2012. The three main sources were households; commercial and industrial users; and construction, excavation and demolition activities.<sup>58</sup>

## Biodiversity

Biological diversity, or biodiversity, is the term given to the variety of life on Earth.<sup>59</sup> It is the variety within and between all species of plants, animals, fungi and micro-organisms and the ecosystems in which they live and interact. It performs a number of vital roles for humans, from maintaining the function of the biosphere as a whole, to providing food and medicine ingredients and enhancing health.

There are numerous statutory designated nature conservation sites and priority habitats within the GLA boundary. In addition, London's important wildlife sites are recognised by the GLA and London boroughs as SINCs. In total, more than 1,400 SINCs have been identified, covering nearly 20 per cent of the Capital.<sup>60</sup>

## Health

### Air pollution

People in the Capital are disproportionately affected by poor air quality compared with other parts of England<sup>61</sup>. The impact varies depending on each person's exposure and whether they have any underlying health conditions. Concerns about air quality may influence Londoners' travel choices, which could further affect their health.

Poor air quality is predominantly an issue in large, densely concentrated cities across the world. The Capital has a particularly acute problem because of its size and density. Inner and central London have greater concentrations of NO<sub>2</sub> than outer London.

Long-term exposure to air pollution can contribute to the development of chronic diseases and increase the risk of respiratory illness. Traffic-related air pollution exacerbates asthma and there is evidence that suggests it causes the onset of childhood asthma, impaired lung function, cardiovascular disease and premature death. In addition, there is growing evidence showing that prenatal exposure to air pollution is associated with issues including

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<sup>57</sup> Defra, May 2014, [www.gov.uk/guidance/waste-legislation-and-regulations](http://www.gov.uk/guidance/waste-legislation-and-regulations)

<sup>58</sup> GLA, [www.london.gov.uk/what-we-do/planning/london-plan/current-london-plan/london-plan-chapter-five-londons-response/policy-516-waste-net-self](http://www.london.gov.uk/what-we-do/planning/london-plan/current-london-plan/london-plan-chapter-five-londons-response/policy-516-waste-net-self)

<sup>59</sup> LU Biodiversity Action Plan 2010: Connecting Nature, <https://tfl.gov.uk/corporate/about-tfl/natural-environment>

<sup>60</sup> GLA, Biodiversity, [www.london.gov.uk/what-we-do/environment/parks-green-spaces-and-biodiversity/biodiversity](http://www.london.gov.uk/what-we-do/environment/parks-green-spaces-and-biodiversity/biodiversity)

<sup>61</sup> CMO Guidelines Annual Report, September 2014, [www.gov.uk/government/publications/chief-medical-officer-cmo-annual-report-public-mental-health](http://www.gov.uk/government/publications/chief-medical-officer-cmo-annual-report-public-mental-health)

low birth weight, intrauterine growth retardation and an increased risk of chronic diseases in later life.

London currently complies with all legal air quality requirements (called 'limit values') except for NO<sub>2</sub>, which exceeds these limits across much of inner London, as well as in the vicinity of Heathrow and near major roads in outer London. Meeting the NO<sub>2</sub> limit poses a huge challenge for many cities in the UK and across Europe.

However, while formal compliance has been achieved for PM<sub>10</sub> there are no 'safe' levels, as even low concentrations have an impact on human health. It is, therefore, important to continue reducing levels as any decrease will result in benefits.

People who live or work near busy roads face a particularly high risk of exposure to the harm caused by air pollution. The same is true of those who spend longer in motor traffic. Evidence suggests that pollution enters into cars and does not disperse, therefore exposing car passengers to higher levels of air pollution than cyclists or pedestrians. In addition, cyclists and pedestrians are able to use quieter streets with lower traffic volumes, which are less heavily polluted. Also the benefits from active travel generally outweigh health risks from air pollution, which is not the case if you are sitting in a car.<sup>62</sup> Individuals living in more deprived areas are frequently exposed to higher concentrations as their homes are situated close to roads. Deprived communities also suffer more instances of death and sickness linked to air pollution, and people face more adverse health effects at the same level of exposure compared with those from less deprived areas. This is partly because they are more likely to have underlying cardio-respiratory and other diseases.

It is important to re-state that neither the ES nor any of the alternative options set out in this document would, on their own, achieve compliance with the limit values in the year they are introduced. However, even with the changes set out here, each proposal should be understood in the context of other actions that can be taken.

## Noise

This is defined as 'unwanted sound and vibration that causes disturbance' and is an important part of determining quality of life in the Capital. Sound levels or vibration from transport, such as train and vehicle movements, construction works or public announcements, can affect people who work or live close to transport.

The main source of ambient noise in London is road traffic, followed by rail. Vehicle noise is created by tyres interacting with the road as well as the noise from engines, exhaust systems and brakes. In urban areas, most vehicle noise comes from engines because, at low speed, it is greater than the noise generated by tyres and road surfaces.

