

A BREATH OF FRESH AIR

A BETTER APPROACH TO
IMPROVING LONDON'S
AIR QUALITY



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CONTENTS

Introduction	1
Current situation	1
Mayor's proposals	3
Air Quality and Health	4
Costs and Practicalities	6
'ULEZ Plus': An Alternative Approach	9
1. Strengthen plans for cleaner bus routes	9
2. Freight Consolidation Plans	10
3. Electric Vehicle Hire	10
4. Loan scheme for converting taxis to LPG	11
5. Extension of the boiler scrappage scheme	11
6. Diesel scrappage scheme	12
Recommendations	13
Appendix I	14
Feedback	15

INTRODUCTION

In confronting the serious issue of improving London's air quality, the Mayor should be looking at how to get the biggest bang for his buck. In other words how to achieve the largest possible reduction in emissions of harmful nitrogen dioxide (NO₂) and other pollutants with the smallest possible cost to Londoners. Unfortunately, as this report will demonstrate, that is not the approach Mayor Khan has taken. Rather, in pushing for a massive expansion of the planned Ultra Low Emission Zone (ULEZ), he has chosen an option that will cost taxpayers hundreds of millions of pounds, damage business and disadvantage Londoners for a relatively marginal improvement in air quality.

The Mayor has also made some sensible suggestions alongside his misconceived idea of an expanded ULEZ. This report will assess his proposals, making clear their benefits and disadvantages. It will set out an alternative 'ULEZ Plus' approach, combining the central London ULEZ that had been planned by the previous Mayoral administration with a raft of additional measures that are better targeted at London's pollution hotspots. This would make up an ambitious but deliverable programme to radically improve London's air quality that would be quicker to implement, cheaper for the taxpayer and more effective for Londoners than Mayor Khan's plans.

CURRENT SITUATION

London's air quality is better now than it was in 2008. Overall, between 2008 and 2013, NO₂ concentrations fell by 12.6%, with the particulates PM₁₀ and PM_{2.5} falling by 8.4% and 13.2% respectively.¹ That may seem surprising and, by itself, it does not eliminate the possibility of hotspots with particularly poor air quality within an overall picture of improvement. However just less than a year since the end of Boris Johnson's mayoralty, it is a fact that is worth remembering.

One reason for the improvement was the phased introduction of the Low Emission Zone (LEZ) from 2008. Although the LEZ had some flaws, with no exemptions for vehicles that had a truly minimal impact on London's air quality such as horse boxes and motor homes, it proved invaluable in setting minimum emissions standards for lorries, minibuses and vans as well as, from January 2012, London's buses. Similarly, measures such as taxi age limits have also been designed to improve London's air quality.

None of which is to argue that the improvement was all down to actions taken by the previous Mayor, that his record on improving air quality was flawless, or that the status quo is acceptable. London needs – and Londoners deserve – better air quality, with lower emissions and a significant reduction in pollution, especially from harmful nitrogen dioxide (NO₂) and particulate matter (PM₁₀). Indeed the previous Mayor recognised this need, which is why he planned to introduce the Ultra Low Emission Zone (ULEZ).

The original version of the ULEZ was due to be introduced from 7th September 2020 using precisely the same boundaries as the Congestion Charge Zone (CCZ). However unlike the CCZ, the ULEZ would have applied all the time. It would have required all vehicles driving in central London to meet new exhaust emission standards, with any vehicle that failed to meet these standards paying a daily charge in order to drive within the zone.

1. *Cleaner Air for London: Progress report on the delivery of the Mayor's Air Quality Strategy*, TfL, 2015, p8

In particular, all cars and vans must would have to meet 'Euro 4' engine standards for petrol and 'Euro 6' for diesel or pay a £12.50 daily charge. This would affect any petrol vehicle that is currently more than 10 years old, or any diesel vehicle that is currently more than 1 year old. A full list of vehicle standards and charges is set out below²:

Vehicle Type	Proposed Emissions standard	Date from when manufactures must sell new vehicles meeting the emissions standards (usually a year earlier for early adopters)	Maximum age of vehicle by 2020**	Charge if vehicles is not compliant with the ULEZ standard***
Motorcycle, moped etc	Euro 3	From 1 July 2007	13 Years	£12.50
Car and small van	Euro 4 (petrol) Euro 6 (diesel)	From 1 January 2006 From 1 September 2015	14 Years 5 Years	£12.50
Large van and minibus	Euro 4 (petrol) Euro 6 (diesel)	From 1 January 2007 From 1 September 2016	13 Years 4 Years	£12.50
HGV	Euro VI	From 1 January 2014	6 Years	£100
Bus/Coach	Euro VI	From 1 January 2014	6 Years	£100

The ULEZ would include additional requirements for TfL buses, taxis (black cabs) and private hire vehicles (PHVs)³:

- A requirement that all taxis presented for licensing from 2018 would need to be zero emission capable, with zero emission requirements for PHVs to be phased in from 2018
- A reduction in the age limit for all non-zero emission capable taxis from 2020 from 15 to 10 years (irrespective of date of licensing)
- Investment in the TfL bus fleet so that all double deck buses operating in central London will be hybrid and all single deck buses will be zero emission (at source) by 2020.

