CLEARING THE AIR

DEVELOPING A MORE TARGETED APPROACH TO TACKLING LONDON'S POLLUTION PROBLEM

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2017

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Issue Date: 22/02/2017

EXECUTIVE SUMMARY

Improving London's air quality is at the forefront of the Mayor of London's environment and transport strategies. This issue has grown in importance over recent years, not just for health professionals and politicians, but for the general public as well. Clearly, the problem of poor air quality is something that needs to be tackled.

In an attempt to tackle this problem, the Mayor has announced several proposals intended to improve air quality in the Capital. These include the T-Charge, which is due to start in October, the proposed earlier implementation of the Ultra Low Emission Zone (ULEZ) and the expansion of the ULEZ to the North and South Circulars.

This report evaluates the Mayor's proposals and outlines how a more targeted approach could deliver the same impact on air quality, but without the impact on ordinary Londoners. While there is some merit in the Mayor's approach to this issue, there remain several key problems with his approach.

This report puts forward ten recommendations that address the problems related to the Mayor's plans and seeks to tackle London air quality problem in a way that is more cost effective, has a less severe impact on the lives of ordinary Londoners, and tackles poor air quality in the Capital without harming London's small businesses.

The report also seeks incorporate the views of business groups and local authorities. It is clear that not everyone is happy with the GLA's proposals. While most share the desire to improve air quality, many are concerned on its impact on businesses and residents. It is important these views are heard as well.

Listed below is a brief outline of the report's ten key recommendations, all of which are directed to the Mayor:

1. **Reassess how the GLA measures the impact of poor air quality**. The report argues that the measure for health impact should, based on Government advice, change from a problem reported as a mortality issue, i.e. lives lost, to a public health problem reported as an issue of morbidity, i.e. the effect on life quality. This would allow for more targeted health interventions and for a more accurate description of the impacts of bad air, which are mostly felt at the end of life and as complications associated with already existing health conditions. Such an approach would be more informative for the general public and would help the Mayo to deliver more cost-effective policy interventions.

2. **Scrap the soon to be imposed T-Charge**. In the official Impact Assessment for this 'tax', it was determined that this intervention would have a "negligible" impact on emissions and would "not lead to any significant improvement" in air quality. This is simply because there are few older vehicles remaining in London that would fall foul of this charge. This 'tax' would place an unnecessary burden on poorer drivers and smaller businesses (approximately £23m in total), and all for a negligible improvement in air quality.

3. **Move the central ULEZ start date back to 2020, rather than 2019**. Businesses and emergency services have already made contingency plans to adapt their fleets to the original timeline agreed by the previous Mayor. By bringing the scheme forward by a mere one year, there will be a real and sizable cost to small business and our emergency services, who will then have to pay a charge to enter the ULEZ in order

to carry out their business or perform their duties. Such a move would not be supported by most Londoners.

4. **Abandon proposals to expand the ULEZ to the North and South Circulars**. To have a ULEZ in Central London is logical, as this is the key pollution hotspot in the Capital. However, outside this central area, air pollution is mostly confined to major roads and motorways. To introduce a very wide charging zone, and adopt such an unwarranted and broad approach to a localised problem, would be disruptive to London's residents and businesses, not to mention the fact it would cost £780m to install and roll-out. Other measures would be just as effective at reducing harmful emissions (listed below), but without a high financial burden imposed on ordinary Londoners.

5. **Install more rapid charging points for electric vehicles**. The Mayor currently has a commitment to purchase a good number of electric charging points. However, most of these have charging times that exceed what most commuters and taxi drivers require as part of their daily travel. Instead of expanding the ULEZ, the Mayor should allocate £30million of the savings generated to install 1,579 rapid charging points across London, which would allow electric vehicles to recharge in minutes, rather than hours. The black cab trade and businesses would require such charging points as standard in the future. Despite recent rapid growth, the electric vehicle market will stall growth if faster charging points are not rolled out en masse.

6. **Play a more active role in promoting freight consolidation schemes**. By making use of his convening powers, the Mayor should help locate sites in London that can accommodate freight consolidation centres. These centres help to reduce the amount of deliveries in any given area, thus reducing emissions, and also save businesses money through the sharing of scheduled deliveries. Some parts of London have already implemented this well. The Mayor should use his powers to disseminate best practice and help other localities make use of such schemes to ensure wide coverage across London.

7. **Instruct TfL to deliver an awareness campaign to help prevent vehicle idling**. Engine idling increases the amount of emissions emitted in any given area. While it may not be possible to prevent idling at junctions and in regular traffic, it is more than possible for motorists to switch off their engines in other, more appropriate situations. The Mayor should, therefore, instruct TfL to deliver a pro-active marketing strategy aimed at highlighting the harm engine idling creates, especially for schools pupils being collected by their parents on the school run. It may also need to explore financial penalties for vehicle idling outside of schools, although such measures should always be considered as a last resort.

8. **Ensure a third of London's bus fleet are hybrid buses as swiftly as possible**. As mentioned above, the Mayor should abandon plans to extend the ULEZ out to the North and South Circulars and save £780m in the process. Of that, £680m should be used to purchase 2,200 hybrid buses. Such a purchase could be complete this year and would not require time or delay for implementation. Purchasing these buses would reduce emissions by a comparable amount to an expanded ULEZ, but without penalising ordinary motorists and hardworking families.

9. **Purchase more zero-emission hydrogen buses to be used on the most polluted roads**. Outside Central London, it is usually only motorways and the largest trunk roads that are in breach of air quality regulations. As such, on those roads that also

contain bus routes, the Mayor should commit to ensuring as many zero-emission hydrogen buses. As buses are the single most polluting form of transportation, shifting to zero-emission buses on the dirtiest routes would deliver great benefits to London's air quality.

10. **Replace the current boiler replacement scheme with the previous Boiler Cashback Scheme**. Household emissions represent a large portion of total emissions, and reducing these emissions should also be a mayoral priority. The current Mayor's Better Boiler Scheme focuses on cutting fuel poverty, by either repairing existing boilers or replacing them. The Mayor should reintroduce the former Mayor's London Boiler Cashback Scheme, which gave £400 for a new cleaner boiler to anyone with an old boiler, not just those in fuel poverty (although it did also include such households). It was a better incentive scheme and was broader in scope. As such, it would, if reintroduced, reduce total household emissions by a greater amount than the current scheme.

INTRODUCTION

The Mayor is quite correct in placing the fight to improve air quality at the heart of his mayoralty. However, the measures that the Mayor wishes to implement to improve London's air quality will not necessarily make the impact that Londoners want or deserve.