Noise can be associated with health impacts such as sleep disturbance, stress, anxiety, high blood pressure and poor mental health in adults. It can affect school performance and cause cognitive impairment in children. Some groups, for instance younger people, are differentially affected by noise, particularly at night, as they spend more time in bed than older people.

Generally, Londoners do not seem to be affected by noise, with 81 per cent saying that it was not a problem at all or not much of a problem. Counter to this, there are a significant

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<sup>62</sup> Tainio, M., et al., Can air pollution negate the health benefits of cycling and walking?, *Prev. Med.* (2016)



minority of Londoners that are experiencing noise as a problem. Antisocial behaviour is seen as the biggest problem, with almost 3 in 10 citing this as a problem, while around a quarter think road traffic noise or noise from crowds is a problem.<sup>63</sup>

#### Active travel

People's travel choices can have a significant effect on their health; if they aren't travelling actively – for instance walking or cycling – as part of their daily routine, they are unlikely to be getting the exercise they need.

Lack of physical activity is one of the biggest threats to the health of Londoners. Staying active helps prevent a wide range of illnesses, including heart disease, stroke, depression, type 2 diabetes and some cancers. Physical inactivity has been identified as the fourth leading risk factor for mortality, causing an estimated 3.2 million deaths globally. If the entire population of London became more active, there would be 4,104 deaths avoided (18.2 per cent of total deaths in a year<sup>64</sup>).

Obesity is highest among people in routine and manual occupations, who are often also living in areas of London with the poorest health and deprivation indicators. Childhood obesity is a particular concern; between 2014 and 2015, 37 per cent of 10 to 11-year-olds were classified as overweight or obese (compared to 58 per cent of adults between 2012 and 2014).<sup>65</sup>

The Chief Medical Officer guidelines recommend 150 minutes of moderate-intensity aerobic physical activity each week, in periods of 10 minutes or more. This includes brisk walking and cycling.<sup>66</sup> On average, 34 per cent of adults in London achieve two 10-minute periods of active travel a day.<sup>67</sup>

#### Crime reduction and community safety

The transport system in London is a safe, low crime environment – the risk of becoming a victim of crime while travelling on the network is now at its lowest recorded level.<sup>68</sup>

Significant reductions have been seen in both the rate and volume of crime, with the number of offences recorded in 2014/15 down by 8.2 per cent on 2012/13 figures. The rate of crime dropped to seven per million passenger journeys in 2014/15, down from 7.6 in 2013/14. Between 2008/09 and 2014/15, overall reported crime on the network fell by 44 per cent.

Theft remains the highest volume crime on public transport, accounting for 40 per cent of all offences.<sup>69</sup>

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<sup>63</sup> Talk London Noise Survey, March 2016.

<sup>64</sup> Public Health England (PHE), [www.apho.org.uk/resource/view.aspx?RID=123459](http://www.apho.org.uk/resource/view.aspx?RID=123459)

<sup>65</sup> Public Health England, Public Health Outcomes Framework, [www.phoutcomes.info/public-health-outcomes-framework#page/0/gid/1000042/pat/6/par/E12000007/ati/102/are/E09000002](http://www.phoutcomes.info/public-health-outcomes-framework#page/0/gid/1000042/pat/6/par/E12000007/ati/102/are/E09000002)

<sup>66</sup> Department of Health (DH), [www.gov.uk/government/publications/uk-physical-activity-guidelines](http://www.gov.uk/government/publications/uk-physical-activity-guidelines)

<sup>67</sup> TfL, Travel in London – Report 8, 2015, <https://tfl.gov.uk/corporate/publications-and-reports/travel-in-london-reports> (page 182)

<sup>68</sup> TfL, Travel in London – Report 8, 2015, <https://tfl.gov.uk/corporate/publications-and-reports/travel-in-london-reports> (page 116)

The latest motor vehicle crime figures for London suggest the total has risen in recent years. In 2013/14, there were more than 20,000 recorded incidents categorised as ‘theft/taking of motor vehicle’ but this increased slightly to 22,045 in 2014/2015 and 22,233 in 2015/16. However, there has been a reduction in the number of recorded incidents in the boroughs located within the Congestion Charging zone.<sup>70</sup>

## **Equalities**

Baseline data for equalities has been compiled from a wide range of sources, including the 2011 Census and our London Travel Demand Survey, Travel in London 8 report and our Understanding our Diverse Communities document published in 2015.

This section will consider the distribution of people with protected characteristics and socio-economically deprived communities, focusing specifically on central London.

### **Population size**

The London boroughs that lie at least partly within the Congestion Charging zone are Lambeth, Southwark, Westminster, Camden, Tower Hamlets, Hackney, Islington, and the City of London.

The Congestion Charging zone is primarily a financial and commercial area, but has approximately 220,000 residents. This equates to just over two per cent of the total population of Greater London. The resident population in the City of London is 7,375, although there are an additional 360,075 people during work days.