It is not suggested that the previous Mayor's ULEZ would have solved the problems of London's air quality. It is clear that it was an idea that needed to be built upon. However it represented a strong foundation and there was ample opportunity for a new Mayor to build upon.

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

3. Ibid

MAYOR'S PROPOSALS

On 5th July, Mayor Sadiq Khan unveiled a number of proposals as a response to London's air pollution. These were as follows⁴:

- Implementing a £10 Emissions Surcharge (dubbed the 'T-charge') on the most polluting vehicles entering central London from 2017. The charge would apply to all vehicles with pre-Euro 4 emission standards (broadly speaking those registered before 2005) and will cost an extra £10 per day on top of the existing Congestion Charge.
- Introducing the central London Ultra-Low Emission Zone one year earlier in 2019
- Extending the Ultra-Low Emission Zone ('ULEZ') beyond central London from 2020: for motorcycles, cars and vans, to the North and South Circular; and for lorries, buses and coaches London-wide
- Developing a detailed proposal for a national diesel scrappage scheme for Government to implement
- Bringing forward the requirement for all double-deck buses to be ULEZ-compliant in central London from 2020 to 2019
- Implementing clean bus corridors – tackling the worst pollution hotspots by delivering cleaner buses on the dirtiest routes

The Mayor's proposals include some worthwhile and sensible measures. For example the plan to bring forward the date at which double-deck buses should be ULEZ-compliant should have a positive impact, although it is also worth noting that such measures can be undertaken without requiring a ULEZ.

Clean bus corridors and a diesel scrappage scheme, both of which build on the previous Mayor's efforts are certainly worth pursuing. Indeed, as noted later in the report, these should be implemented with greater urgency and as part of a coherent approach.

However this package of measures is undermined by the Mayor's highly flawed proposals, especially the expansion of the ULEZ, to the extent that it would be very difficult to claim an overall benefit to the approximately 3.7 million Londoners and 258,000 small businesses⁵ located within the North and South Circulars. In seeking to address a significant problem, Mayor Khan has made a number of significant errors. These will reduce the effectiveness of what he is trying to achieve, damage London's economy and – potentially – undermine the public support for tackling London's air quality. As we will see in the following sections, whilst expanding the ULEZ would enable the Mayor to claim, on a superficial level, that 'something' was being done – and perhaps gain some positive attention as a result – it is highly unlikely that this measure would have a proportionately beneficial impact on London's air quality so as to justify the substantial costs to London's residents, businesses and taxpayers.

4. <https://www.london.gov.uk/press-releases/mayoral/mayor-unveils-action-plan-to-battle-toxic-air>

5. Figures obtained from GLA Economics, Aug-Sep 2016

AIR QUALITY AND HEALTH

TfL has yet to produce a full assessment of the impact of an expanded ULEZ on air quality and health in London and this is not expected until later in 2017⁶ However, TfL has indicated that there would only be a 10% improvement in air quality as a result of extending the ULEZ to the North and South Circulars for cars and vans.⁷

There are several reasons why an expanded ULEZ, within the North and South Circulars, is likely to have only a marginal impact on air quality and health in London, over and above the benefits that would already be achieved by the original plans for a ULEZ in central London.

The central London ULEZ planned by the previous Mayoral administration is already projected to have significant air quality benefits for the whole of London, and especially within inner London, though the knock-on effect of vehicle compliance. Within inner London, exposure to harmful levels of NO₂ are expected to be cut from 13% of the population to 6%⁸, and over 10,400 properties would no longer be exposed to harmful NO₂ – a reduction of 52%⁹. By 2025 this would include a further 1,115 properties¹⁰.

Indeed, under Boris Johnson's proposals, of the 18,000 properties across London that would be taken out of exposure to harmful NO₂, over half are located in inner London¹¹. In total, over 75%¹² of the air quality benefits from a central London ULEZ would be felt outside central London. In fact, the most deprived areas of London are expected to feel the greatest benefit from the central London ULEZ, with TfL's health impact assessment noting that 'It is the most deprived communities that on average experience the most significant reductions.'¹³

Boroughs outside the central London ULEZ could already benefit almost as much as those within it. For example, Kensington and Chelsea, which is completely outside the zone, is projected to see a reduction of 2.3µm of NO₂ per m³, almost as high as Westminster's 2.9µm/m³.¹⁴ Moreover, a study by the London Borough of Islington found that 'it is likely that extending the ULEZ to include Islington would yield only marginal health benefits' and went on to assert that 'an extended Islington ULEZ can be expected deliver much fewer benefits than it would cost to setup'.¹⁵

A 2014 study by King's College London, of the current London wide Low Emission Zone, demonstrated the limitations of relying on low emission zones to deliver air quality improvements in a widespread area. It said, "The LEZ did not reduce ambient air pollution levels, or affect the prevalence of respiratory/allergic symptoms over the period studied."