This report investigates the background to the air quality debate and evaluates the Mayor's current proposals; including the introduction of the T-Charge, the earlier implementation of the Ultra-Low Emission Zone (ULEZ) and the potential expansion of the ULEZ to the North and South Circulars. The report will also highlight alternatives that could be delivered by the Mayor, for the same impact on air quality, but without negatively affecting the lives of ordinary Londoners.

SHIFTING THE AIR QUALITY DEBATE

Those involved in the debate surrounding air quality will be familiar with the statistic that poor air contributes to 9,400 deaths in the Capital. This statistic has been used by the Mayor[1] to justify the implementation of his suite of policies designed to improve London's air quality. While there is no doubt that poor quality air affects the lives of Londoners, there is some debate as to how best to report the extent of the air quality problem in the Capital.

The 9,400 premature deaths statistic that is used by the Mayor derives from a report titled Understanding the Health Impacts of Air Pollution in London[2]. The report, published by Kings College London for TfL, estimated the mortality burden of 2010 concentrations of fine particles NO2 in London. This sum figure is derived by combining the total mortality burden of anthropogenic PM2.5 for the year 2010 (3,537 deaths at typical ages) and the total mortality burden of long-term exposure to NO2 (5,879 deaths at typical ages).

The report also makes it clear that, while medical science and government policies have advanced to a point whereby the impact of air pollution can be adequately calculated and reduced, there still remain significant measurement issues. The report states that "for the

1. https://tfl.gov.uk/info-for/media/news-articles/taking-action-on-air-quality
2. https://www.kcl.ac.uk/lsm/research/divisions/aes/research/ERG/research-projects/HIAinLondonKingsReport14072015final.pdf

first time, emerging techniques have been used to assess the mortality burden of nitrogen dioxide (NO2) in London, following on from World Health Organisation's recommendations. WHO acknowledged uncertainty in the evidence so the associated figures are considered approximate and need to be used with care".[3] The report goes on to say that the "N02 numbers are much less certain than those for PM2.5", which means we should use these figures with care as well.[4]

The 1993 American 'six cities study' was the first to comprehensively show incrementally higher death rates in cities associated with high levels of air pollution, and this is now an uncontested fact. However, Professor Anthony Frew, a respiratory consultant doctor working in Sussex and a former member of COMEAP (the Government's advisory body on this issue) said, at an All Party Parliamentary Group on Air Quality meeting in March, that there were a number of confusing claims about the impact of air pollution. Although he was clear to highlight that air pollution is clearly harmful, the true extent of that harm is often difficult to measure or convey to the general public.[5]

In the UK, COMEAP (the Committee on the Medical Effects of Air Pollution) is the body that provides advice to government bodies on the impacts of air pollution. In their research, COMEAP estimate that 340,000 'life years' are lost in the UK every year. The problem with using this statistic is that the term 'life years' is not easily understood by the general public.

COMEAP also have a different, more easily understood means of measuring the health impact of poor air quality. They also make use of an aggregated 'deaths per year' figure, which in what the often quoted 9,400 figure represents. But, as has been mentioned above, using a more simplified number, while it makes for a better headline, comes with its own set of problems.

Alongside the inherent measurement and accuracy issues detailed above, in the same parliamentary evidence session, it was also highlighted that the 9,400 deaths per year figure could be potentially misleading because it gives no indication as to the age of the people dying prematurely or their existing health conditions. Knowing the latter is vital to understanding how to best tackle this public health issue, not least because there has not been one single incident since the introduction of the Clean Air Acts that suggests harmful emissions are the recorded cause of death on a death certificate.

To overcome these measurement and accuracy problems, and better inform the general public on the true risks associated with air pollution, rather than fixating on overall and broad figures that only describe mortality, it might be best for the Mayor to instead focus on the impact of pollution on public health and personal life quality.

The exact effects of air pollution differ depending on individual lifestyles and pre-existing medical conditions. A person who suffers from a respiratory or cardiovascular condition will suffer the consequences of bad air much more when compared to an individual that is healthy or has no pre-existing medical conditions.

The Government's advisory body, in its research, clearly prefers this approach. As has been detailed above, COMEAP's preferred form of measurement, although not the most easily understood, is to express the harmful effects of poor air as the average number of years of life lost per death.

As has been mentioned, the advisory body describes this as being 340,000 years lost life

3. https://www.kcl.ac.uk/lsm/research/divisions/aes/research/ERG/research-projects/HIAinLondonKingsReport14072015final.pdf Page 7
4. https://www.kcl.ac.uk/lsm/research/divisions/aes/research/ERG/research-projects/HIAinLondonKingsReport14072015final.pdf Page 8
5. https://appgairpollution.org/2017/03/27/the-health-impacts-of-air-pollution-event-summary/

expectancy for the whole UK population. This is equivalent to three days of life lost during 2008 for every member of the population or, if expressed just in terms of those who died in that year (569,000 deaths), this would be six months per person at the end of life. So instead of dying at the age of 81, the average person would die at 80.5 years.[6]

Using this measure, which represents a more accurate picture of the health impacts of air pollution, some people might expect have their life shortened by months due to poor quality air, while others might have their life expectancy shortened by a few weeks or days depending on individual health factors. To describe the impact of poor air quality as measured in any other way than this, as stated by the Government's advisory body, could potentially misinform the general public.

As the link to mortality is confusing when considered in this light, the focus of the air quality debate should move away from reporting poor air quality as only a mortality issue, to exploring the impact of air pollution on morbidity or life quality.[7] Such a move would help to better inform the general public on the exact dangers of poor quality air, such as living near a busy road with a pre-existing condition, and it would also allow for more targeted interventions from health professions and policy makers.

Directing greater respiratory care resources to the most vulnerable localities would be a much better means of defeating this modern day scourge. Simply using mortality figures, as the Mayor currently does, hides the true nature of the problem. Also, by adopting such a broad and all-encompassing description of the problems of bad air, one that ignores nuance and medical opinion, likewise requires a broad and all-encompassing policy response, such as an expanded ULEZ, which ultimately results in various negative unintended consequences (detailed in later sections).

Further, it is important to remember that, while air pollution is a public health concern, it is not nearly as damaging as other public health dangers, such as smoking. So misrepresenting the scope of the air quality problem could both distract from other, more important public health campaigns (such as the NHS campaign to help people quit smoking). It could also cause unnecessary concern for the public, who may not necessarily detect the nuances of the debate from the mortality figures alone.

It must also be remembered that the current air quality debate is being conducted at a time when harmful emissions are at their lowest in London since the Industrial Revolution. Figures from Defra indicate that that, since 1970, PM10 emissions have fallen by 73 per cent and PM2.5 emissions by 76 per cent. Also, NOx emissions have fallen by just under 69 per cent. Indeed, NOx emissions have fallen every year since 1991 bar one, where levels remained flat.[8] The UK has been steadily decreasing air pollutants for some time, indicating that this is not a growing problem and one that requires more nuance than is currently being provided.