### **Age profile**

Under the Equalities Act 2010, the relevant protected groups in this category are younger people (defined as under 25) and older people (65+).

The Congestion Charging zone has a smaller proportion of residents aged under 18 than Greater London as a whole. In 2011, there were approximately 32,000, which represented 17 per cent of the total population of the zone. In Greater London, 22 per cent of people were under 18. The number of younger Londoners (under 25) is predicted to increase by approximately nine per cent by 2020 and 16 per cent by 2025.

The proportion of people aged 65 and over is lower in the Congestion Charging zone than in Greater London. In 2011, around nine per cent of people living in the zone were over 65 compared with 11 per cent in Greater London. However, this age group is predicted to increase by approximately 19 per cent by 2020 and 31 per cent by 2025.

Across the UK there has been an increase in the number of people holding driving licences, particularly young people. Seventy-four per cent of all adults aged 17 and over in England held a full car driving licence in 2015, a rise from 48 per cent in the mid-1970s. This equates to 32 million licence holders.

While the number of both men and women holding a licence has increased, the rate has been much greater among women. For men, the proportion has been flat since the mid-

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<sup>69</sup> TfL, Crime and incident bulletins, <https://tfl.gov.uk/corporate/publications-and-reports/crime-and-incident-bulletins>

<sup>70</sup> Metropolitan Police, Crime Mapping, <http://maps.met.police.uk/tables.htm>

1990s (80 per cent in 2015). Among women, it has continued to rise, reaching 68 per cent in 2015.<sup>71</sup>

### Disability

The 2011 Census revealed that 13 per cent of those living in the Congestion Charging zone (22,886 people) reported a long-term health problem or disability that limited their day-to-day activities. This was slightly lower than for London as a whole (14 per cent).

Approximately six per cent (10,743) of people living in boroughs located wholly, or in part, in the Congestion Charging zone, had a long-term health problem or disability that limited their day-to-day activities a lot. This is compared with seven per cent London-wide.

**Table 23: People with a reported long-term health problem or disability limiting their day-to-day activities**

	Day-to-day activities limited a lot	Day-to-day activities limited a little
<b>Total number</b>	10,743	12,143
<b>Percentage of total in ES zone</b>	6.0%	6.8%
<b>Percentage of total in London</b>	6.7%	7.4%

The proportion of zone residents who receive Employment and Support Allowance (ESA) is 1.77 per cent of the population, which is similar to the figure for all of London (1.73 per cent), but lower than inner London (two per cent).

**Table 24: People receiving ESA**

Borough/zone	Percentage of total population receiving ESA
<b>Boroughs that lie at least partly in the Congestion Charging zone</b>	1.77%
<b>Inner London</b>	2.01%
<b>Outer London</b>	1.63%
<b>All London</b>	1.73%

### Marriage and civil partnership

This topic has been scoped out of the IIA because the ES is not expected to have any impact (see Table 22 on page 84).

<sup>71</sup> DfT, National Travel Survey: England 2015, <https://www.gov.uk/government/statistics/national-travel-survey-2015>

## Race: BAME

Evidence suggests that minority groups often experience lower economic status and associated physical health issues, which may be a result of discrimination, levels of education, or even language barriers. The 2011 Census reported considerable variation in the representation of different ethnic groups across the boroughs that are, at least in part, within the Congestion Charging zone. BAME people are expected to make up 51 per cent of the population by 2041.

Evidence from the original ULEZ EqIA suggests a significantly higher proportion of London's Asian community are business owners in the wholesale and retail business. In 2007, 23 per cent of all businesses in London were in the wholesale and retail sector, compared to 39 per cent of Asian-owned businesses.<sup>72</sup>

## Religion and belief

Most of the Congestion Charging zone residents according to the 2011 Census are Christian (43 per cent). The only other commonly found religion in the area is Islam, at 11 per cent. More than a quarter of people living in the zone are of no religion and 13 per cent have not stated a religion. All other religions combined account for less than six per cent of the population.

There are some differences in religion between those living in the zone and London residents as a whole. Most noticeably, more people say they have no religion.

## Socio-economic/deprived groups

The Indices of Deprivation 2015 are the Government's primary measure of deprivation for small areas in England (known as Lower Super Output Areas or LSOAs).