6. London Assembly Environment Committee meeting, 15th Sep 2016

7. At the Environment Committee meeting on 15th Sep 2016, TfL estimated a total 40% improvement in air quality from its extended ULEZ plans, including a 30% improvement for making the ULEZ London-wide for HGVs, buses and coaches. This indicates that only a 10% improvement can be attributed to expanding the ULEZ to the North and South Circulars for cars, vans and other light goods vehicles (LGVs). This was confirmed by TfL in its October 2016 consultation document, available at: https://consultations.tfl.gov.uk/environment/air-quality-consultation-phase-2/user_uploads/consultation-information-document.pdf-1

8. *Ultra Low Emission Zone - Supplementary Information*, TfL, Oct 2014, p89

9. *ULEZ Environmental Impact Assessment*, TfL, Oct 2014, para 7.3.7, p32

10. *ULEZ Environmental Impact Assessment*, TfL, Oct 2014, Table 7-D, p29

11. *ULEZ Environmental Impact Assessment*, TfL, Oct 2014, Table 7-C, p29

12. 10,500 properties in inner London and 3,000 in outer London, out of a total of 18,000.

13. *Ultra Low Emission Zone Health Impact Assessment*, TfL in association with Ben Cave Associates and Ricardo-AEA, October 2014, Appendix 2, p33

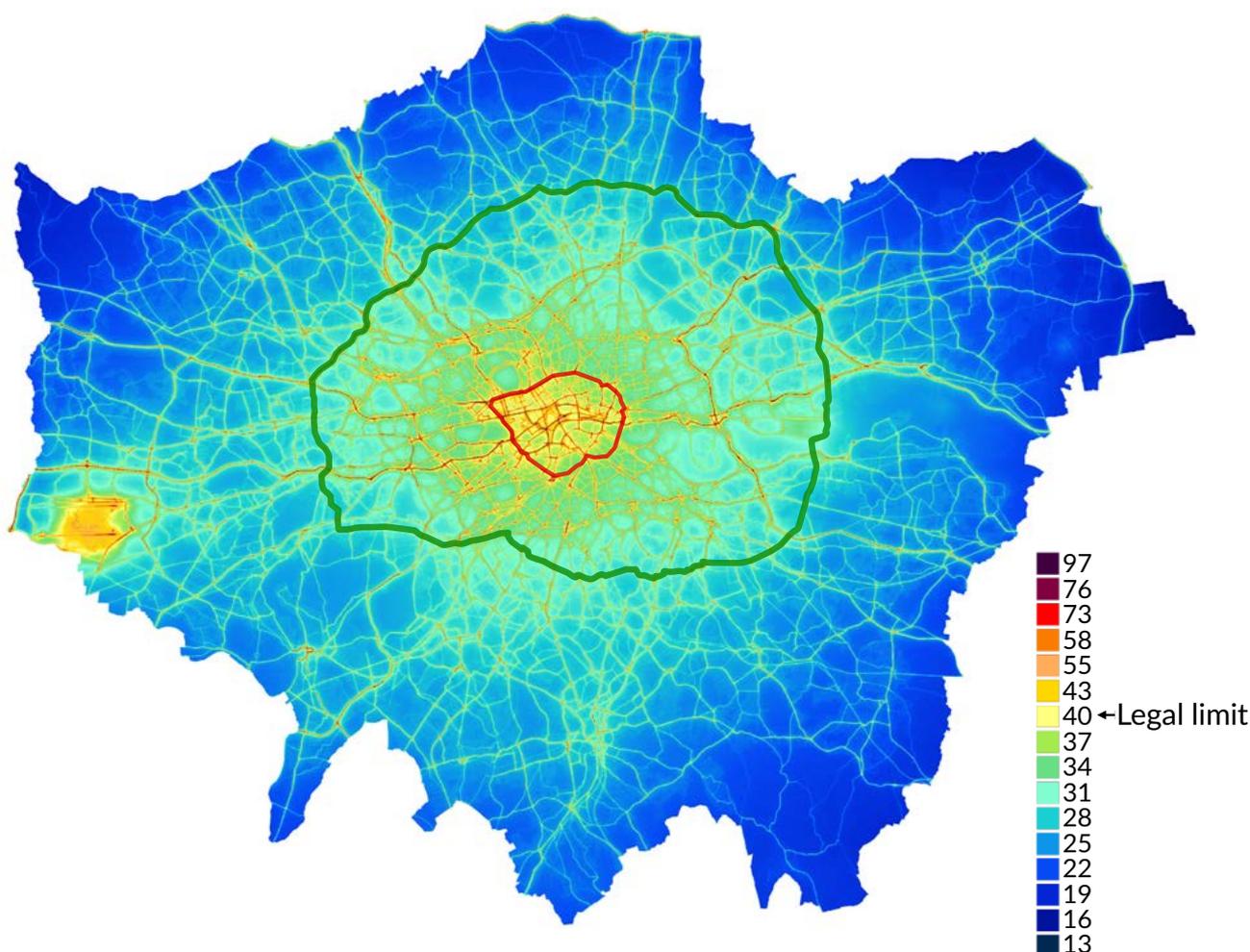
14. *ULEZ Environmental Impact Assessment*, TfL, Oct 2014, Table 7-E, p30

