

Greater Manchester's Clean Air Plan to tackle Nitrogen Dioxide Exceedances at the Roadside

Note 12: Evidence of the impact of 2021 implementation of a CAZ C without exemptions



Salford City Council



Oldham Council

TRAFFORD COUNCIL



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| Version Status: | DRAFT FOR APPROVAL | Prepared by: | Geoff Clarke 8th July 2019 |
| Authorised by: Date: | Ian Palmer 12 th July 2019 | | |

1 Introduction

- 1.1 A Clean Air Plan (CAP) has been proposed by Greater Manchester's (GM) ten local authorities aiming to target and mitigate areas of poor air quality within the GM boundary, which is being managed on behalf of the 10 districts by Transport for Greater Manchester (TfGM). Currently, the CAP includes plans for a Clean Air Zone (CAZ) across Greater Manchester, implemented as a category B in 2021 and as a category C in 2023 which would apply different charges to Heavy Goods Vehicles (HGVs) and Light Goods Vehicles (LGVs or vans) alongside buses, coaches, minibuses and taxis. The proposed charges for freight vehicles are shown in **Table 1-1**.
- 1.2 The current CAZ proposal includes charging schemes in different introduction years for HGV and vans, considering the fact that vans were one of the last vehicle categories to adopt the Euro 6 emissions standards in 2016. This note provides analysis on the impact of the CAZ charge on the van sector, particularly in terms of the potential impact of introducing the CAZ charge in 2021 versus 2023.

Table 1-1 Greater Manchester Clean Air Zone Charges for freight vehicles

| Vehicle Group | Proposed CAP Charge (per day) | Introduction Date |
|---------------|-------------------------------|-------------------|
| HGVs | £100 | 2021 |
| LGVs | £7.50 | 2023 |

- 1.3 The report will discuss the impact of an earlier adoption of CAZ charging scheme for vans from the following aspects:
- Vulnerability Analysis
 - Market distortion and impact on SMEs
 - Upgrading Choice Limitation

2 Vulnerability Analysis

- 2.1 One aspect of the vulnerability of a sector is the non-compliant vehicle ratio at the time a CAZ is introduced. The higher proportion of non-compliant vehicles a sector has, the more vulnerable towards the effects of CAZ charge it is assumed to be. Other factors will also determine how vulnerable a sector is, such as the availability of compliant vehicles at an affordable cost, ability to access equity or credit, and the profitability and predictability of business operations.

2.2 Businesses in different sectors tend to keep their vehicles for different lengths and time. For example, the financial sector tends to keep vehicles for a shorter period than the construction sector does. It is sensible to assume that different sectors replenish their fleet at different rates based on the replacement age. For example, sectors with average replacement age of 10 years are assumed to replenish on average 1/10 of their fleet each year. Therefore, the vehicle compliance ratios will ultimately be based on van replacement ages as well as the time gap between the year when Euro 6 emissions standards were adopted and the date when the CAZ charge is introduced. This means that sectors that have longer vehicle replacement age will have a higher proportion of non-compliant vehicles and will therefore be more vulnerable to CAZ charge impact. Equally importantly, the sooner a CAZ charge is introduced, the less time sectors will have for upgrading their fleets, the fewer compliant vehicles that will be available and therefore, the more vulnerable those sectors will become.

2.3 As shown in

| 2.4 Sectors | Vehicle Replacement Age | CAZ Introduced at the end of 2021 | | | CAZ introduced at the end of 2023 | | |
|---|-------------------------|-----------------------------------|-------------------------|---------------|-----------------------------------|-------------------------|---------------|
| | | Non-compliant Ratio | No of vehicles affected | Vulnerability | Non-compliant Ratio | No of vehicles affected | Vulnerability |
| Construction | 15 | 65% | 26,700 | Very High | 51% | 21,100 | Very High |
| Wholesale, retail & repair of motor vehicles | 10 | 47% | 12,700 | Very High | 27% | 7,200 | Medium |
| Manufacturing | 10 | 47% | 10,500 | Very High | 27% | 6,000 | Medium |
| Transport & storage | 10 | 47% | 7,000 | Very High | 27% | 4,000 | Medium |
| Accommodation & food services | 9 | 42% | 6,000 | Very High | 19% | 2,700 | Low |
| Information & communication | 9 | 42% | 4,400 | Very High | 19% | 2,000 | Low |
| Professional, scientific & technical activities | 10 | 47% | 3,600 | Very High | 27% | 2,100 | Medium |
| Mining, energy & water supply | 10 | 47% | 3,200 | Very High | 27% | 1,800 | Medium |
| Public admin. & defence; social security | 12 | 56% | 3,600 | Very High | 39% | 2,500 | High |
| Human health & social work activities | 12 | 56% | 2000 | Very High | 39% | 1,400 | High |
| Other services | 12 | 56% | 1,900 | Very High | 39% | 1,300 | High |