The main one is the Index of Multiple Deprivation (IMD), which provides measures across seven distinct aspects of deprivation. The IMD2015<sup>73</sup> data shows that:

- Overall, London is less deprived, compared with other parts of the country, than was the case in IMD2010
- The most deprived 20 per cent of England includes 22.5 per cent of the Capital
- While the pattern of deprivation is more dispersed than in 2010, the most deprived areas are still in inner London – Hackney, Islington and Westminster, as well as Haringey and Tower Hamlets
- The City of London is the only local authority area in the Capital with no LSOAs in England's most deprived 20 per cent

## Pregnancy and maternity

The number of births in England has risen substantially during the past decade, from just over 600,000 in 2000 to just under 700,000 in 2015. London has the highest General

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<sup>72</sup> GLA Economics, Asian Business Report, <https://www.london.gov.uk/what-we-do/business-and-economy/business-and-economy-publications/asian-business-report>

<sup>73</sup> GLA Intelligence, English Indices of Deprivation 2015 – <http://data.london.gov.uk/dataset/indices-of-deprivation-2015/resource/ce3afc23-78ce-4df5-b035-96bb06b0a2e2#>

Fertility Rate in England, with 129,685 live births in 2015 (defined as the number of live births per 1,000 women aged between 15 and 44).<sup>74</sup>

## Sex

At an individual level, car ownership by age and gender present a slightly different picture:

- On average, 46 per cent of men and 34 per cent of women have access to a car in London
- Forty-eight per cent of women hold a driving licence, a lower proportion than among men (60 per cent)
- Across all age bands, car ownership is lower among women, with this gap increasing beyond the age of 40
- Women are less likely than men to have household access to a car – 37 per cent compared with 33 per cent of men

## Sexual orientation and gender reassignment

This topic has been scoped out of the IIA because the ES is not expected to have any impact on it (see Table 22 on page 84).

## Economy and business

The Central Activity Zone (CAZ) is the Capital's geographic, economic and administrative core. It only covers two per cent of London's total area, and is home to less than four per cent of its population. It does, however, contain almost a third of the Capital's jobs and is the most economically productive part of the UK.

Employment in the CAZ and Isle of Dogs is expected to grow substantially, owing in particular to the expansion of the office-based business services sector, as well as more jobs in the retail and leisure services. At present, almost 800,000 people commute into London for work and this is estimated to grow to more than a million by 2036.

Inner London is an important economic hub for both the Capital and the UK. It can compete with key cities across the globe and is an important international and domestic visitor attraction.

The long-term picture of population and employment growth points to the following trends and challenges:

- Increased levels of commuting into and within London requiring better access
- Rising demand for services and adverse impacts on business productivity from congestion
- Greater concentrations of transport connections will be required in the CAZ, owing to high levels of employment

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<sup>74</sup> Office of National Statistics, birth summary tables, [www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/livebirths/datasets/birthsummarytables](http://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/livebirths/datasets/birthsummarytables)

## SMEs

Private sector businesses are unevenly distributed across the UK. Based on head office locations, London and the South East have considerably more than any other county or region.

In London, SMEs represent a large and important section of industry. At the start of 2015, there were 974,375, which equated to 99.85 per cent of all businesses in the Capital. Of these, 96 per cent were micro-businesses and three per cent were small businesses, with medium businesses making up just one per cent.<sup>75</sup> SMEs account for 51.8 per cent of all employment in London. However, they face many challenges that can impact their performance and growth potential eg retaining top talent, lack of appropriately skilled staff and regulatory pressures.

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<sup>75</sup> A micro-business has zero to nine employees and includes unregistered businesses. A small business has 10–49 employees and a medium business has 50–249 employees

**B6: Assessment outcomes**  
**Table 25: IIA assessment for ES**

**KEY**

Minor positive
Negligible positive
Neutral (no change)
Negligible negative
Minor negative