Shifting the debate surrounding air pollution from mortality to morbidity or quality of life would allow national, regional and local government to provide better, more targeted policy interventions. More holistic and less generalised public initiatives are almost always more impactful and cost-effective. The Mayor should adopt such an approach for all of his environmental programmes.

6. Professor Anthony Frew, speech Brighton Summary of speech at APPG on air pollution 14th March 2017
7. https://appgairpollution.org/2017/03/27/the-health-impacts-of-air-pollution-event-summary/
8. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/610927/Air_Quality_National_Statistic_apr17_FINAL.pdf

MAYOR'S PROPOSED SOLUTIONS TO IMPROVING AIR QUALITY

As stated above, there are a number of initiatives and schemes which the Mayor is planning that seek to reduce harmful emission. This section will outline these proposals and evaluate their suitability for doing just this.

THE T-CHARGE

The Mayor of London's T-charge will start in October 2017. The T-Charge (the Toxicity Charge) is a £10 levy on older vehicles entering the centre of London.[9] It is due to come into effect on 23 October 2017 and will apply to all vehicles which do not meet Euro 4 emissions standards – typically those registered before 2006. It is estimated that it will cost to Londoners of £23million[10] a year despite the Mayor's own Impact Assessment saying it will have only a 'negligible'[11] impact on pollution.

Transport for London's own assessment concludes the £10 daily charge for vehicles that are over ten years old will save just 1-3 per cent of NOx (nitrous oxide) emissions. The assessment also concludes the anticipated reduction in air pollution will be 'low'. Small businesses with older vehicles will be hardest hit, facing charges of £2,600 a year or having to spend between £3,000 and £7,000 to renew their vehicles.

Evidently, the T-Charge is an expensive project that will deliver very little benefit in terms of improvements to air quality, at a significant economic cost.

The minimum vehicle replacement cost (taking into account trade-in value and depreciation) is £2,400 for cars and £3,000 for vans.[12] Using the figures above for non-compliant cars and vans, if all vehicles were replaced, this would also be a total cost of around £23 million[13]. However, this is very much a minimum figure, as it will not be the same vehicles using the zone each day.

The T-charge will mainly come to an end when the Ultra-Low Emission Zone begins, either in 2019 or 2020 depending on whether the Mayor proceeds with his proposals to introduce the scheme a year early. However, it has one peculiar feature, in that it will continue for a further three years for residents who live within the zone, in order to charge them £1 a day on top of the Congestion Charge. This is because those residents will have a three-year exemption from the ULEZ and will therefore continue to pay the T-Charge at the 90 per cent resident discount rate.

The T-Charge therefore could be viewed as simply a publicity exercise for the Mayor that helps him present the case to Londoners and the media that he is being proactive in implementing measures to improve air quality. However, as we have seen, this policy will deliver little actual benefit to Londoners, and it is considered by the Mayor's own data to be of "negligible" benefit. It is right to question whether the money used to deliver this policy could be better spent on other measures that would deliver better value to Londoners, and would do so without penalising poorer motorists and small businesses, that often own older vehicle. The Mayor should, therefore, not go ahead with the implementation of the T-Charge this October

9. https://www.london.gov.uk/what-we-do/transport/mayors-new-ps10-toxicity-charge-londons-most-polluting-cars
10. http://glaconservatives.co.uk/news/t-charge-will-cost-londoners-23million-a-year-for-negligible-improvement-in-air-quality/#more-5245
11. https://consultations.tfl.gov.uk/environment/air-quality-consultation-phase-two/user_uploads/report-to-the-mayor_final.pdf Page 72
12. https://consultations.tfl.gov.uk/environment/air-quality-consultation-phase-2/user_uploads/consultation-and-information-document.pdf p48
13. http://glaconservatives.co.uk/news/t-charge-will-cost-londoners-23million-a-year-for-negligible-improvement-in-air-quality/#more-5245

THE ULTRA-LOW EMISSION ZONE

The introduction in 2020 of the central London ULEZ, which is based on the Congestion Charging Zone and was planned by Boris Johnson, is projected to have significant air quality benefits for the whole of London. The current proposals by Sadiq Khan, however, on bringing the central London ULEZ start date forward to 2019 and expanding the boundaries to the North and South Circular by 2021, are not nearly as beneficial, given their impact on London's residents, businesses or emergency services.

The Mayor is currently consulting on introducing the central London ULEZ in 2019, a year earlier than planned. London's emergency services are currently struggling to meet the proposed earlier deadline for complying with Ultra Low Emission Zone (ULEZ). Data released under the Freedom of Information Act shows that all three emergency services are concerned about the financial and logistical impact of an earlier 2019 introduction.

The ULEZ will require all vehicles, including those operated by the emergency services, travelling inside the zone to meet exhaust emission standards or pay a daily charge of £12.50 or more if a larger vehicle. Responses by all three emergency services to the current public consultation, obtained through freedom of information requests and other resources, show the following:

The Metropolitan Police state that:

- They need to replace 82 per cent of their entire fleet in order to meet emissions standards
- That despite a replacement programme, financial restraints mean that by 2020 they will still have 800 non-compliant vehicles facing daily charges
- Tight budgets mean they are unlikely to be able to replace the vehicles early
- They have asked the Mayor for concessions on its non-compliant vehicles[14]

The London Fire Brigade states that:

- If the ULEZ is brought forward to 2019, they will have 52 non-compliant vehicles on the road facing daily charges – potentially costing half million pounds per year
- This is the equivalent cost of hiring 23 trainee firefighters. [15]

The London Ambulance Service states that:

- They need to replace 828 diesel vehicles and 27 petrol vehicles before the fleet is ULEZ compliant
- They will have to modify their replacement programme if the deadline is brought forward as it will not be anywhere near compliance in 2019[16]

Our emergency services will have to pay at least £12.50 every day if a non-compliant vehicle from their fleet enters the ULEZ zone. The London Fire Brigade, due to its large fire appliances, would have to pay £100 every day if a non-compliant vehicle enters the zone. The recent Grenfell Tower tragedy required fire appliances to come from across London with many outside the planned central London ULEZ, but if this happened after the proposed 2019 start date, there would be ULEZ charges associated with non-compliant vehicles attending large incidents such as this, which is clearly not desirable, nor something most Londoners would approve of.

