



RHA NOx Emission Assessment 2018

Road Haulage Association

8 May 2018

V.1

Policy context

1. The DEFRA Clean Air Zone Framework (2017)¹ requires local authorities to improve air quality in their areas. The Road Haulage Association (RHA) supports the UK government's aims to improve local air quality but has significant reservations about the approaches promoted by DEFRA and the Department for Transport (DfT). The focus to date has been in the creation of 'Clean Air Zones' with an emphasis on introducing high charges for pre-Euro VI lorries.
2. The RHA and others have highlighted that the problems this approach is causing in the road haulage sector and the ineffectiveness of current approach to focus solely on certain vehicle types (e.g. HGVs and buses) while ignoring other factors and vehicle types.
3. Last year the RHA assessed how NOx emissions from HGVs have changed and will change over the next several years. The RHA has reviewed and updated this assessment. This paper provides our estimation of the changes to NOx emissions between 2013 and 2025 based on the expected composition and use of the HGV fleet in Great Britain. We have based our assessment on fleet numbers by Euro class (up to 2017) published by the DfT on the 12 April 2018.
4. This set of estimates is vital given that the sector has no option to avoid Clean Air Zone fines other than the replacement of all non-Euro VI lorries. There is no retrofit option available for lorries – nor any government or local authority support to provide any such option. By the end of 2019, around half of the lorry fleet will still be Euro V or older.
5. To be effective, CAZ policies should be underpinned by a clear understanding of how the fleet age profile has changed and will continue to change. Failure to do so will result in an excessive and unnecessary cost to businesses and consumers.

¹ DEFRA (2017). Clean Air Zone Framework. DEFRA, London, UK.



NOx emissions by source

The data published by the National Atmospheric Emissions Inventory (NAEI)² show that NOx emissions from lorries and buses (i.e. heavy-duty vehicles³) is declining and accounted for a small proportion (7.6%) of the total NOx emissions in 2015 (Please see Figure 1b). In contrast, between 2013 and 2015, the proportion of NOx emissions from other transport and passenger cars has increased from 20% to 23% and 14.5% to 16% respectively (Please see Figure 1a and 1b).

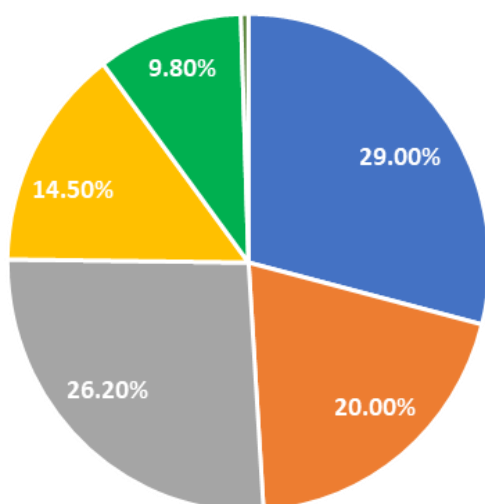


Figure 1a: NOx emissions by key sources in 2013 in the UK.

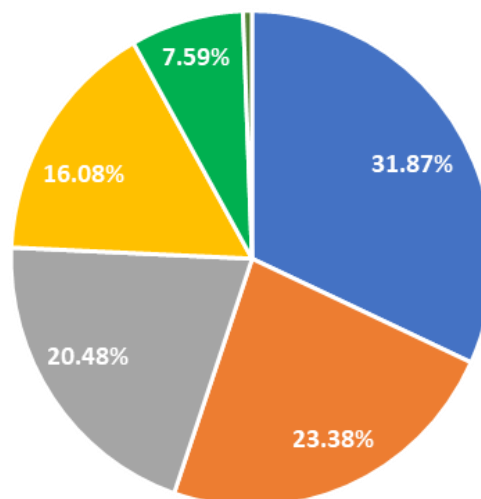


Figure 1b: NOx emissions by key sources in 2015 in the UK.

- Combustion in Industry
- Other transport
- Public electricity & heat production
- Passenger cars
- Lorries and buses
- Production processes: Agriculture/waste/other

² NAEI - http://naei.beis.gov.uk/overview/pollutants?pollutant_id=6

³ Heavy-duty vehicle – A bus or lorry designed for heavy work. https://en.wiktionary.org/wiki/heavy-duty_vehicle.