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|-----------------------------------|----|------------|---------------|-----------|------------|---------------|-----------|
| Financial & insurance activities | 9 | 42% | 1,300 | Very High | 19% | 600 | Low |
| Administrative & support services | 12 | 56% | 1,800 | Very High | 39% | 1,200 | High |
| Agriculture, forestry & fishing | 15 | 65% | 1,400 | Very High | 51% | 1,100 | Very High |
| Real estate activities | 9 | 42% | 600 | Very High | 19% | 300 | Low |
| Education | 10 | 47% | 700 | Very High | 27% | 400 | Medium |
| Royal Mail | 9 | 42% | 500 | Very High | 0% | 0 | Very Low |
| Total | - | 52% | 87,900 | - | 33% | 55,700 | - |

2.5 , a 'vulnerability' analysis of the CAZ charge impact on van-owning business sectors has been carried out for scenarios where the CAZ charge for vans is introduced either in 2023 or in 2021. The analysis is based on the main criteria for assessing 'vulnerability' as shown in

| 2.6 Non-Compliant Ratio | Vulnerability |
|-------------------------|---------------|
| 10% and below | Very Low |
| 10%-20% | Low |
| 21%-30% | Medium |
| 31%-40% | High |
| 40% above | Very High |

2.7 and

assumes that any sector where more than 40% of vehicles are non-compliant at launch is 'very vulnerable' to the proposals. More work is required to better understand what drives vulnerability for different groups.

2.8 The total number of registered vans in the UK, along with the distribution of the van fleet by industrial segments, are provided by "Light Commercial Vehicles Delivering for The UK Economy 2019" report issued by The Society of Motor Manufacturers & Traders (SMMT) in 2019¹. The number of vans serving in Greater Manchester area is further estimated from the national vans number, using the population ratio between GM and the UK. This is based on the fact that the freight sector is essentially regarded as a service industry, which aims at providing a transportation service to the people and businesses in Greater Manchester area, which is also the boundary of the Clean Air Zone. Therefore, the number of vans in GM is best estimated by Aecom Freight Team, based on the size of the population in Manchester.

¹ <https://www.smmmt.co.uk/reports/light-commercial-vehicles-delivering-for-the-uk-economy/>

Table 2-1: Vulnerability' Comparison 2023 vs 2021

| Sectors | Vehicle Replacement Age | CAZ Introduced at the end of 2021 | | | CAZ introduced at the end of 2023 | | |
|---|-------------------------|-----------------------------------|-------------------------|---------------|-----------------------------------|-------------------------|---------------|
| | | Non-compliant Ratio | No of vehicles affected | Vulnerability | Non-compliant Ratio | No of vehicles affected | Vulnerability |
| Construction | 15 | 65% | 26,700 | Very High | 51% | 21,100 | Very High |
| Wholesale, retail & repair of motor vehicles | 10 | 47% | 12,700 | Very High | 27% | 7,200 | Medium |
| Manufacturing | 10 | 47% | 10,500 | Very High | 27% | 6,000 | Medium |
| Transport & storage | 10 | 47% | 7,000 | Very High | 27% | 4,000 | Medium |
| Accommodation & food services | 9 | 42% | 6,000 | Very High | 19% | 2,700 | Low |
| Information & communication | 9 | 42% | 4,400 | Very High | 19% | 2,000 | Low |
| Professional, scientific & technical activities | 10 | 47% | 3,600 | Very High | 27% | 2,100 | Medium |
| Mining, energy & water supply | 10 | 47% | 3,200 | Very High | 27% | 1,800 | Medium |
| Public admin. & defence; social security | 12 | 56% | 3,600 | Very High | 39% | 2,500 | High |
| Human health & social work activities | 12 | 56% | 2000 | Very High | 39% | 1,400 | High |
| Other services | 12 | 56% | 1,900 | Very High | 39% | 1,300 | High |
| Financial & insurance activities | 9 | 42% | 1,300 | Very High | 19% | 600 | Low |
| Administrative & support services | 12 | 56% | 1,800 | Very High | 39% | 1,200 | High |