14. Information obtained from an FOI request
15. http://moderngov.london-fire.gov.uk/mgconvert2pdf.aspx?id=6187
16. Information obtained from an FOI request

Compliance costs for the scheme would derive directly from the Metropolitan Police Service, London Fire Brigade (LFB) and London Ambulance Service, which are already managing scarce resources. The Mayor has been asked whether there will be an exemption for emergency vehicles, but is yet to formally answer, although he did state on television that no exemptions would be given even[17] though the sole reason for their vehicles entering the ULEZ is to protect lives. It is reasonable that, over time, the emergency services introduce more modern vehicles to their fleet, but the financial pressures that would be felt by the LFB due to the early implementation of the ULEZ would undermine their ability to do their job.

Alongside our emergency services, London's businesses will struggle to cope with the earlier introduction of the ULEZ. Businesses have been aware of the introduction of the ULEZ since 2014, when the scheme was first put out to consultation. As has been noted, the original plan was to introduce the scheme in 2020. Businesses had factored that start date into budgeting for either fleet replacement /retrofitting programmes. Business groups have criticised the Mayor's plans because many of their members have done the correct thing by initiating vehicle replacement schemes, but it will now be difficult for many businesses to be ready for the new 2019 start date without negative financial implications.

The Freight Transport Association's Head of National and Regional Policy Christopher Snelling commented:

We stated before that the central ULEZ starting in 2019 and expanding in 2020 would cause significant issues – especially in the van sector where there will only be two-and-a-half to three years' worth of compliant vehicles in the fleet. Typically, operators who rely on second-hand vehicles buy at four years old so it will place significant cost burdens on them. Bringing this further forward only adds to the cost on small businesses. Those using, or relying on, vans in inner London will now face a situation where there are no second hand vehicles available to purchase.[18]

The Federation of Small Businesses (FSB) also responded to the Mayor's proposals.

The FSB are supportive of environmental protection measures and seek to encourage its members to retrofit where economically possible. However, FSB London is disappointed that the proposals seek to bring forward the introduction of the ULEZ scheme to 2019. This, according to the FSB, simply does not allow sufficient time for businesses to make changes to their fleets without significant cost hardship and may result in business failures with resulting job losses and in the worst cases, the loss of the business owner's home if it has been used to secure business lending.[19]

The examples above of the views of key business groups show there is real concern over the impact on businesses and therefore jobs if the Mayor introduces the ULEZ in 2019 instead of 2020. Even though the central London ULEZ is a good idea, given the issues regarding early implementation that affect businesses and the emergency services, the Mayor should not go ahead with the 2019 start date, and should instead revert to the initial 2020 introduction date. To do otherwise would put a strain on small businesses and could, ultimately, lead to significant job losses.

17. BBC television interview, March 2017
18. http://www.fta.co.uk/media_and_campaigns/press_releases/2016/20161010-fta-disappointed-at-mayors-plans-to-bring-forward-ulez.html
19. https://www.fsb.org.uk/docs/default-source/fsb-org-uk/ulez-consultation---fsb-response---june-2016-final-2.pdf?sfvrsn=0

THE ULEZ EXPANSION TO THE NORTH AND SOUTH CIRCULARS

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 would be required - minimising the initial setup costs, which TfL has estimated at £30 million[20]. 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 km[21]. 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 CCZ[22], 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 London.[23]

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[24].

An expanded ULEZ would therefore need to deliver significant air quality and health benefits in order to make these costs worthwhile, but TfL analysis states that an expanded ULEZ would only deliver a 10 per cent reduction in harmful emission. Given this and the concerns raised in the analysis above, GLA finances could be used far more effectively for better air quality outcomes.

By way of comparison, £780 million could fund at least 2,600 hybrid buses[25], nearly a third of London's bus fleet[26]. According to TfL figures, by 2020 TfL buses will account for 23% of NO2 pollution on London's roads, higher more than any other source, so purchasing more hybrid buses would significantly improve air quality[27]. Ensuring a third of London's bus fleet were zero or low-emission buses would reduce harmful emissions by a comparable amount to an expanded ULEZ, but do so in a way that did not penalise the average motorist.

20. Ultra Low Emission Zone – Supplementary Information, TfL, Oct 2014, p92
21. Islington ULEZ Extension Study: Final Report, London Borough of Islington, 2015, p4
22. Islington ULEZ Extension Study: Final Report, London Borough of Islington, 2015, p4
23. Approximately 3.7 million households projected in London by 2021, according to Housing in London 2015, GLA, Sep 2015, p7
24. ULEZ Environmental Impact Assessment, TfL, Oct 2014, p11
25. 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
26. There are 8,600 buses in TfL's fleet, according to https://tfl.gov.uk/campaign/bus-investment, accessed Sep 2016
27. Ultra Low Emission Zone Consultation, TfL, 2014

IMPACT ON SMALL BUSINESSES

In addition, the likely impact on London's residents and businesses is potentially very substantial. Roughly 57 per cent of London's small businesses are located within the North and South Circulars, a total of 257,957 as of 2015. Further, 807,506 vehicles are registered within this area and the resident population is 3,688,047 as of June 2014[28]. 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 least £6.5 billion[29].

The financial implications of a wider ULEZ are likely to be felt across London and beyond, 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 London[30]. The average age of LGVs in London is eight years[31], which indicates that a significant proportion would not be compliant by 2021. As LGVs cannot be retrofitted[32], 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 of up to at least £8,000[33].

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 at least £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 at least £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 market[34] 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."[35]

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 area[36]. If all of these vehicles had to pay a £12.50 daily charge, this would amount to a significant amount of charges that Londoners would be paying each 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

28. Figures provided by GLA Economics, Aug-Sep 2016
29. This assumes a typical replacement cost of £8,000 for cars or vans, based on ULEZ Economic and Business Impact Assessment, TfL, Oct 2014
30. ULEZ Economic and Business Impact Assessment, TfL, Oct 2014
31. Ibid
32. 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
33. ULEZ Economic and Business Impact Assessment, TfL, Oct 2014
34. ULEZ Economic and Business Impact Assessment, TfL, Oct 2014, p22
35. http://www.fsb.org.uk/docs/default-source/fsb-org-uk/air-quality-consultation---fsb-response---december-2016.pdf?sfvrsn=0
36. New proposals to improve air quality, TfL, Oct 2016, p63