15. *Islington ULEZ Extension Study: Final Report*, London Borough of Islington, 2015, p1

It went on to say, “Importantly, the London LEZ has not significantly improved air quality within the city, or the respiratory health of the resident population in its first three years of operation.”¹⁶

In general, NO₂ pollution issues within inner London are very different to central London. Air pollution in central London, especially within the Congestion Charge Zone, is more severe and covers a larger area, and this is the type of problem that is much more suited to a ULEZ-type solution. By contrast, air pollution within inner London is much more concentrated within hotspots of harmful levels of NO₂, but overall the problem is less severe¹⁷. Across London, the most harmful levels of NO₂ pollution have been identified at 187 hotspots.¹⁸ These are predominantly main roads or major trunk roads served by major bus routes.

This is illustrated by the following map¹⁹, showing projected NO₂ pollution levels in 2020. Within the central London ULEZ area, bounded by a red line, shows significant and concentrated areas of high NO₂. Meanwhile, within the North and South Circulars, bounded by a green line, there are far fewer areas of high NO₂ exceedance, and these are surrounded by cleaner areas.



NO₂ annual mean concentrations in 2020 (µg/m³)

16. <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0109121>

17. The population-weighted annual mean NO₂ concentration in 2020, without a ULEZ, would be 42.5µm/m³ (above legal limit) in central London and 34.7µm/m³ (below legal limit) in inner London, according to *Ultra Low Emission Zone Health Impact Assessment*, TfL in association with Ben Cave Associates and Ricardo-AEA, October 2014, Appendix 2, p8

18. A full list of hotspots is available at: <http://data.london.gov.uk/dataset/air-quality-focus-areas>

19. Adapted from a TfL map used as part of the original ULEZ consultation in 2014, original available [here](#)

As the map illustrates, expanding the ULEZ to the North and South Circulars would be very much a blunt instrument, imposing restrictions on large areas where the problem does not exist, yet, as described above, would deliver only marginal improvements in air quality across the expanded area. A far more effective and fairer solution would be to target hotspot areas with specific measures, alongside other measures that do not require a ULEZ, as set out later in this report.

The expanded ULEZ proposed by Sadiq Khan could have several unintended consequences that may compromise any benefits that it does achieve, or may even make the situation worse. First, it is likely to dramatically increase the number of exempt vehicles, at least in the short term. The original ULEZ proposals includes a three-year exemption for residents of the zone and it would clearly be unfair not to extend this to residents within the expanded area. However, as noted in the Islington study, this would dilute any expected air quality or health benefits for at least the first three years. Indeed, it could even lead to the perverse situation where a larger number of high-polluting vehicles were able to drive within central London, where the problems are most acute, that would otherwise be the case with a smaller ULEZ.

Secondly, it could severely impact pollution in the roads surrounding the North and South Circulars themselves. These roads would most likely see increased congestion from vehicles that wish to avoid the ULEZ, thereby risking an increase in pollution on those roads. This is similar to the effect of the Congestion Charge on Marylebone Road, which saw a 36% increase in NO₂ pollution in the two years following the introduction of the charge, compared to the two years prior to its introduction²⁰. There is particular concern regarding the South Circular, which unlike the North Circular is not a defined highway and is more of a collection of local roads, about its ability to cope with the impact of an expanded ULEZ.

Thirdly, a larger ULEZ would be less flexible than a smaller ULEZ, which could make it more difficult to tighten standards in the future. It is notable that the Greater London Low Emission Zone has not been updated since 2010. If the Euro 6 standard turns out not to deliver the expected results, yet a significant proportion of London residents and businesses have already invested in these vehicles as a result of a large ULEZ, it would be unreasonable to expect them to do so again for a tighter standard within a short period of time. By contrast, a small, tightly-focused ULEZ within central London could be updated more quickly if necessary, perhaps within five years. It should be noted that Euro 6 is already due to be superseded within the next few years by the Euro 6c standard, which would be subject to more rigorous 'real world' testing.²¹

COSTS AND PRACTICALITIES

Similarly, TfL has yet to produce any estimate of the expected costs of an expanded ULEZ – either to residents, businesses or the public purse.

The advantage of a central London ULEZ is that it shares a boundary with the Congestion Charge Zone (CCZ), meaning that no new infrastructure is required and minimising the

20. *The impact of the Congestion Charging Scheme on ambient air pollution concentrations in London*, R.W. Atkinson, B. Barratt, B. Armstrong, H.R. Anderson, S.D. Beevers, I.S. Mudway, D. Green, R.G. Derwent, P. Wilkinson, C. Tonne, F.J. Kelly, 2009, p10

21. *Up in the Air: Part 2*, Policy Exchange and King's College London, 2016, p12

setup costs, which TfL had estimated at £30 million²². This would not be the case with an expanded ULEZ, which would require entirely new infrastructure at great expense.