RHA NOx emissions assessment

The RHA’s estimates for NOx emissions from the lorry fleet between 2013 and 2025 in Great Britain is presented in Figure 2. For indexing, we considered 2013 as a base year as this is the year Transport for London (TfL) use as their baseline for consideration of Ultra Low Emission Zones. We can see that following the introduction of Euro VI in 2014, NOx emissions fell by 43% to 57.3% to the end of 2017 when compared to the base year. The 21% reduction in the RHA assessment between 2013 and 2015 is in line with the NAEI assessment as shown in Figure 1.

In summary, by 2025, NOx emissions from the lorry fleet is expected to be reduced to less than one-fifth of the base year emission level (i.e. the end of 2013).

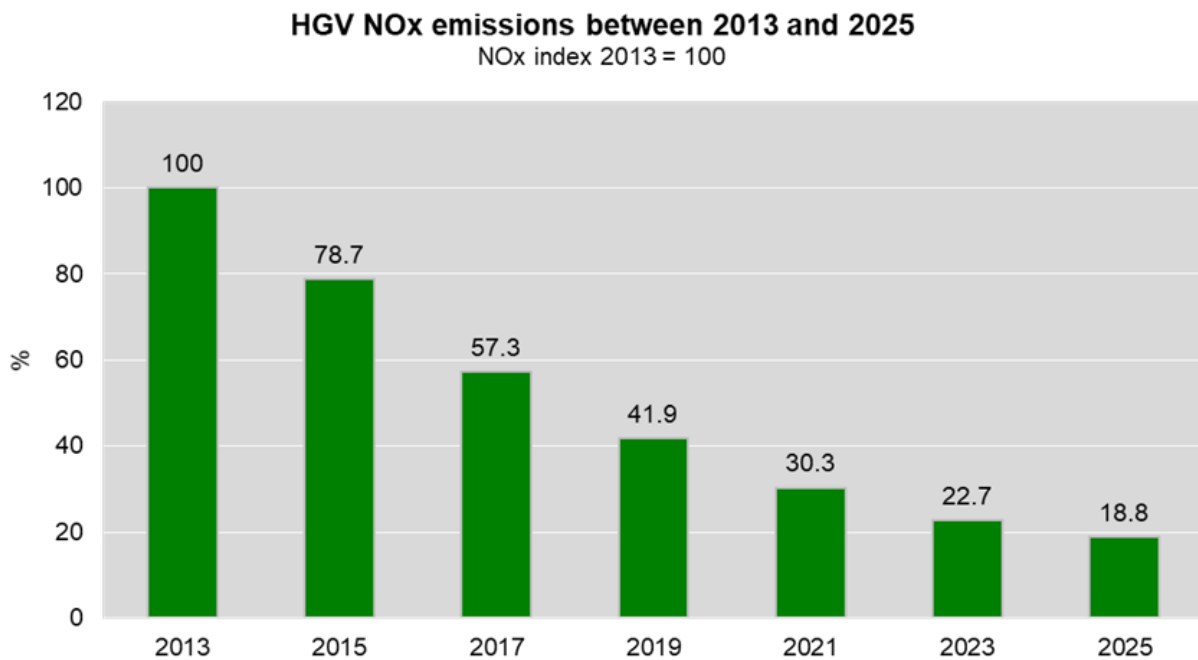
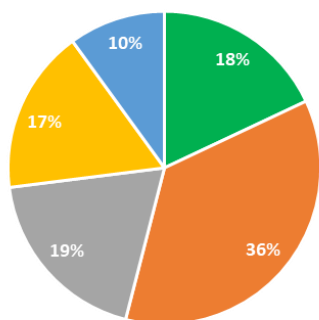


Figure 2: RHA Estimates of NOx emissions from lorries in Great Britain.
NOx Index in 2013 = 100.