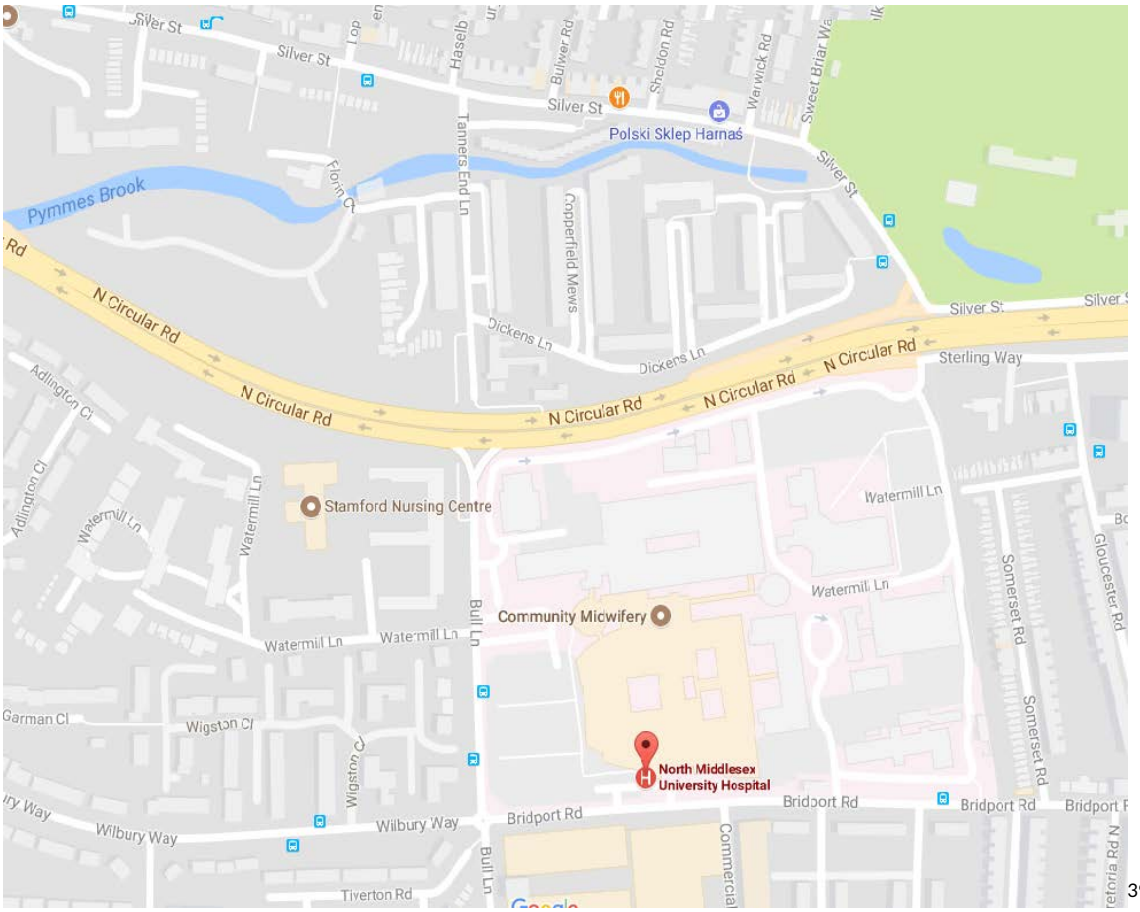
the existing Low Emission Zone covering Greater London. As noted by Policy Exchange and King's College London:

"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."[37]

IMPACT ON LONDONERS WHO LIVE OUTSIDE OR ON THE EDGE OF THE ZONE

The Mayor's proposals to expand the ULEZ out to the North and South Circular will run through ten boroughs that straddle the charging zone.[38] This division will significantly impact upon these boroughs, and the Mayor has not fully taken into consideration the everyday consequences of using the North and South Circular as a boundary. The major impact on Londoners will be access to public services within the zone. If you live outside the zone in a borough that is divided by the ULEZ your local hospital or school may be located within the zone. This means that if your car is not ULEZ compliant then the Mayor will be effectively charging you £12.50 every day to drop your child to school or visit your local hospital.

An example: North Middlesex Hospital



[39]

As an example, North Middlesex Hospital is located in the London Borough of Enfield. This is the local hospital for Enfield's residents and the majority of them live outside the proposed

37. Up in the Air: Part 2, Policy Exchange and King's College London, 2016, p22

38. This includes: Enfield, Barnet, Brent, Ealing, Hounslow, Richmond, Wandsworth, Lambeth, Southwark, Lewisham, Greenwich, Barking & Dagenham, Redbridge, Waltham Forest, Newham

39. https://www.google.co.uk/maps/place/North+Middlesex+University+Hospital/@51.6142661,-0.0754831,17z/data=!4m5!3m4!1s0x48761ebc483808ad:0x93dcc28ab472d637!8m2!3d51.6121875!4d-0.0744853

expanded ULEZ area. The hospital as you can see highlighted on the map above, is located on the North Circular. If the Mayor implements his proposals to expand the ULEZ out to the North Circular, Enfield residents whose vehicles are not compliant will be charged £12.50, on top of expensive hospital parking charges, to visit a person in hospital or to seek medical treatment themselves.

EMISSIONS BY SCHOOLS NEAR THE NORTH AND SOUTH CIRCULARS

Information obtained through Freedom of Information requests suggests there are approximately 56 schools near the North and South Circulars with some being directly located on those roads.[40] The Mayor has particularly focused his proposals for improving air quality on children living and indeed playing in school playgrounds close to polluted roads. However, an expanded ULEZ may make the air quality situation worse not better for Londoners who live, work or go to school close to the North and South Circulars, which is obviously not the desired outcome.

An expanded ULEZ would severely impact on air quality in the areas surrounding the North and South Circulars. These localities would most likely see increased congestion from vehicles that wish to avoid the ULEZ, thereby risking an increase in pollution on adjoining roads. The introduction of the Congestion Charge Zone had a similar impact on air quality in the surrounding areas, in particular on the Marylebone Road, which is on the boundary of the charging zone. When the Congestion Charge Zone was introduced, the Marylebone Road saw a 36 per cent[41] increase in NO2 pollution in the two years following the introduction of the charge, compared to the two years prior to its introduction[42].

Further, a study that explored the impact on emissions around the periphery of the CCZ found that NO2 emissions went up by 10 per cent and PM10 particles went up four per cent on the border after the introduction the congestion charge.[43] A similar increase can be expected around the North and South Circulars.

40. Information obtained via FOI
41. http://www.londonair.org.uk/london/reports/Atkinson2009-CCSImpact.pdf p12
42. c, 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
43. http://www.londonair.org.uk/london/reports/Atkinson2009-CCSImpact.pdf p12

A BETTER WAY FORWARD

The aforementioned problems associated with the Mayor's proposals suggest that it would be reasonable for the Mayor and TfL to explore alternative approaches to tackling poor air quality.