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| <i>Agriculture, forestry & fishing</i> | 15 | 65% | 1,400 | Very High | 51% | 1,100 | Very High |
| <i>Real estate activities</i> | 9 | 42% | 600 | Very High | 19% | 300 | Low |
| <i>Education</i> | 10 | 47% | 700 | Very High | 27% | 400 | Medium |
| <i>Royal Mail</i> | 9 | 42% | 500 | Very High | 0% | 0 | Very Low |
| Total | - | 52% | 87,900 | - | 33% | 55,700 | - |

Table 2-2: Classification criteria for 'Vulnerability'

| <i>Non-Compliant Ratio</i> | <i>Vulnerability</i> |
|----------------------------|----------------------|
| <i>10% and below</i> | Very Low |
| <i>10%-20%</i> | Low |
| <i>21%-30%</i> | Medium |
| <i>31%-40%</i> | High |
| <i>40% above</i> | Very High |

2.9 As can be seen clearly in the

2.10 **Table 2-1**, within the same CAZ charge introduction year, the longer a sector keeps their van fleet, the more non-compliant vehicles they have and the more 'vulnerable' they have been assumed to be in this analysis to the impact of the charge. This can be specifically illustrated by the construction and agriculture, forestry & fishing sectors which have the longest average van replacement age (15 years) and are classified as the most 'vulnerable' with a 2023 CAZ implementation.

2.11 Comparing the 'vulnerability' of sectors between different CAZ introduction years, if a CAZ was introduced in 2021, all industries would be classified as 'highly vulnerable' based on these assumptions, with an estimated 40% or more of their fleet being non-compliant. In comparison, only two sectors remain in this category by 2023. In total, this analysis suggests that around a third of vans in GM would be non-compliant in 2023 compared to more than half in 2021, a total difference of around 32,000 vans.

- 2.12 Early introduction of the CAZ C would increase the impact on sectors classified as 'highly vulnerable', such as construction, agriculture, forestry & fishing, from a 51% non-compliant ratio to 65%. Around 30% of all affected vans (26k) are expected to be from the construction sector. Moreover, the non-compliant ratio increases dramatically from 19% to 42% for sectors, such as accommodation & food services, information & communication, etc., which appear to have lower 'vulnerability' as classified here with a later introduction. It is important to note that even if CAZ C was introduced in 2023 the vulnerability of the sector will still be classed as "High".