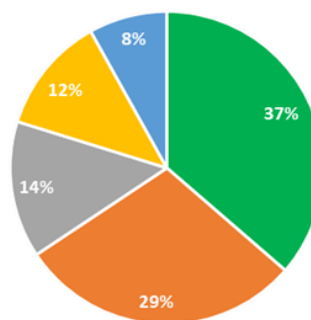
Fleet age profile by Euro class

Understanding how the lorry fleet changes over time is vital for policymakers so that they can assess the impact of any proposed Clean Air Zones on operators.



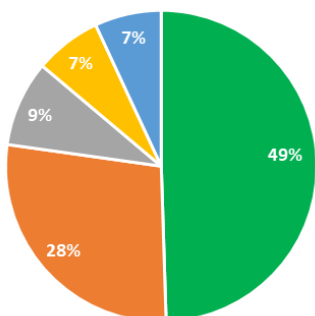
■ Euro VI ■ Euro V ■ Euro IV ■ Euro III ■ Pre-Euro III

Figure 3a: GB HGV fleet by Euro class in 2015.



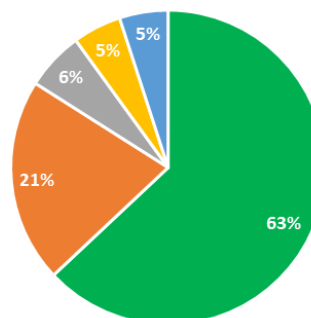
■ Euro VI ■ Euro V ■ Euro IV ■ Euro III ■ Pre-Euro III

Figure 3b: GB HGV fleet by Euro class in 2017.



■ Euro VI ■ Euro V ■ Euro IV ■ Euro III ■ Pre-Euro III

Figure 3c: GB HGV fleet by Euro class in 2019.



■ Euro VI ■ Euro V ■ Euro IV ■ Euro III ■ Pre-Euro III

Figure 3d: GB HGV fleet by Euro class in 2021.

The above charts show how the composition of the GB lorry fleet evolves over time (please see Table A2 in the annex for details).

The assessment shows that at the end of 2019 just over half the lorry fleet will not be Euro VI – and will, therefore, be subject to Clean Air Zone pay to pollute charges where they will apply from that time.

The assessment also shows that by 2025 the lorry fleet will be dominated by Euro VI – with about 80% fleet being Euro VI at that time. This will represent nearly all of the commercially active vehicles in 2025.

Concluding remarks

In summary, our estimates show that pre-Euro VI vehicles are rapidly being replaced by Euro VI and this trend will continue.

Our data also gives an indication of for how long modern Euro IV and Euro V lorries will be in highly active service. Generally, lorries last about 12 years in active service. We know that it is longer for specialised vehicles.

The data published by the National Atmospheric Emissions Inventory (NAEI) show that NOx emissions from lorries and buses is declining and accounted for a small proportion (7.6%) of the total NOx emissions in 2015.

The prediction is that given consistent changes in fleet profile, we found that by 2025, there will be an 80% decline in NOx emissions level from the GB lorry fleet compared to the 2013 base year level - without imposing any restrictive measures on HGV movements. This reduction excludes any change due to alternative fuels or electrification – both of which may add to that reduction.



Annex - RHA Information on the GB lorry fleet and emissions

Table A1 below shows EU NOx emission standards for HGVs over time:

Table A1: NOx emissions - maximum permitted by Euro Standard

Euro standards	Year	NOx standard*
Euro VI	2014 onwards	0.4
Euro V	2009 to 2013	2.0
Euro VI	2006 to 2008	3.5
Euro III	2001 to 2005	5.0
Pre Euro III	1997 and older	7.5

(Rounded to full year)

Table A2 shows the approximate Euro Standard for the GB lorry fleet in each selected year.

Up to 2017, DfT data is used RHA estimates are used thereafter.

Table A2: Licensed heavy goods vehicles at the end of the year in Great Britain between 2013 and 2025.

	2013	2015	2017	2019*	2021*	2023*	2025*
Euro VI	0	83,236	177,327	244,853	308,349	360,632	398,438
Euro V	180,000	168,162	142,497	136,367	104,378	73,064	48,731
Euro IV	108,600	91,598	70,641	43,169	28,437	18,453	13,020
Euro III	104,100	79,566	59,406	32,046	22,232	16,301	11,820
Pre Euro III	65,600	49,497	38,406	33,565	26,604	21,550	17,992

Data to 2017 extracted from DfT Statistics - VEH0511, published April 2018.