This would include going ahead with the central London ULEZ in 2020 as planned rather than in 2019, due to the complexities with it explained earlier in this report. It would mean shelving plans to expand the ULEZ to the North and South Circulars and instead using that money to invest in other schemes and activities that would not be as disruptive to London's businesses and residents. This would including freight consolidation schemes, initiatives to reduce vehicle idling, more hybrid and hydrogen buses, more rapid electric charging points and promoting the take-up of less polluting boilers.

REDUCING EMISSIONS THROUGH FREIGHT-CONSOLIDATION SCHEMES

A freight consolidation scheme is where a group of companies, usually located in the same area, agree to have deliveries co-ordinated through a central freight centre. This allows for fewer deliveries, mainly because one lorry trip from the consolidation centre can include goods from more than one supplier. The fact that these schemes result in fewer vehicle deliveries occurring contributes to improving air quality because less fuel is pumped into the air. These schemes are industry-led, not imposed by national, regional or local government. There are also a number of successful consolidation schemes in operation, including one from the Crown Estate.

The Mayor and TfL should convene a working group and develop a strategy to increase the number of the freight consolidation schemes in London, 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. This would be a cheaper alternative to some of the Mayor's policies to improve air quality many of which seem to have little flexibility.

CASE STUDY, THE CROWN ESTATE

With over 7.5 million tourist visits each year, Regent Street has a reputation for being the premier retail destination in London's West End. With a street frontage of 2km, home to over 700 small and medium sized businesses, and over 150 retail and catering outlets[44], Regent Street represents the largest concentration of value in The Crown Estate's portfolio. As such, it experiences heavy road congestion which results in an unpleasant shopping environment for visitors.

As part of the £750 million regeneration of Regent Street, The Crown Estate initiated a comprehensive public realm strategy to create better conditions for visitors, workers, residents and shoppers. One of the objectives was to create more footway space to allow better accessibility to retail outlets which would increase a retailer's turnover and ultimately result in a higher rental value for the property. To achieve this, traffic on Regent Street had to be reduced, of which a significant proportion is attributed to delivery vehicles.

Arup was commissioned to bring forward measures to reduce the volume of delivery vehicles around Regent Street[45]. Extensive experience in delivering urban logistic solutions enabled the management of complex scenarios involving multiple stakeholder groups, ensuring that we deliver value for all associated parties.

It was discovered that retail deliveries were uncontrolled, causing unnecessary congestion and road blockages during peak retail periods, with delivery vehicles accounting for 35 per cent of all peak hour traffic[46]. To improve overall retail logistics efficiency, Arup proposed the use of a retail consolidation centre, the first in the UK to make use of existing operational facilities.

The consolidation centre provides a delivery solution which allows retailers to consolidate deliveries from all suppliers to one easily accessible point outside of the congestion charging zone. Deliveries to the store are then consolidated into one consignment and delivered at a pre-arranged time via an electric truck. As well as providing a more cost-effective way to manage stock, the scheme helps to drive footfall, increase sales, and address environmental targets. Since the scheme has been implemented there has been an 80 per cent reduction in lorry movements associated with retailers on Regent Street, with 21 retailers signing up to the scheme including Liberty, Ferrari, Banana Republic and Gap[47].

This sort of initiative could be replicated not just in London but across the country. The scheme reduces the number of large vehicles delivering to Regent Street's businesses and therefore is aiding in the process of improving air quality. This scheme was introduced without pressure or motivation from the Mayor, Westminster City Council or national government. It is an example of what can be achieved without government intervention.

REDUCING EMISSIONS BY TARGETING VEHICLE IDLING

A number of local authorities are introducing policies to reduce the number of drivers who leave their engines running whilst stationary. Such interventions are intended to reduce

44. https://www.arup.com/en/projects/r/Regent-Street-delivery-and-servicing-reduction-scheme
45. https://www.arup.com/en/projects/r/Regent-Street-delivery-and-servicing-reduction-scheme
46. https://www.arup.com/en/projects/r/Regent-Street-delivery-and-servicing-reduction-scheme
47. https://www.arup.com/en/projects/r/Regent-Street-delivery-and-servicing-reduction-scheme

emissions from these vehicles during high-emitting periods.

In Westminster, for example, motorists who leave their engines idling whilst stationary can be issue with a £80 fine. The borough started this scheme in February 2017[48]. Drivers of cars, van, coaches and taxis will face a Fixed-Penalty Notice if caught idling for more than a minute while parked up.

Teams of "air marshals" record the registration numbers of polluting vehicles. Offenders will typically receive three written warnings before being given an on-the-spot £80 penalty, reducing to £40 if paid within 14 days.

Cllr Heather Acton, Westminster Council's cabinet member for sustainability and parking, said when the scheme was announced: "By speaking to drivers, making them aware of how, by switching their engine off when they are not moving, they can help cut air pollution, we can be more mindful of our impact on the environment and our health".[49]

The Licensed Taxi Drivers Association (LTDA) is backing the policy. Within the taxi industry itself, all new black cabs licensed from January 1 next year will have to be zero-emissions-capable, and no new diesel taxis will be allowed.[50]

Ultimately, it is up to individual boroughs to determine what policies they introduce to reduce air pollution and how these policies are enforced. It is welcomed that the Mayor jointly funded a no idling scheme on Tower Bridge delivered by Southwark and Tower Hamlets Councils.[51] The scheme encourages drivers to turn engines off when the bridge is raised. The Mayor should increase the number of schemes it joint funds, but only for those boroughs who wish to implement policies of this kind.

The Mayor's funding of the Vehicle Idling Action campaign action days[52] is welcomed. However, only 15 local authorities in London participated. The Mayor could play an additional role by promoting such initiatives that tackle vehicle idling in London and encourage more boroughs to be involved, especially in those projects that seek to educate motorists as to why it is important to stop leaving their engines on whilst idle. There is nothing restricting also the Mayor, via TfL, delivering a London wide awareness campaign promoting the strategy to stop people leaving their engines on whilst idle in London and educating them as to why it is important as part of his overall campaign to improve air quality.

INSTALLING MORE RAPID-CHARGE ELECTRIC VEHICLES CHARGING POINTS

Electric vehicles (EVs) will increasingly be seen as the most effective means of improving harmful emissions from vehicles. However, the greatest problem facing prospective owners of EVs is the lack of charging infrastructure in London.

As has been noted, electric vehicle sales are increasing; because of this the charging network is rapidly becoming overburdened. In the US, for example, there have already been queues at charging points as drivers squabble over access. This phenomenon has even been given a name: 'charge rage'. This is something that London should endeavour to avoid.