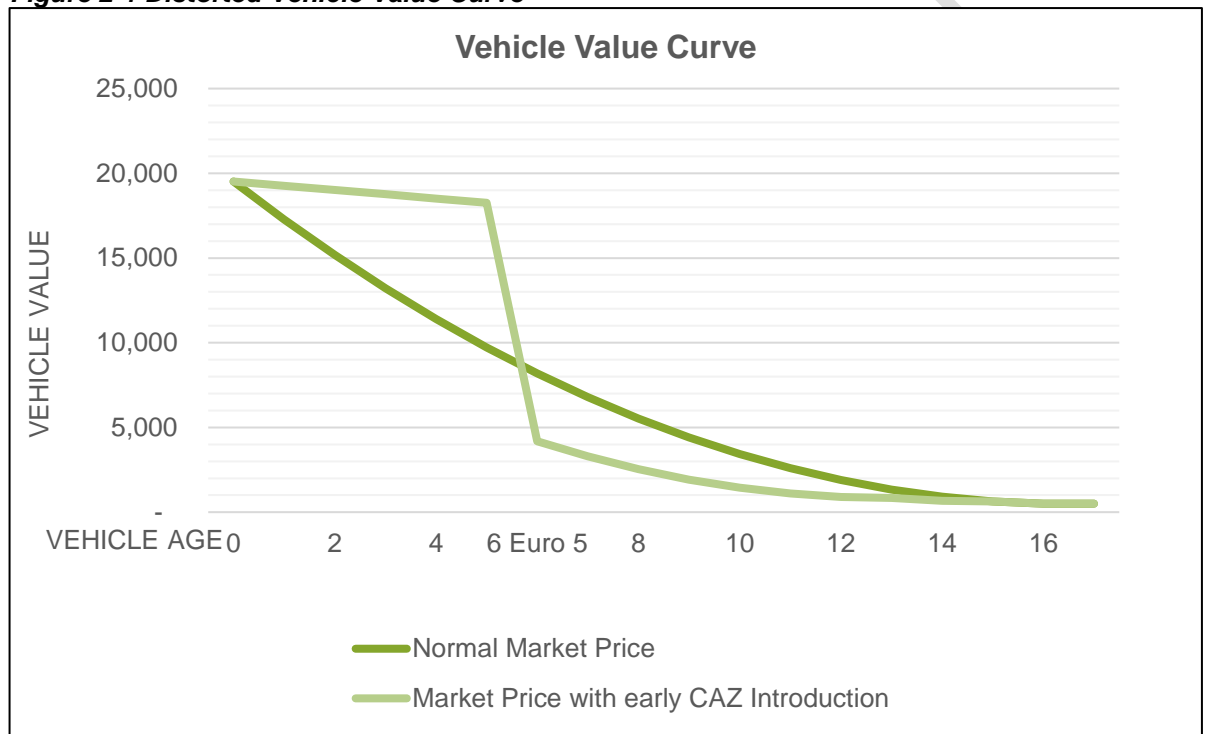
3 Market distortion and impact on SMEs

- 3.1 The analysis below shows that the implementation of a GM-wide CAZ C in 2021 has the potential to cause serious market disruptions as there would be insufficient compliant, but older, Euro 6 vans in the second-hand market.
- 3.2 According to the most recent report² issued by The Society of Motor Manufacturers & Traders (SMMT) in 2019, around 900,000 vans change hands each year illustrating how the used market is critical for the van-dependent economy. To put this into perspective there are around 300,000 new vans each year so about a third of transactions relate to new purchases. More importantly, the report evaluates that vehicles purchased from new tend to be de-fleeted after 4-5 years and the majority of second-hand vehicles are typically operated by SMEs.
- 3.3 The early introduction of a van scheme at the end of 2021 would mean that the oldest euro 6 (and therefore compliant) vans available at that point would be around 5 years-old. However, the evidence suggests that typically second-hand vans start to be released from large organisations after 4 years. This means only one-years' worth of compliant second-hand vehicles will be available in the van market, while half of all the vans are affected by early introduction of CAZ charging scheme as discussed in Section 2. The high demand for compliant second-hand vans and low supply on the market will inevitably distort the vehicle values on the market as shown in the **Figure 2-1** Error! Reference source not found. below based on local analysis, where compliant vehicle values below 5 years will be inflated in price and older non-compliant vans prices are expected to be pushed down, with the need for them to be sold outside of regions where CAZ schemes are being introduced. This is particularly concerning for SMEs who may be more likely to have relatively low net profit margins, and less flexibility in terms of access to equity or credit, and the majority of which rely on second-hand vehicles.

² Light Commercial Vehicles Delivering for The UK Economy 2019 report

3.4 Around 20% of all vans on the road are leased or rented. A high proportion of new vans are acquired in this way whereas few vehicles over 10 years are still on lease or contract hire. As typically vans have an active life of 16 years, their second or third owners tend to buy them outright. Lease lengths are typically four to five years however a small number of rental companies may renew their fleet from as short as three years, such as Enterprise. The BVRLA (the trade body for the vehicle rental and leasing sector) reported a growth of 30% in van leasing in 2016 and they had 387,000 LGVs in their member's lease fleet that year predominantly on business contract hire.