Islington Council commissioned research in 2015 which considered the impacts of expanding the ULEZ, including the set-up costs of doing so. Given that Islington supported the extension of the ULEZ to its borough, it had every reason to make a good case on these costs. Islington's report estimated the additional set-up costs for expanding the ULEZ boundary would be £10.2 million per km²³. The combined length of the North and South Circulars is 76.5km, indicating an additional set-up cost of £780 million. Although this is an estimate, given the £161 million setup cost of the 19km CCZ²⁴, the significantly larger circumference of the North and South Circulars, and inflation since 2003, this would also support a figure in the region of £780 million. Added to the original £30 million, this would put the total set-up cost of a ULEZ within the North and South Circulars at £810 million, or around £220 for every household in London²⁵.

TfL's environmental impact assessment for the original ULEZ notes the following:

*The CCZ [Congestion Charge Zone] provides an existing boundary for central London, shaped by the IIR [Inner London Ring Road] and well embedded in road user travel behaviour. Not only is this zone a defined area, TfL also already operates an extensive camera enforcement network that is planned to be utilised to manage compliance with the ULEZ; helping to reduce implementation costs.*²⁶

An expanded ULEZ would therefore need to deliver significant air quality and health benefits in order to make these costs worthwhile; however, given the concerns raised in the analysis above, this money could be used far more effectively for better air quality outcomes. By way of comparison, £780 million could fund at least 2,600 hybrid buses²⁷, nearly a third of London's bus fleet²⁸. According to TfL figures, by 2020 TfL buses will account for 23% of NO₂ pollution on London's roads, higher than any other source, so purchasing more hybrid buses could significantly improve air quality.²⁹

In addition, the likely impact on London's residents and businesses is potentially very substantial. 57% of London's small businesses are located within the North and South Circulars, a total of 257,957 as of 2015. 807,506 vehicles are registered within this area and the resident population is 3,688,047 as of June 2014³⁰. Some of these residents may or may not qualify for a resident exemption, although in any case that is only likely to be temporary. Some may already be compliant. However, without the relevant assessment from TfL it is difficult to know what these details will be. If all vehicles registered within the zone required replacement, either immediately or at a later date, a total cost for this could be estimated at around £6.5 billion.³¹

However, the financial impacts are also likely to be felt across London and beyond,

22. *Ultra Low Emission Zone - Supplementary Information*, TfL, Oct 2014, p92

23. *Islington ULEZ Extension Study: Final Report*, London Borough of Islington, 2015, p4

24. *Islington ULEZ Extension Study: Final Report*, London Borough of Islington, 2015, p4

25. Approximately 3.7 million households projected in London by 2021, according to *Housing in London 2015*, GLA, Sep 2015, p7

26. *ULEZ Environmental Impact Assessment*, TfL, Oct 2014, p11

27. The typical cost of a hybrid bus is currently £300,000, according to *TfL Surface Transport Panel on Hybrid Buses*, 2010, para 5.1, p3

28. There are 8,600 buses in TfL's fleet, according to <https://tfl.gov.uk/campaign/bus-investment>, accessed Sep 2016

29. *Ultra Low Emission Zone Consultation*, TfL, 2014

30. Figures provided by GLA Economics, Aug-Sep 2016

31. This assumes a typical replacement cost of £8,000 for cars or vans, based on *ULEZ Economic and Business Impact Assessment*, TfL, Oct 2014

particularly by small businesses. Vans and minibuses, also known as light goods vehicles (LGVs) are the lifeblood of the small business economy. There are just over 200,000 LGVs in London³². The average age of LGVs in London is eight years³³, which indicates that a significant proportion would not be compliant with the ULEZ before 2020³⁴. As LGVs cannot be retrofitted³⁵, they will need to be replaced in order to be compliant with the ULEZ, up to two years earlier than normal, at an additional cost estimated by TfL of up to £8,000³⁶. This is compared to the likely vehicle replacement costs on a normal cycle without a ULEZ, taking into account depreciation and other factors. Given that Euro 6 is a new technology, without a substantial second hand market, it is likely that replacement costs would be at the high end of this estimate.

It is difficult at this stage to know how many of these vehicles would require replacement before 2020. If all 200,000 vehicles needed to be replaced, this would be a total cost to Londoners of £1.6 billion. However, this will clearly affect some businesses more than others. For a small firm with a fleet of 10 vans, for example, this could require an upfront cost of around £80,000. A sole trader, who may need to travel within the area on average five days a week, would be faced with a large outlay of £8,000 for a new vehicle, or a cost of £3,250 a year in daily charges. It was already recognised in TfL's previous assessment that some firms may leave the market³⁷ even at the prospect of a central London ULEZ. For a larger ULEZ, it is not difficult to see this being at a much greater order of magnitude.