48. https://www.standard.co.uk/news/london/london-motorists-who-leave-engines-running-to-face-80-fines-a3439786.html
49. http://www.westminsterbc.org.uk/1865-2/
50. http://www.standard.co.uk/news/london/london-motorists-who-leave-engines-running-to-face-80-fines-a3439786.html
51. https://www.london.gov.uk/press-releases/mayoral/mayor-launches-no-idling-tower-bridge-scheme
52. http://idlingaction.london/

Founder of rapid charging point company Ecotricity, Dale Vince, says the network is coping at the moment but admits his company does have some busy sites. "We do get charge rage if someone ICEs your bay. And people don't like it if someone parks a Tesla to charge for two hours. When your car has finished charging, our message is: move it."[53] ICE-ing is EV owner-speak for when an internal combustion engine (ICE) car blocks or parks in a charging point space. British EV drivers resort to leaving notes and icy stares when the offending ICE driver returns.

How relaxed they will be as they become more numerous remains to be seen. In March, more than 17,000 new electric or hybrid models left showrooms. That's more than 12 times the number that was sold in the same month 10 years ago. In 2015, sales of cars eligible for the government's plug-in grant were up by 94 per cent compared to the previous year.[54]

This does compare well when measured against the growth in charging points. According to online database Zap-Map, there are currently 13,528 public connectors as of August this year in the UK[55]. Between September 2016 to August 2017, the number increased by 29 per cent from 10,484. So the number of charging points is growing fairly quickly. In London, there are 63 rapid charge points in London. It is also worth noting that 23 of the 63 are Tesla Supercharger points that can only be used by Tesla drivers.[56]

Latest statistics from the Department of Transport (DfT) indicate that electric vehicle registrations are growing at a pace of 172 per cent every five years. Further, statistics from the industry show that charging points are expanding by 29 per cent every year.[57] Extrapolating these growth figures out to 2031 allows us to make several assumptions. By that year, there will be just over seven million electric or hybrid vehicles on the road, which amounts to roughly one in five of all vehicles. This is rapid growth, but the main problem that derives from this is the strain such growth puts on charging infrastructure, which is mostly a problem because charging times for electric vehicles far exceed average refill times for petrol or diesel vehicles.

If charging points are expanding at the rate detailed above, there will be approximately 478,000 such points by 2031. Whereas there is now a charging point for every 26 electric vehicles, this will decrease to a charging point for every 15 vehicles. While this is an improvement, having so many vehicle fighting for a charging point within what should then be a mature market is clearly not desirable. In fact, the inconvenience caused by such a disparity could result in the industry not meeting its full potential.

Expanding charging infrastructure is, therefore, vital. In general, there are four main EV charging speeds: Slow charging (up to 3kW) which is best suited for 6-8 hours overnight, Fast charging (7-22kW) which can fully recharge some models in 3-4 hours; and there are two types of Rapid charging units (43-50kW) which are able to provide an 80% charge in around 30 minutes. The two rapid charge point types are AC and DC – depending on whether they use alternating current or direct current.[58]

Rapid charging is clearly the most convenient for Londoners, but unfortunately there are currently only two places within the Congestion Charge Zone currently where there are rapid chargers. This announcement, in April 2017, from Transport for London (TfL), is to be welcomed. However, the initial aim of TfL is to roll-out 75 charging points throughout the

53. http://www.telegraph.co.uk/cars/features/electric-car-drivers-could-face-queues-quarrels-christmas/
54. http://www.telegraph.co.uk/cars/features/electric-car-drivers-could-face-queues-quarrels-christmas/
55. https://www.zap-map.com/statistics/#location
56. Zap Map London.
57. Department for Transport, Cars licensed by propulsion / fuel type, Great Britain, from 1994; also United Kingdom from 2014, Table VEH0203
58. https://www.zap-map.com/charge-points/basics/

Capital by the end of this year, with the network growing to 150 by the end of 2018 and 300 fully functioning by 2020.

Three hundred fully-functioning rapid charging points is still not enough when you consider that there are 22,500 black cabs in London and that all new taxis licensed after 1 January 2018 will need to be zero-emission capable, and the rate of electric vehicle sales discussed above[59]. Add this to the rapid rise in privately owned EVs, and London is facing a potential infrastructure crisis.

Given the vast £780 million 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 such as more electric vehicle charging points. The Mayor could use £30million from the scrapping of this expansion to deliver 1,579 extra rapid charging points,[60] which would ensure London could cope with the rapid expansion in electric vehicle ownership.

PURCHASING MORE HYDROGEN AND HYBRID BUSES INSTEAD OF A ULEZ EXPANSION

As a priority, bus routes serving polluted hotspot areas of London should be provided with cleaner, less polluting buses, such as hybrid, electric or hydrogen buses. It is good thing that the Mayor has recently begun to address this, including his recent announcement of a number of 'Low Emission Bus Zones' to be introduced by 2020 and 300 zero emission buses by 2020, with 51 battery electric buses recently going into service on the 507/521 route, taking the number of completely electric bus routes to three, with 79 zero emission buses in total in the fleet[61]. There is, however, scope for this to be significantly expanded by ensuring more of the bus fleet is low or zero-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 per cent of NO2 pollution on London's roads, higher than any other source[62].

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 running these buses will be in central London. This could be extended into the Inner Zone and Outer Zone.[63]

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 (NOx) emissions by up to 78 per cent.

London is trialling double decker hydrogen buses this year. It was reported that at least 20 brand new hydrogen buses would be delivered as part of a £10 million part-EU/part-TfL

59. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/456733/taxi-private-hire-vehicles-statistics-2015.pdf
60. Figure derived from industry figures provided by Chargemaster.
61. https://www.london.gov.uk/press-releases/mayoral/sadiq-to-stop-buying-dirtiest-diesel-buses
62. Ultra Low Emission Zone Consultation, TfL, 2014
63. Ultra Low Emission Zone Health Impact Assessment, TfL in association with Ben Cave Associates and Ricardo-AEA, October 2014, para 8.6.3, p27

funded project. Transport for London will provide at least £5 million of funding[64]. On this basis if £680million is spent on 2,200 hybrid buses out of the £780 million that would it cost to expand the ULEZ, £70 million could provide at least 140 more hydrogen buses, which are zero-emission.

This could deliver improvements to the most polluted roads throughout London, including the Euston and Marylebone Roads and Woolwich Flyover, 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, especially when compared to the Mayor's current 2021 introduction date for the extended ULEZ.

REDUCING HOUSEHOLD EMISSIONS THROUGH A NEW BOILER REPLACEMENT SCHEME

It is often assumed that air pollution is only a transport-related issue. However, a sole focus on transport emissions hides the release of emissions from other sources, including household boilers. Gas boilers contribute approximately 12 per cent of London's NOx (nitrous oxide) emissions. New A-rated boilers are over 90 per cent efficient, and can save over 1.2kg NOx per year compared to older boilers, as well as making significant carbon dioxide savings[65]. Moving to a more efficient boiler can also save households around £340 from their fuel bills per year[66].

