Diesel car pollution higher in neighbourhoods outside city centre

Methodology

Data source and site inclusion

The dataset used in this study is available on the Breathe London website. This dataset was produced by Cambridge Environmental Research Consultants (CERC), who used their ADMS model to estimate the average source-specific hourly NO_x concentrations ($\mu g/m_3$) from 1st April 2019 to 12th December 2019 at sites across London. The sources modelled include those listed in Figure 3 below.

Duplicate locations were removed from the dataset, and the sites were restricted to all sites within Greater London and classed as either roadside, kerbside or urban background; leaving 231 sites in total. Figure 1 below shows the sites studied across Greater London and their distribution within the city centre (defined by the Ultra Low Emission Zone - ULEZ), the planned ULEZ Expansion (coming in 2021) and the remainder of the city sitting outside of those zones.

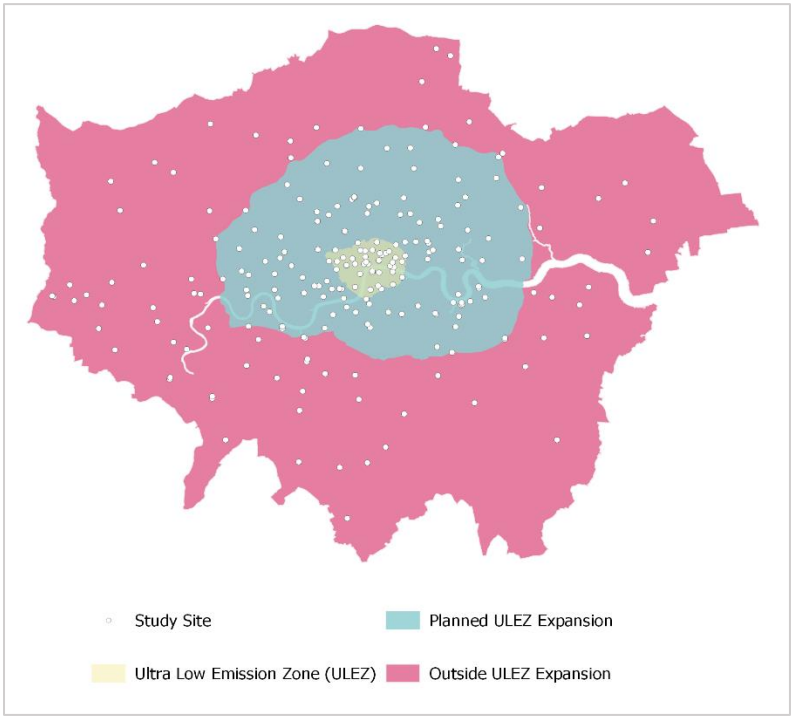

Figure 1: Greater London coloured by area, with study sites

Average concentration comparison

The difference in NO_x pollution from diesel cars at sites outside and inside the city centre of 23% was calculated by comparing the modelled average hourly concentration associated with diesel cars averaged across all sites (n=194) outside the ULEZ (15.01 µg/m3) to the modelled average hourly concentration associated with diesel cars averaged across all sites (n=37) within the ULEZ (12.24 µg/m3).

To ensure this comparison is fair, it is important to check that the proportion of site types is comparable across the different areas. Table 1 shows that both areas have a similar proportion of kerb or roadside and urban background sites.

Area	Site Type	%
Outside ULEZ (ULEZ expansion and LEZ)	Kerb or Roadside	65%
Outside ULEZ (ULEZ expansion and LEZ)	Urban Background	35%
ULEZ	Kerb or Roadside	68%
ULEZ	Urban Background	32%

Table 1: Comparison of the proportion of site types by area.

Diesel car percent contribution

The diesel car percentage of total NO_x at each site was calculated from the modelled average hourly NO_x concentrations associated with diesel cars divided by the total of average hourly NO_x concentrations associated with all emissions sources, in the 1st April to 12th Dec 2019 time period.

A high percentage contribution of NO_x from a source is not necessarily associated with a high concentration of NO_x. Figure 2 shows that generally sites outside the ULEZ expansion have a higher percentage contribution value than sites at a similar concentration levels in the ULEZ and ULEZ Expanded areas, and that sites with greater than 25% contribution from diesel are largely sites outside the ULEZ expansion, which also have relatively high concentration levels.

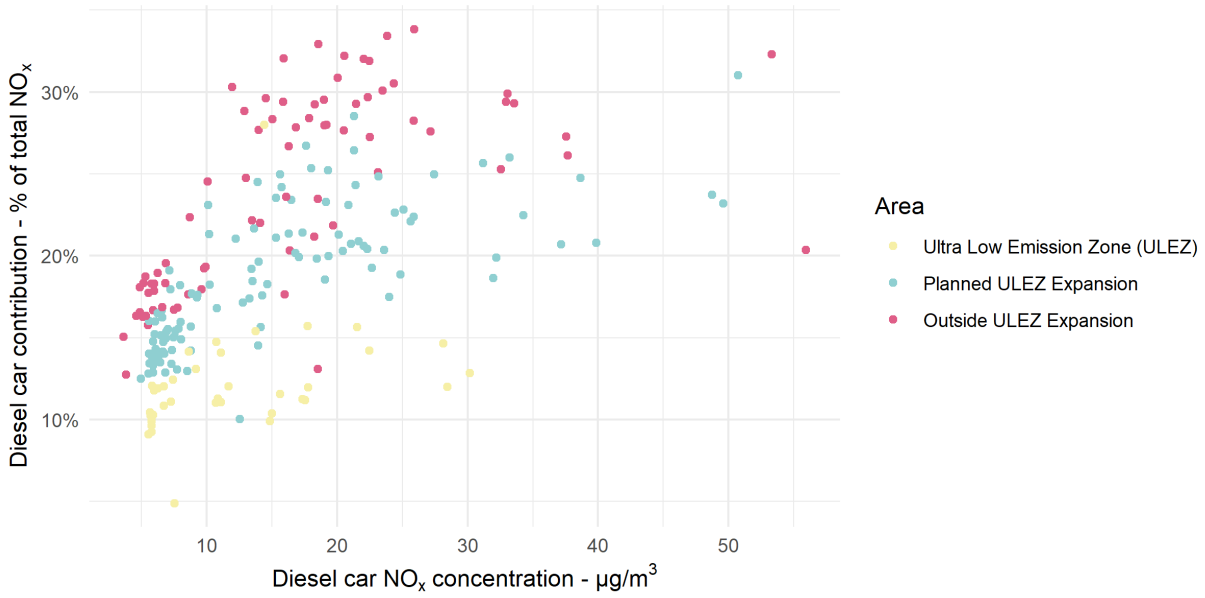

Figure 2: Diesel car concentration and % contribution for all London sites.

Diesel cars are the dominant source in the dataset in terms of average percentage contribution to total NO_x, contributing 19% on average across all monitoring sites in Greater London. Figure 3 illustrates how this figure is larger in outer London areas, while the contribution from commercial gas and petrol car sources (including Taxis) is lower.

Figure 3: Mean % contribution of all sources by area.