Figure 2-1 Distorted Vehicle Value Curve

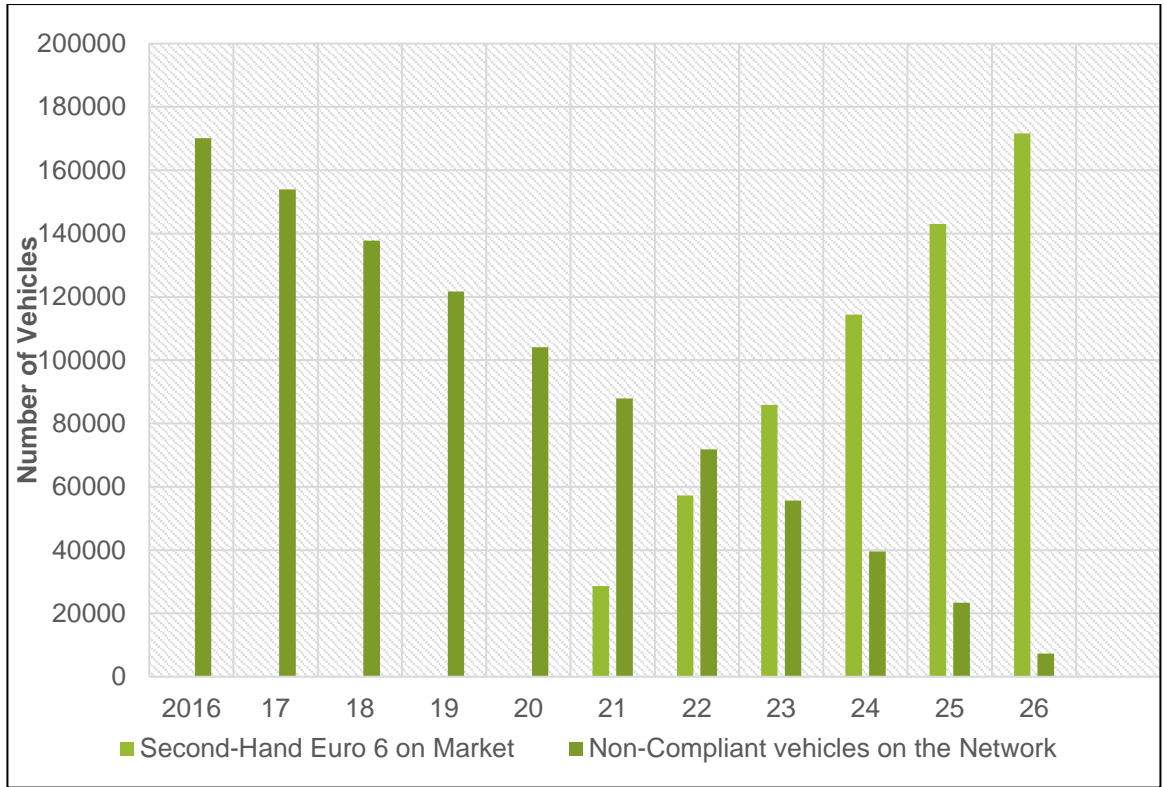


Source: AECOM analysis for GM CAP 2019

3.5 It is worth noting that the vehicle value curves above represent disturbance of early CAZ introduction in the Greater Manchester (GM) second-hand vehicle market. There is the potential that certain small and medium-sized enterprises (SMEs) and sole traders could purchase compliant second-hand Euro 6 vans from outside GM. However, the number of van owners likely to do this is estimated to be small due to the following supply and demand reasons.