As noted by the Federation of Small Businesses in its recent consultation response to the Mayor's ULEZ proposals, "the costs of extending the ULEZ scheme more widely across London from 2019, will disproportionately fall on the smallest operators within the business community."³⁸

The latest figures from TfL, published in its October 2016 consultation, indicate that in 2019, an average of 180,000 non ULEZ-compliant cars and 56,000 non-compliant vans will be driving per day within the expanded ULEZ area³⁹. If all of these vehicles had to pay a £12.50 daily charge, this would be a total cost to Londoners of over £100 million in the first year.

Furthermore, a ULEZ boundary around the North and South Circulars would add new complexity, and potential confusion, for London's motorists. It would add a third new charging zone within London, in addition to the central London Congestion Charge Zone and the existing Low Emission Zone covering Greater London. As noted by Policy Exchange and King's College London:

*In our view it could potentially be problematic to introduce an additional Low Emission Zone or expanded ULEZ covering the North-South circular, since this could potentially create confusion amongst motorists and would also involve investment in an additional set of enforcement cameras to cover the new boundary.*⁴⁰

32. [ULEZ Economic and Business Impact Assessment](#), TfL, Oct 2014

33. Ibid

34. Only LGVs registered from 2016 onwards will automatically be compliant with the ULEZ

35. According to TfL in p21 of its [ULEZ Environmental Impact Assessment](#), and the Freight Transport Association as quoted in [London Ultra Low Emission Zone on the way](#)

36. [ULEZ Economic and Business Impact Assessment](#), TfL, Oct 2014

37. [ULEZ Economic and Business Impact Assessment](#), TfL, Oct 2014, p22

38. <http://www.fsb.org.uk/docs/default-source/fsb-org-uk/air-quality-consultation---fsb-response---december-2016.pdf?sfvrsn=0>

39. [New proposals to improve air quality](#), TfL, Oct 2016, p63

40. [Up in the Air: Part 2](#), Policy Exchange and King's College London, 2016, p22

‘ULEZ PLUS’: AN ALTERNATIVE APPROACH

As we have shown above, whilst a ULEZ is well suited to central London, expanding it to the North and South Circulars would be a much blunter tool, which would be unlikely to deliver more than a marginal improvement to London’s air quality and health despite a high cost to London’s residents, businesses and the public purse. Indeed, recent work by Policy Exchange and King’s College London found that legal limits on NO₂ could be met in London without needing to expand the ULEZ.⁴¹

This report therefore proposes an alternative approach that would see resources better targeted at where they can be most effective in improving London’s air quality. This would involve going ahead with the central London ULEZ as originally planned, along with extensive measures to improve air quality at hotspot locations of high NO₂ exceedance. This approach can best be understood as ‘ULEZ Plus’.

Along with the central London ULEZ, this approach would include the following measures.

1. STRENGTHEN PLANS FOR CLEANER BUS ROUTES

As a priority, bus routes serving polluted hotspot areas of London should be provided with cleaner, less polluting buses, such as hybrids, electric or hydrogen buses. It is welcome that the Mayor has recently begun to address this, including his recent announcement of a number of ‘Low Emission Bus Zones’⁴² to be introduced by 2020, but there is scope for this to be significantly strengthened by ensuring more of the bus fleet is low-emission.

Not only could this be done without extending the ULEZ, and probably more quickly and effectively, it would tackle the largest single source of air pollution on London’s roads. According to TfL figures, by 2020 TfL buses will account for 23% of NO₂ pollution on London’s roads, higher than any other source.⁴³ The most polluting roads in London are predominantly main roads or major trunk roads⁴⁴ served by major bus routes. Therefore, cleaning these routes would be a much more efficient and targeted way of cutting pollution than the blunt instrument of an expanded ULEZ.

A good example of this is Oxford Street, where electric buses and other hotspot measures were introduced twelve months ago by the previous Mayor. In this relatively short period, there was a 30% cut in pollution levels and an 88% drop in the number of days where legal limits were breached⁴⁵, on a road that is often described as the most polluted in the world⁴⁶. This demonstrates the potential of targeted hotspot measures, centred around buses, to deliver significant cuts to pollution where it is actually causing a problem.

In addition, TfL’s health impact assessment has indicated that the best way to achieve future benefits would be to extend cleaner buses to inner and outer London:

Further improvements in air quality could be enhanced through encouraging increased usage of hybrid, electric and hydrogen buses. Initially the greatest proportion of routes

41. *Up in the Air: Part 2*, Policy Exchange and King’s College London

42. <https://www.london.gov.uk/press-releases/mayoral/mayor-announces-10-new-low-emission-bus-zones>

43. *Ultra Low Emission Zone Consultation*, TfL, 2014

44. A full list of hotspots is available at: <http://data.london.gov.uk/dataset/air-quality-focus-areas>

45. <http://www.standard.co.uk/news/london/oxford-street-pollution-drops-by-a-third-in-12-months-after-electric-bus-switch-a3441301.html>

46. <http://www.londonair.org.uk/london/asp/news.asp?NewsId=OxfordStHighNO2&StartIndex=31>