Topic	IIA objective	Relevant impacts identified	Assessment and scale of impact
<b>Environment</b>			
<b>Air quality</b>	To contribute to compliance with limit values and a reduction in air pollutant emissions and	<ul style="list-style-type: none"> <li>- Around seven per cent of vehicles that travel into the Congestion Charging zone daily will be affected by the ES</li> <li>- It will lead to an approximate three per cent reduction in NO<sub>x</sub> from road transport in central London (if all non-compliant vehicles stopped entering the zone), delivering a minor improvement in air quality. For some vehicle categories, this rises to nine per cent. See section 3.10 on page 45 of the main document for further detail</li> <li>- The ES will lead to some reduction in PM emission. See 3.10 on page 45 of the main document</li> <li>- The ES is a strong signal from the Mayor and shows he is tackling air quality, removing older polluting vehicles and ensuring the 'polluters pay'</li> </ul>	Minor positive
<b>Noise</b>	To reduce disturbance from general traffic noise	<ul style="list-style-type: none"> <li>- The ES will encourage some car owners to upgrade (although the charge level is unlikely to be high enough to convince many HGVs and 9+ seater operators to do the same). Newer vehicles tend to be quieter, so the scheme will result in a minor reduction in noise emissions from road vehicles</li> <li>- The impacts of the ES are anticipated to be positive in terms of noise. Further reductions in noise could be achieved through complementary schemes, such as investment in walking and cycling</li> </ul>	Negligible positive
<b>Climate change</b>	To reduce CO <sub>2</sub> emissions and contribute to the mitigation of climate change	<ul style="list-style-type: none"> <li>- The scheme will lead to a negligible reduction in the amount of GHGs emitted in London as there could be minor decreases in traffic. The impact on CO<sub>2</sub> has not been quantified, but expert judgement considers it to have a negligible positive benefit</li> <li>- The scheme is likely to encourage behavioural change as some people will seek alternative modes of transport or switch to low/zero emission vehicles</li> </ul>	Negligible positive
<b>Biodiversity</b>	To protect and enhance the natural environment, including biodiversity, flora and fauna	<ul style="list-style-type: none"> <li>- Owing to the distance of designated sites from the Congestion Charging zone, combined with the minor changes in air quality levels, the scheme is unlikely to have any impact on local designated sites within the scope of the assessment</li> </ul>	Neutral (no change)
<b>Material resources and waste</b>	To promote more sustainable resource use and waste management	<ul style="list-style-type: none"> <li>- The ES could result in a minor impact on sensitive receptors, owing to the disposal of non-compliant vehicles. This would include an increase in the disposal of hazardous waste from various components, such as batteries, engine oil and plastics. However, disposal of these vehicles is unlikely to be significant and would involve older vehicles that are close to being replaced anyway. The vast majority of the disposal would be managed through licensed vendors</li> </ul>	Negligible negative
<b>Cultural heritage</b>	To protect and enhance the historic, archaeological and socio-cultural environment	<b>Scoped out</b>	
<b>Landscape, townscape and urban realm</b>	To protect and enhance the built environment and streetscape	<b>Scoped out</b>	
<b>Water and soil</b>	To protect and enhance river spaces and waterways through planning and operation	<b>Scoped out</b>	
<b>Health</b>			
<b>Air pollution</b>	To contribute to enhancing health and well-being for all within London	<ul style="list-style-type: none"> <li>- With the anticipated impact on air quality being 'minor positive', a similar improvement is expected in air pollution related health. However, the extent of this will depend on where, geographically, any air quality improvement becomes apparent, and which sensitive receptors will no longer be exposed to higher levels of NO<sub>x</sub> or PM</li> <li>- As this scheme affects just seven per cent of vehicles entering the Congestion Charging zone, the anticipated reduction in air pollution is low, and it was felt that air quality concentration modelling would not produce any significant results. However, the ES is an important transitional scheme ahead of the ULEZ, which will have a much greater impact on air pollution</li> </ul>	Negligible positive

		<ul style="list-style-type: none"> <li>- The likely reduction in NO<sub>x</sub> emissions from road transport could be up to three per cent, and from this we can assume there could be a negligible positive impact on health associated with improvements in air quality</li> </ul>	
<b>Noise</b>		<ul style="list-style-type: none"> <li>- A very small improvement in noise emissions is expected as a result of the ES. However, much like the air quality association with health, it depends on where the exposure is reduced. Modelling would not result in any useful results as the changes would be very small and well within the margin of error. It is, however, assumed there could be a negligible positive impact on health associated with reductions in noise</li> </ul>	Negligible positive
<b>Physical activity</b>		<ul style="list-style-type: none"> <li>- A small increase in physical activity could result from some people moving from car use to more active travel, for instance walking, cycling</li> <li>- Ahead of the ULEZ the ES will send a strong signal that older vehicles have a negative environmental and financial impact, therefore the scheme will encourage the uptake of cleaner vehicles and encourage people to walk and cycle in the zone.</li> </ul>	Negligible positive
<b>Crime reduction and community safety</b>		<ul style="list-style-type: none"> <li>- With the anticipated impact on air quality being 'minor positive', a similar improvement is expected in air pollution related health. However, the extent of this will depend on where, geographically, any air quality improvement becomes apparent, and which sensitive receptors will no longer be exposed to higher levels of NO<sub>x</sub> or PM</li> <li>- As this scheme affects just seven per cent of vehicles entering the Congestion Charging zone, the anticipated reduction in air pollution is low, and it was felt that air quality concentration modelling would not produce any significant results. However, the ES is an important transitional scheme ahead of the ULEZ, which will have a much greater impact on air pollution</li> <li>- The likely reduction in NO<sub>x</sub> emissions from road transport could be up to three per cent, and from this we can assume there could be a negligible positive impact on health associated with improvements in air quality</li> </ul>	Neutral
<b>Equalities</b>			
<b>Age – (younger) 24 and under</b>	To enhance equality and social inclusion	<ul style="list-style-type: none"> <li>- Young people may be affected as the charge could apply to school minibuses that are used for trips including educational, curriculum-based activities. The charge is likely to be passed on to parents so could result in some withdrawing permission for their child to participate if it becomes unaffordable. This links with the protected group below (socio-economic/deprived groups). It could be argued that the charge is not high enough to make any material impact</li> <li>- It is recommended that further research is carried out ahead of further emission-based road user charging schemes</li> <li>- Younger people, in particular those who are very young and more vulnerable to illness, will benefit from improved air quality, although this will be minor</li> </ul>	Neutral
<b>Age – (older) 65+</b>		<ul style="list-style-type: none"> <li>- Older people who attend more medical appointments could be disproportionately affected if their appointments require them to travel into the Congestion Charging zone, meaning they need to pay the charge. There is currently an NHS compensation scheme available that allows people to apply for a refund on the Congestion Charge if they have to attend a medical appointment, so it is vital this is extended to the ES to help minimise the impact</li> <li>- Older people, in particular those who are very old and more vulnerable to illness, will benefit from improved air quality as a result of the scheme, although this will be minor</li> </ul>	Neutral
<b>Disability</b>		<ul style="list-style-type: none"> <li>- Disabled people may also have a greater need to attend medical appointments and if these take place within the Congestion Charging zone, may have to pay the additional charge (if they don't have a Blue Badge)</li> <li>- Disability is a broad term, and includes many people who do not qualify for a Blue Badge, for example those with long-term illness. The NHS reimbursement scheme for travel to appointments should be extended to the ES so this group is not disproportionately affected (this is already proposed in section 3.9 on page 44 of the main document)</li> <li>- There are, however, other non-medical journeys that disabled people may also need to make to and from the zone</li> <li>- Disabled people who have modified their vehicle accordingly are exempt from vehicle tax, the Congestion Charge and the future ULEZ. To reduce the impact on this group, it is important to extend this to the ES</li> <li>- Disabled people, in particular those with certain illnesses, will also benefit from improved air quality, although this will be minor</li> </ul>	Neutral
<b>Marriage and civil partnership</b>		<b>Scoped out</b>	
<b>Race (BAME)</b>		<ul style="list-style-type: none"> <li>- There is evidence to suggest the ES may have a disproportionate impact on BAME businesses using vans in central London</li> <li>- BAME groups are disproportionately represented in Greater London's retail and wholesale industry, a sector that makes frequent use of vans that may be eligible for the charge</li> <li>- It is recommended that further research is carried out on this ahead of further emission-based road user charging schemes</li> </ul>	Negligible negative
<b>Religion and belief</b>		<ul style="list-style-type: none"> <li>- The ES may negatively affect some religious groups who attend worship sessions within the Congestion Charging zone, where they are transported by minibuses or coaches that are not compliant and incur the ES</li> <li>- Some religious groups organise social and religious trips using minibuses and coaches and these will be affected by the ES in a similar way to school trips for younger people</li> </ul>	Negligible negative
<b>Socio-economic/deprived groups</b>		<ul style="list-style-type: none"> <li>- People in lower socio-economic groups are more likely to own cheaper, older vehicles, so will be disproportionately affected by the ES</li> <li>- In addition, there is a higher likelihood that their jobs require them to travel by car, so they, or the business they work for, are more</li> </ul>	Negligible negative