- 3.6 CAZ schemes are expected to be rolled out nationwide. Clean Air Zones are already confirmed in Birmingham (category D) and Leeds (category B) and Bath have announced their intention to progress with a Category C CAZ. Clean Air Plans are under production in tens of cities and towns and it is likely that more CAZ schemes will come forward over similar timescales to the GM proposals. London implemented the Ultra Low Emission Zone (ULEZ) in the city centre in 2019 and has confirmed the expansion of the ULEZ to the area of inner London bordered by the North/South Circular roads in 2021 requiring Euro 6 for all diesel-engined vans. This means that the market for Euro 6 vans in many cities may be affected.
- 3.7 Furthermore, it is known that most second-hand vehicles are operated by SMEs who tend to just own only one or two vans and look to regular local dealers they get good service from. Considering the small size of fleet operated by individual SMEs, it seems less likely that SMEs and sole traders will purchase second-hand compliant vans outside of GM.
- 3.8 Delaying the CAZ introduction date for vans would help alleviate the potential distortion, as it allows more second-hand Euro 6s to be released into the market and reduces the brought-forward demand for compliant vehicles, with old non-compliant vehicles being naturally replaced each year. This can be further illustrated in the **Figure 2-2**, where the supply of second-hand Euro 6 vehicles start to be released into the market in late 2020/early 2021 and the demand for second-hand Euro 6 (the number of non-compliant vehicles on the network) is projected to meet the supply some time during 2023. According to SMMT in 2019, around 900,000 vans change hands each year nationwide. The turnover of vans becoming second-hand in GM is calculated based on the population ratio between GM and the UK. It should be noted that the turnover number has been discounted by a factor in order to reflect a number of second-hand vans which are becoming third-hand, which are unlikely to be compliant Euro 6 vans, as they have already changed hands once. Note that this analysis does not take into account the distorting impact of an announcement of the intention to proceed with a CAZ, which would be expected to accelerate compliance and affect market availability and sale prices before launch.

Figure 2-2 Second-hand euro 6 vehicles demand vs supply



Source: AECOM analysis for GM CAP 2019

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4 Upgrading Choice Limitation

- 4.1 Bringing the van charging scheme forward to 2021 is estimated to increase the difficulty in upgrading, in terms of the limited upgrading choices available. Here we discuss the options and argue that by leaving the introduction of the CAZ for vans to 2023 it helps in all of the following instances.
- 4.2 Vans were one of the last vehicle categories to adopt the Euro 6 emissions standards in 2016, which means there are more Euro 5 diesel vans in legacy fleets. In general, retrofit solutions can be relatively high in cost and difficult to fit. This means that it is often cheaper to replace than to retrofit vans. The retrofitting technology for vans is not expected to be ready and affordable by the year 2021 as type approval is lengthy and the market capacity to make physical changes is limited. It could be that retrofitting could be a more developed option by 2023.
- 4.3 As an alternative to purchasing a compliant diesel van, operators could alternatively upgrade to a compliant petrol or electric van. However, the fleet of petrol vans is small (less than 5% of the total LGV fleet) and most are relatively new. The availability of electric vans is also low, although several options are in development and expected to be put to market in the early 2020s.

5 Conclusion and next steps

- 5.1 Analysis by sector of potential 'vulnerability' to the implementation of charging, based on the proportion of the fleet in that sector that would be expected to be non-compliant, suggests that in 2021, more than 40% of the LGV fleet in all sectors is likely to be non-compliant. In comparison, by 2023 just two sectors are in this position, with several sectors expected to have compliant fleets of 80% or more.
- 5.2 Evidence suggests that around 300,000 new LGVs are purchased each year and that most vehicles have a 'first life' before being sold for the first time of around four to five years. Lease periods are typically of a similar length although some large van-rental companies may release their fleet after three years.
- 5.3 The early introduction of a van scheme at the end of 2021 would mean that the oldest euro 6 (and therefore compliant) vans available at that point would be around five years-old. This means only one-years' worth of compliant second-hand vehicles will be available in the van market, around 300,000 vehicles.
- 5.4 Estimates suggest that up to 90,000 non-compliant vans may be affected by a CAZ if implemented in 2021.
- 5.5 By 2023, this would be expected to fall to around 56,000 based on average turnover rates. Compliant vehicles up to 7 years old would be available.

- 5.6 The evidence suggests that SMEs tend to buy second or third life vehicles and would therefore be reliant on the availability of affordable second-hand Euro 6 vehicles in order to be able to comply.
- 5.7 Further analysis is underway to better understand the potential impacts and effectiveness of implementing a CAZ C in 2021 GM-wide without exemptions. In particular, this will focus on the availability of vehicles and deriving assumptions about the impact on sale prices and residual vehicles values, and on the implications in terms of the effectiveness of a 2021 implementation date in terms of bringing forward compliance. Other relevant factors will also be considered.

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