*running these buses will be in central London. This could be extended into the Inner Zone and Outer Zone.*⁴⁷

As noted above, saving the £780 million set-up cost of expanding the ULEZ could fund up to 2,600 hybrid buses. Even spending £680 million on hybrid buses, and £100 million on other programmes, could provide at least 2,200 hybrid buses. Either way, the additional hybrid buses would provide a significant boost to this scheme. Hybrid buses can reduce nitrous oxide (NO_x) emissions by up to 78%.⁴⁸

This could deliver improvements to the most polluted roads throughout London, including the Euston and Marylebone Roads and Woolwich Flyover⁴⁹, none of which have so far been included in plans for cleaner bus routes. Not only could additional buses be delivered, they could potentially be introduced at a much earlier date, compared to the Mayor's current 2020 deadline.

Therefore, the Mayor should put in place coherent and specific proposals to ensure that all NO₂ pollution hotspots are served by cleaner buses as soon as possible, using some or all of the money that would have been spent on extending the ULEZ.

2. FREIGHT CONSOLIDATION PLANS

Whilst there has been some movement towards freight consolidation centres, there is plenty of scope to expand these significantly. For example the Crown Estate was able to reduce the number of deliveries made to Regent Street by over 80% using a consolidation centre in Enfield run by Clipper Group.⁵⁰ Furthermore, by using an electric vehicle to make deliveries to Regent Street, Clipper Group has been able to reduce emissions and improve air quality still further.

There is a clear role for TfL in coordinating consolidation centres, particularly in areas where there are pollution hot spots. This could include bringing companies together for discussions, assisting with any road-space requirements and identifying land that could be used for these centres. If land availability is an issue, consideration could be given to utilising redundant TfL land, even if only on a temporary basis before it is developed.

3. ELECTRIC VEHICLE HIRE

There has long been a 'chicken and egg' situation with regard to electric vehicles and electric charging points in that it has not seemed sensible to expand the number of charging points until there are more electric cars on the road and yet many people may have been dissuaded from buying electric cars because of a lack of charging points. However there is evidence that that is changing and there is a real opportunity to significantly expand the numbers of electric vehicles on our roads, specifically through the use of electric car clubs.

The *Autolib* scheme in Paris is used by around 220,000 drivers using nearly 4000 cars and 6000 charging points. In June 2015 the London version, Source London, was re-launched.

47. *Ultra Low Emission Zone Health Impact Assessment*, TfL in association with Ben Cave Associates and Ricardo-AEA, October 2014, para 8.6.3, p27

48. *London Buses Emissions Reduction*, TfL, June 2013, p18

49. <http://www.standard.co.uk/news/london/revealed-the-20-blackspots-for-toxic-air-in-london-a3236611.html>

50. <http://content.tfl.gov.uk/regent-street-case-study.pdf>

Source London has over 850 charging points, with a further 4500 due to be rolled out by 2018.⁵¹ The Mayor and TfL should be seeking to do everything possible to help ensure that this is a success. In Paris the scheme has saved 4.8 million tonnes of CO₂ emissions as well as encouraged the spread of privately-owned electric cars due to the wide-scale increase in charging points.⁵²

4. LOAN SCHEME FOR CONVERTING TAXIS TO LPG

Given the vast cost of the Mayor's proposed expansion of the ULEZ, avoiding that mistake would free up a considerable amount of money for better alternative schemes.

By converting their diesel vehicles to using liquid petroleum gas (LPG), there is an opportunity for London's black cab drivers to improve London's air quality and save significant amounts of money on cheaper fuel. However although those who convert to LPG can break even within two years, the upfront cost of conversion can be prohibitive. Therefore TfL should offer a loan scheme to help speed up the rate of conversions.

As of 2015, there were 22,500 taxis in London⁵³. At a conversion cost of £8,000 per vehicle⁵⁴, converting 10,000 vehicles could be achieved at a total loan cost of £80 million to TfL – or lower if it manages to achieve an economy of scale. Given the estimated payback period of two years, this is only likely to be a short-term outlay, and could make use of funds freed up by not expanding the ULEZ boundary to the North and South Circulars.

5. EXTENSION OF THE BOILER SCRAPPAGE SCHEME

It is often assumed that air pollution is only a transport-related issue. However, a sole focus on transport emissions is a missed opportunity to tackle emissions from other sources, especially boilers. Gas boilers contribute approximately 12 per cent of London's NO_x (nitrous oxide) emissions, which contribute to NO₂. New A-rated boilers are over 90% efficient, and can save over 1.2kg NO_x per year compared to older boilers, as well as making significant carbon dioxide savings.⁵⁵ It can also save households around £340 from their fuel bills per year.⁵⁶

A London Boiler Cashback Scheme was launched by Mayor Boris Johnson in February 2016, providing £400 cashback to households that replaced the oldest, most polluting boilers with the newest and cleanest models. Funding of £2.6 million was allocated to the scheme, which provided for 6,500 owner occupiers and accredited private landlords to benefit from the scheme.