* RHA Data generated from long-term fleet profile information derived from VEH0511 - April 2018.

The projected HGV market share index by Euro class until 2025 is shown in Figure A3. It shows that the rapid rise in the share of Euro VI over time.

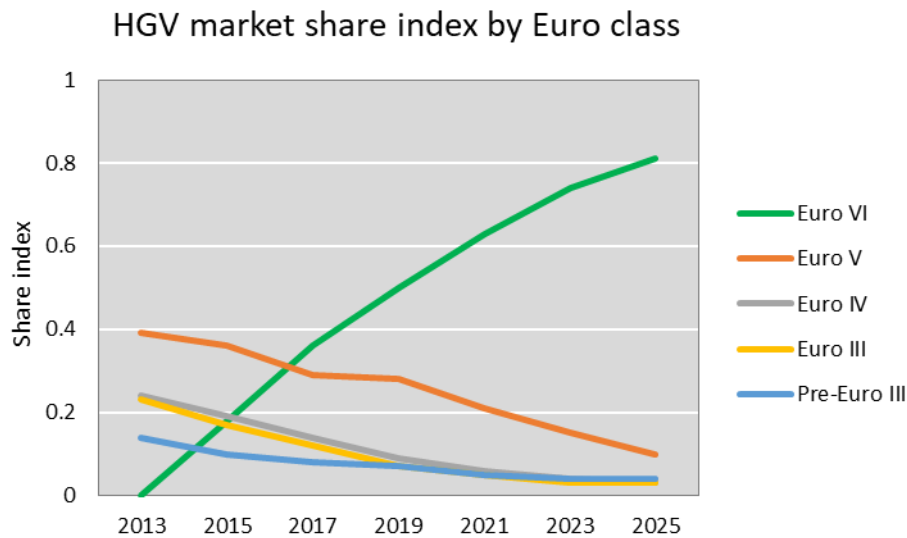


Figure A3: HGV market share index by Euro class between 2013 and 2025.

NOx emissions by source data published by the UK's National Atmospheric Emissions Inventory's are presented in Figure A4.

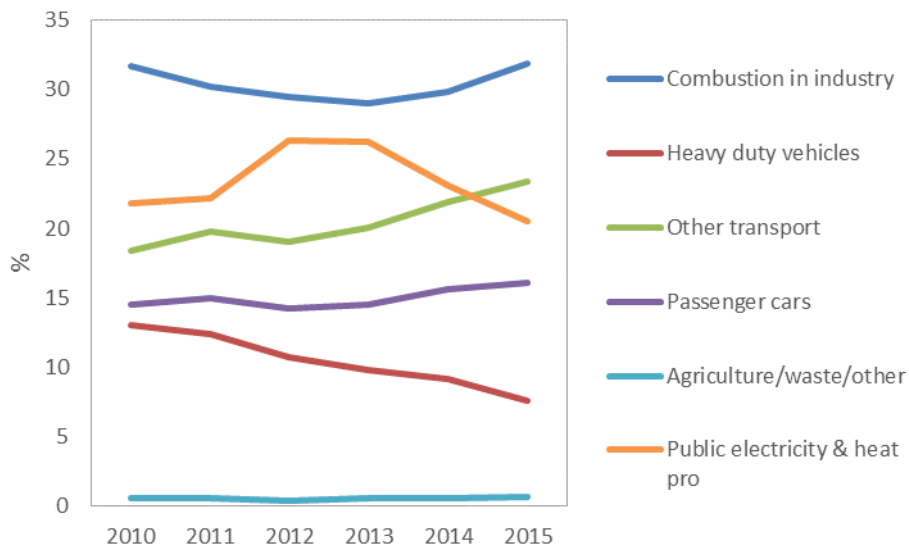


Figure A4: NOx emissions from key sources between 2010 and 2015.
Data source: National Atmospheric Emissions Inventory (NAEI).

Duncan Buchanan,
Policy Director
Email: d.buchanan@rha.uk.net