		<p>likely to be affected than the average person</p> <ul style="list-style-type: none"> <li>- Lower socio-economic groups tend to suffer the worst air quality. The deprived wards are exposed to 41% higher concentrations of NO<sub>2</sub> than those people living in average wards. Therefore, those wards could benefit more from the improvement in air quality and noise<sup>76</sup></li> <li>- There could be a negative impact on access to work for some, eg out of hours plumbers, but with so few vehicles affected, this is not expected to be significant</li> </ul>	
<b>Gender reassignment</b>		<b>Scoped out</b>	
<b>Pregnancy and maternity</b>		<ul style="list-style-type: none"> <li>- Pregnant women may have a greater need to travel to work by car as public transport can be very uncomfortable, especially during peak times. Therefore, they may be disproportionately impacted, although the number of people affected would be very low</li> <li>- Pregnant women are more vulnerable to illness, so will also benefit from improved air quality, although this will be very minor</li> </ul>	Negligible negative
<b>Sex</b>		<ul style="list-style-type: none"> <li>- As more men drive into the Congestion Charging zone, it is likely they will be disproportionately affected by the ES, but this is no different from any other charging scheme</li> </ul>	Negligible negative
<b>Sexual orientation</b>		<b>Scoped out</b>	
<b>Economic and business</b>			
<b>London's economic competitiveness</b>	Provide an environment which will help to attract and retain internationally mobile businesses	<ul style="list-style-type: none"> <li>- The promotion of clean air is good for London's international image as a 'green' and 'clean' city. Air quality improvements and the subsequent health benefits will make the Capital a more attractive city for businesses and tourists. It may increase its scores on benchmarking lists such as the 'Cities Index'</li> <li>- At the macro level, the financial burden of the ES is not expected to cause any material negative impact on London's businesses</li> </ul>	Negligible positive
<b>Small to medium sized enterprises (SMEs)</b>	Support the growth and creation of SMEs	<ul style="list-style-type: none"> <li>- For businesses, the cost of having to upgrade vehicles or pay the charge could be a financial burden. This will most likely affect small businesses with lower margins. Some companies that operate with a number of older vehicles or vans could be disproportionately affected</li> <li>- It is apparent that there is a relatively small amount of vans (four per cent) and HGVs (six per cent)<sup>77</sup> not meeting the Euro standard proposed for the ES</li> <li>- The estimated compliance cost in 2017 is £3,000 for a 10-year-old van and from £5,000 to £7,000 for an HGV. This will decrease over time as costs depreciate – by 2020 the amount will drop by approximately 50 per cent. Further details on compliance costs for other vehicles are provided in Table 13 on page 48</li> <li>- Most of the minibus-type vehicles are irregular visitors. Some may be running scheduled services, including inter-company shuttles and airport to hotel transfers. There may be a small impact on limousines, but it is likely that these vehicles will be operating outside the ES hours</li> <li>- Many small businesses rely on LGVs (eg vans) and HGVs to carry out their business activity. However, the ES will only affect four per cent of these vehicles already entering the zone</li> <li>- Some industries will benefit from retrofitting or purchasing new vehicles. Newer vehicles tend to be more efficient, especially after considering fuel consumption and future air quality standards</li> </ul>	Minor negative
<b>Health monetisation</b>		<ul style="list-style-type: none"> <li>- The health benefits of implementing the ES will depend on the response to the charge. If non-compliant vehicles stopped entering the zone, it could lead to health benefits in the region of £5m over three years<sup>78</sup>. If all non-compliant vehicles were upgraded to Euro 6, the health benefits would drop to around £2m over three years. In reality, not all vehicles will make such a change and a proportion will simply pay the charge, so the actual benefits are likely to be lower than this</li> </ul>	Negligible positive