An extension of this scheme would allow greater NO₂ savings to be achieved and more households to benefit from lower bills. It could also be prioritised within pollution hotspot areas to help tackle high NO₂ exceedance.

Whilst Mayor Khan has recently launched a new 'Better Boilers' scheme aimed at cutting

51. <https://www.sourcelondon.net/what-is-source-london>

52. <https://www.theguardian.com/cities/2014/jul/09/electric-boris-car-source-london-how-work-paris-autolib>

53. *Table TAXI0101: Licensed taxis and taxi drivers: England and Wales, from 1965*, Department for Transport, Aug 2015

54. <http://www.airqualitynews.com/2016/05/06/birmingham-switching-63-diesel-cabs-lpg/>

55. <http://www.london.gov.uk/LLDC/documents/s53612/Boiler%20Scrappage%20Scheme.pdf>

56. <https://www.london.gov.uk/decisions/md1606-london-boiler-cashback-scheme>

fuel poverty⁵⁷, this is not designed to tackle air pollution and is only expected to benefit 500 homes for the £1 million investment in the scheme. By contrast, investing a similar amount of money into extending the London Boiler Cashback Scheme could replace an additional 2,500 boilers.

6. DIESEL SCRAPPAGE SCHEME

A diesel scrappage scheme would enable older, more polluting diesel vehicles to be traded in for the latest and cleanest models. It could potentially be aimed at all owners of older diesel vehicles, but could particularly be of benefit for vans and other LGVs where cleaner models are only now starting to come onto the market. Recent analysis suggests that a diesel scrappage scheme could cut NO_x emissions by up to 15.5%⁵⁸.

The idea of a diesel scrappage scheme in London was first raised by the previous Mayor, Boris Johnson, but would require government funding. The rise in popularity of diesel vehicles can be traced back to a decision of a previous government in 1998, to reduce vehicle tax for diesel vehicles compared to their petrol equivalents. It makes sense that central government plays a role in correcting the errors of one of its predecessors.

57. <https://www.london.gov.uk/press-releases/mayoral/mayor-tackles-fuel-poverty-with-1m-boiler-fund>

58. [Would a diesel car scrappage scheme improve air quality?](#), RAC, March 2016

RECOMMENDATIONS

RECOMMENDATION #1 - For cars, vans and motorcycles, the Mayor should progress with the original ULEZ scheme, within the Congestion Charge boundaries, rather than seek to expand the scheme out to the North and South Circulars.

RECOMMENDATION #2 - A 'ULEZ Plus' approach should be adopted, with enhanced measures to tackle pollution hotspot areas in London to be brought forward as quickly as possible, without being reliant on the ULEZ timetable.

RECOMMENDATION #3 - The Mayor should put in place proposals to accelerate the increase in hybrid, hydrogen and electric buses, to ensure that all NO₂ pollution hotspots are served by cleaner buses as soon as possible, using some or all of the money saved from not expanding the ULEZ boundary to the North and South Circulars.

RECOMMENDATION #4 - The Mayor should instruct TfL to design, co-ordinate and implement freight consolidation plans for pollution hotspot areas in London as soon as practicable.

RECOMMENDATION #5 - The Mayor should seek to expand electric vehicle use within inner and central London by all practical means, including expanding the charging infrastructure, supporting electric car clubs and bringing forward an electric vehicle hire scheme.

RECOMMENDATION #6 - The Mayor and TfL should introduce a loan scheme to enable black cab drivers to convert their cabs to running on LPG as soon as possible.

RECOMMENDATION #7 - The Mayor should extend the London Boiler Cashback Scheme, particularly targeted at NO₂ pollution hotspot areas.

RECOMMENDATION #8 - The Mayor should redouble efforts to achieve a diesel vehicle scrappage scheme, building on the work of the previous Mayor

APPENDIX I

Boris Johnson's ULEZ plans	Sadiq Khan's ULEZ plans
ULEZ in central London Congestion Charge area (Euro 6/VI for diesel and Euro 4 for petrol) from 2020	ULEZ in central London Congestion Charge area (Euro 6/VI for diesel and Euro 4 for petrol) from 2019
All double deck buses in central London to be hybrid by 2020	All double deck buses in central London to be hybrid by 2019
All single deck buses in central London to be zero emission by 2020	All single deck buses in central London to be zero emission by 2020
Zero emission taxis phased in from 2018 and 10 year age limits from 2020, applying Londonwide	Zero emission taxis phased in from 2018 and 10 year age limits from 2020, applying Londonwide
New PHVs to be Euro 6 or hybrid from 2018 and zero emission PHVs phased in from 2020, applying Londonwide.	New PHVs to be Euro 6 or hybrid from 2018 and zero emission PHVs phased in from 2020, applying Londonwide.
	ULEZ expanded to North & South Circulars for cars, vans and motorcycles, from 2019 or later
	ULEZ expanded Londonwide for HGVs, coaches and buses, from 2019 or later



FEEDBACK

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