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 fuel poverty[67] , 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: a much more effective means of reducing household emissions.

CONCLUSIONS AND RECOMMENDATIONS

London's air quality needs to improve and it is right that the Mayor is seeking to do introduce measures to achieve this. However, the policies proposed must be effective and not have a negative impact on Londoners. It is becoming increasingly apparent that leading business groups, local authorities and the emergency services have reservations about the Mayor's policies, including the earlier implementation of the ULEZ and the proposed expansion of the ULEZ to the North and South Circulars

64. https://www.cnbc.com/2016/11/30/hydrogen-powered-double-decker-buses-are-coming-to-london.html
65. http://www.london.gov.uk/LLDC/documents/s53612/Boiler%20Scrappage%20Scheme.pdf
66. https://www.london.gov.uk/decisions/md1606-london-boiler-cashback-scheme
67. https://www.london.gov.uk/press-releases/mayoral/mayor-tackles-fuel-poverty-with-1m-boiler-fund

The report highlights what the Mayor is doing right in terms of more electric charging points, funding no idling schemes and cleaner buses and advocates that more should be done in these areas. The original central London ULEZ created by Boris Johnson is the right policy to implement, but the Mayor and TfL need to seriously re-examine the impact of its early introduction on key services, residents and small businesses before deciding to bring the start date forward. The report also highlights the T-Charge as overly expensive and not very effective in reducing harmful emissions.

The ten recommendations below indicate what the Mayor should consider going forward in order to deliver policies that will make a difference to air quality in London.

RECOMMENDATION #1 - Reassess how the GLA measures the impact of poor air quality. The report argues that the measure for health impact should, based on Government advice, change from a problem reported as a mortality issue, i.e. lives lost, to a public health problem reported as an issue of morbidity, i.e. the effect on life quality. This would allow for more targeted health interventions and for a more accurate description of the impacts of bad air, which are mostly felt at the end of life and as complications associated with already existing health conditions. Such an approach would be more informative for the general public and would aid the Mayor with delivering more cost-effective policy interventions.

RECOMMENDATION #2 - Scrap the soon to be imposed T-Charge. In the official Impact Assessment for this 'tax', it was determined that this intervention would have a "negligible" impact on emissions and would "not lead to any significant improvement" in air quality. This is simply because there are few older vehicles remaining in London that would fall foul of this charge. This 'tax' would place an unnecessary burden on poorer drivers and smaller businesses (approximately £23m in total), and all for a negligible improvement in air quality.

RECOMMENDATION #3 - Move the central ULEZ start date back to 2020, rather than 2019. Businesses and emergency services have already made contingency plans to adapt their fleets to the original timeline agreed by the previous Mayor. By bringing the scheme forward by a mere one year, there will be a real and sizable cost to small business and our emergency services, who will then have to pay a charge to enter the ULEZ in order to carry out their business or perform their duties. Such a move would not be supported by most Londoners.

RECOMMENDATION #4 - Abandon proposals to expand the ULEZ to the North and South Circulars. To have a ULEZ in Central London is logical, as this is the key pollution hotspot in the Capital. However, outside this central area, air pollution is mostly confined to major roads and motorways. To introduce a very wide charging zone, and adopt such an unwarranted and broad approach to a localised problem, would be disruptive to London's residents and businesses, not to mention the fact it would cost £780m to install and roll-out. Other measures would be just as effective at reducing harmful emissions (listed below), but without a high financial burden imposed on ordinary Londoners.

RECOMMENDATION #5 - Install more rapid charging points for electric vehicles. The Mayor currently has a commitment to purchase a good number of electric charging points. However, most of these have charging times that exceed what most commuters and taxi drivers require as part of their daily travel. Instead of expanding the ULEZ, the Mayor

should allocate £30million of the savings generated to install 1,579 rapid charging points across London, which would allow electric vehicles to recharge in minutes, rather than hours. The black cab trade and businesses would require such charging points as standard in the future. Despite recent rapid growth, the electric vehicle market will stall growth if faster charging points are not rolled out en masse.

RECOMMENDATION #6 - Play a more active role in promoting freight consolidation schemes. By making use of his convening powers, the Mayor should help locate sites in London that can accommodate freight consolidation centres. These centres help to reduce the amount of deliveries in any given area, thus reducing emissions, and also save businesses money through the sharing of scheduled deliveries. Some parts of London have already implemented this well. The Mayor should use his powers to disseminate best practice and help other localities make use of such schemes to ensure wide coverage across London.

RECOMMENDATION #7 - Instruct TfL to deliver an awareness campaign to help prevent vehicle idling. Engine idling increases the amount of emissions emitted in any given area. While it may not be possible to prevent idling at junctions and in regular traffic, it is more than possible for motorists to switch off their engines in other, more appropriate situations. The Mayor should, therefore, instruct TfL to deliver a pro-active marketing strategy aimed at highlighting the harm engine idling creates, especially for schools pupils being collected by their parents on the school run. It may also need to explore financial penalties for vehicle idling outside of schools, although such measures should always be considered as a last resort.

RECOMMENDATION #8 - Ensure a third of London's bus fleet are hybrid buses as swiftly as possible. As mentioned above, the Mayor should abandon plans to extend the ULEZ out to the North and South Circulars and save £780m in the process. Of that, £680m should be used to purchase 2,200 hybrid buses. Such a purchase could be complete this year and would not require time or delay for implementation. Purchasing these buses would reduce emissions by a comparable amount to an expanded ULEZ, but without penalising ordinary motorists and hardworking families.

RECOMMENDATION #9 - Purchase more zero-emission hydrogen buses to be used on the most polluted roads. Outside Central London, it is usually only motorways and the largest trunk roads that are in breach of air quality regulations. As such, on those roads that also contain bus routes, the Mayor should commit to ensuring as many zero-emission hydrogen buses. As buses are the single most polluting form of transportation, shifting to zero-emission buses on the dirtiest routes would deliver great benefits to London's air quality.

RECOMMENDATION #10 - Replace the current boiler replacement scheme with the previous Boiler Cashback Scheme. Household emissions represent a large portion of total emissions, and reducing these emissions should also be a mayoral priority. The current Mayor's Better Boiler Scheme focuses on cutting fuel poverty, by either repairing existing boilers or replacing them. The Mayor should reintroduce the former Mayor's London Boiler Cashback Scheme, which gave £400 for a new cleaner boiler to anyone with an old boiler, not just those in fuel poverty (although it did also include such households). It was a better incentive scheme and was broader in scope. As such, it would, if reintroduced, reduce total household emissions by a greater amount than the current scheme.

FEEDBACK

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