<sup>76</sup> Securing the future: Delivering UK sustainable development Strategy (2005) HM Government, The Stationery Office.

<sup>77</sup> These percentages are based on the LAEI (which is 24 hours) and may overestimate for charging hours

<sup>78</sup> These calculations have been made using Defra's central estimates in their updated guidance

## **B7: Summary of the key findings**

As shown in Table 25, in the previous section, the proposed ES will have a minor positive impact London-wide in the short term, particularly when considering the contribution towards environmental and health objectives. There were a few 'negligible negative' impacts identified, as well as one that was considered to be 'minor negative' in relation to SMEs, owing to the cost of upgrading vehicles or paying the charge.

The purpose of the ES is to act as a stepping stone ahead of the full introduction of the ULEZ (see section 3.8 on page 43), when tighter vehicle emissions standards will come into force. It is clear that, with this scheme, the Mayor intends to take action quickly on air quality.

### **Positive and neutral impacts of the ES**

- It will lead to a minor improvement in air quality, particularly in central London
- There may be a further indirect reduction in CO<sub>2</sub> through a small drop in traffic
- The scheme would improve how the Capital is perceived nationally and internationally as a 'green' and 'clean' city
- It is likely to reduce noise as some drivers may switch to compliant vehicles, which generally have quieter engines
- There will be a positive effect on the economy as a result of improved health and reduced impacts on the NHS. The monetised health outcomes are estimated to be between £2m and £5m over three years

### **Negative impacts**

- Waste materials would be produced from the disposal of non-compliant vehicles
- It may have a differential impact on some equality groups, although these are expected to be negligible
- The cost of compliance would mean economic disadvantage for some SMEs as well as private coach and minibus drivers
- There could be a negligible negative impact on groups who rely on charitable or voluntary services that operate 9+ seater vehicles, such as minibuses, as these will be subject to the ES

### **Issues raised by the assessment**

We are proactively seeking ways to mitigate the potential impacts of the ES. This includes:

- Using existing Congestion Charging zone infrastructure (eg ANPR cameras and signage) so that the scheme is easier to understand and is seen as an extension of the Congestion Charge
- Investment in public transport, walking and cycling

- Carrying out a study, and lobbying the Government, in relation to a diesel scrappage scheme
- Promoting the OLEV grant, which helps businesses with a UK address to reduce the cost of purchasing an ultra low emission vehicle<sup>79</sup>

The IIA has also identified research that could help determine the impacts of future emissions-based charging schemes. These include:

- The effects on BAME groups to see whether impacts would be disproportionate
- The effects on young people, in particular their school and sporting activities

The following should be considered to increase the benefits of the ES:

- Early and proactive engagement and communication of the scheme
- Lobbying for financial assistance at a national level to help small businesses upgrade to compliant vehicles (as well as a diesel scrappage scheme)
- Encouraging the use of, and investment in, public transport, cycling and walking to enhance the health benefits caused by a reduction in air pollution and noise

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<sup>79</sup> OLEV, [www.gov.uk/government/organisations/office-for-low-emission-vehicles](http://www.gov.uk/government/organisations/office-for-low-emission-vehicles)

# Glossary

**Air pollutants:** Generic term for substances emitted that have adverse effects on humans and the ecosystem

**Auto Pay:** Auto Pay is an account system that allows drivers to register with TfL and pay the congestion charge automatically each month via direct debit or payment card

**ANPR (Automatic Number Plate Recognition):** A system which uses cameras to identify vehicles from their licence plates

**CC, CCZ – Congestion Charge, Congestion Charging zone:** An area in central London where a daily charge (£11.50) applies to vehicles using the zone Monday to Friday, 07:00 to 18:00

**CO<sub>2</sub> (carbon dioxide):** Principal greenhouse gas related to climate change

**CCMES (Mayor's Climate Change Mitigation and Energy Strategy):** Statutory document outlining the Mayoral plans to reduce CO<sub>2</sub> emissions and encourage renewable energy

**Limit values:** Legal maximum levels of atmospheric concentrations of air pollutants

**Economic Business Impact Assessment (EBIA):** Assessment that identifies and assesses impacts on London's economy as a result of the Emissions Surcharge, the potential impacts on small to medium sized enterprises (SMEs) and the monetized health benefits of the scheme.

**Environment Impact Assessment (EIA):** Assessment that Identifies and assesses the impacts across a range of environmental issues as a result of the Emissions Surcharge including: air quality, noise, climate change, biodiversity, cultural heritage, landscape, townscape and the urban realm, material resources and wastes.

**Euro standards:** Standards set by the European Union for maximum emissions of air pollutants for new vehicles sold within EU member states. They range from Euro 1–6 for light vehicles, with 6 being the most recent and Euro I–VI for heavy vehicles

**EV (electric vehicle):** Vehicle which uses an electric motor for propulsion. Includes both pure electric vehicles that run solely from batteries and plug-in hybrid electrics that have an attached petrol or diesel engine to power the battery engine

**Equality Impact Assessment (EqIA):** Assessment that identifies and assesses impacts on equalities issues, in particular those groups of people with protected characteristics or are socio-economically disadvantaged.

**Greenhouse gas:** Gases that absorb heat, contributing to climate change. The most significant of which is CO<sub>2</sub>

**Health Impact Assessment (HIA):** Assessment that Identifies and assesses the impact on the health and well-being of the population of Greater London and the ability to access health-related facilities and services as a result of the Emissions

Surcharge. The assessment also addresses equalities issues and thus has some overlap with the EqIA.

**HGV (heavy goods vehicle):** Type of truck weighing >3.5T

**Integrated Impact Assessment (IIA):** The IIA identifies and assesses the impacts and the likely effects on equality, the economy, environment and the economy arising from the proposed Emissions Surcharge

**LAEI (London Atmospheric Emissions Inventory):** Database of emissions sources and information about rates of emissions for air pollutants emitted within and around London

**LEZ (Londonwide Low Emission Zone):** A charging zone across most of Greater London for vehicles that do not meet emissions standards for PM<sub>10</sub>

**LGV (light goods vehicle):** Also known as Light Commercial vehicle. Vehicles designed and constructed for the carriage of goods and weighing less than 3.5T

**MAQS (Mayor's Air Quality Strategy):** Statutory document outlining the Mayor's plan to reduce air pollution

**NO<sub>x</sub> (nitrogen oxides):** A generic term for nitrogen dioxide (NO<sub>2</sub>) and nitrogen monoxide (NO), which can form NO<sub>2</sub> in the atmosphere. Euro standards set limits for vehicles emissions of NO<sub>x</sub>

**NO<sub>2</sub> (nitrogen dioxide):** A gas formed by combustion, identified as an air pollutant harmful to human health. The European limit values measure concentrations of NO<sub>2</sub> in the air

**OLEV (Office for Low Emission Vehicles):** Cross governmental office set up to support the development of the low emission vehicle sector

**PHV (private hire vehicle):** Licensed vehicles that are available for hire on a pre-booked basis. Also known as minicabs

**Plug-in hybrid:** A vehicle which combines conventional internal combustion and electric propulsion with the batteries charged from an electric power source.  
**PM (particulate matter):** A mixture of various solid and liquid particles of various chemical compositions suspended in the air

**PM<sub>10</sub> (particulate matter <10 microns in diameter):** Particulate matter that is harmful to human health and subject to EU limit values

**PM<sub>2.5</sub> (particulate matter <2.5 microns in diameter):** The smallest and most harmful form of particulate matter; also subject to EU limit values

**Sensitive receptors:** Sensitive receptors include, but are not limited to, hospitals, schools, daycare facilities, elderly housing and convalescent facilities. These are areas where the occupants are more susceptible to the adverse effects of exposure to toxic chemicals, pesticides, and other pollutants.

**Taxi (black cab):** A specialist vehicle licensed by TfL to ply for hire in London. Most taxis are licensed to carry five passengers although some are licensed to carry six

**VED (Vehicle Excise Duty):** Annual charge levied for vehicles to use the public highway. Banded according to engine size or CO<sub>2</sub> emissions

**Zero emission capable vehicle (ZEC):** A vehicle that is constructed to be capable of operating in zero emission mode for at least part of its operating cycle. The zero emission mode may be augmented by an internal combustion engine configured to extend the driving range of the vehicle, either by propelling the driven wheels or by powering an on-board generator