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Quantifying the impact of low- and zero-emission zones in six European cities

for the Clean Cities Campaign and Transport & Environment

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1 Introduction

The European Commission has been undertaking a review of the Ambient Air Quality Directive 2008/50/EC, abbreviated as AAQD. The purpose of this report is to provide real-world context and analysis to inform this process. The European Commission has also recently set out proposals for regulating the type approval of emissions from motor vehicles under the Euro 7 standard; a separate element of research has been commissioned which is currently being finalised and will be reported on in due course. The current report quantifies the benefits that future Low Emissions Zones (LEZs)[1,2] and Zero Emissions Zones (ZEZs)[3] might have on air quality in major European Cities. It takes a generally cautious approach regarding air quality improvements in the future, particularly with respect to those which might be delivered by non-transport sectors.

The work has been carried out by Air Quality Consultants Ltd (AQC), on behalf of the Clean Cities Campaign (CCC) and Transport and Environment (T&E). Additional data has been kindly provided by the International Council on Clean Transportation (ICCT) and The Real Urban Emissions (TRUE) Initiative.

The AAQD requires that limit value compliance must be achieved at all relevant locations within each member state, and the Court of Justice of the European Union has clarified that compliance must be assessed at monitoring states where people's exposure is greatest, and not based on an average across an area[4].

Within each member state, the location with the maximum reported concentration thus defines when and if a limit value is achieved. Local 'hot spot' areas[5] inevitably dictate the ultimate date of compliance. Measures to improve air quality in these worst-case locations usually combine international, national, and local actions. Local actions such as LEZs and measures to encourage modal shift can be particularly effective, as shown by AQC in a companion report to this one[6]. Despite this, it is understood that the European Commission's impact assessment to accompany the proposals for a revised Directive does not take the potential impacts of further Low- and Zero Emission Zones into account. The Commission's analysis thus misses a key feature which might assist member states achieve future limit values.

The LEZ/ZEZ study shows the additional benefits that LEZs, ZEZs, and their tightening, might have on air quality in the following six cities:

- Madrid;

[1] LEZs regulate access to urban areas based on the emissions of motorised vehicles[2].
[2] https://cleancitiescampaign.org/wp-content/uploads/2022/07/The-development-trends-of-low-emission-and-zero-emission-zones-in-Europe-1.pdf
[3] ZEZs restrict the use of vehicles with internal combustion engines[2].
[4] https://www.clientearth.org/latest/latest-updates/news/clean-air-closer-for-brussels-after-top-eu-court-ruling/
[5] Meeting the siting requirements of the AAQD.
[6] https://www.aqconsultants.co.uk/CMSPages/GetFile.aspx?guid=61d3074d-014c-4f7f-896f-3915c7bce75e

- Paris;
- Brussels;
- Milan;
- Warsaw; and
- London[7].

While a range of assessment methods might ultimately be required, the most common approach in reporting compliance with the AAQD limit values is to use measurements made at fixed monitoring sites. As noted above, the monitoring site[5] which measures the highest concentration ultimately dictates when and if the limit value is exceeded within a zone or agglomeration. This study has thus focused on the fixed monitor within each city measuring the highest concentrations. However, since very local actions (e.g. individual road closures) could simply 'move' the worst-case measurement in a city, and because the existing fixed monitoring sites are unlikely to represent unique[8] air quality conditions within each city, the worst-case measurements are taken more broadly to represent worst-case air quality across the city as a whole. The potential future benefits on these concentrations from three alternative LEZ/ZEZs in each city have then been quantified, including expected effects on traffic reduction and modal shift as already observed in the most stringent low-emission zones (e.g. London's ULEZ).

1.1 Report Structure

Section 2 outlines the methodology for this study. Section 3 describes the measurements from each of the six cities on which this study has been based. Section 4 sets out the results for each city. Finally, Section 5 provides a brief summary and conclusions.

[7] While London is outside of the EU27, it is still of interest to consider the potential effects of future tightening of the London 'Ultra' LEZ.

[8] or even the worst-case location. Locations with fixed monitors are unlikely to capture the worst air quality across all hotspots in a city (https://www.aqconsultants.co.uk/CMSPages/GetFile.aspx?guid=2b5163c4-a64a-482a-930a-d0d99ee52b84)

2 Methodology

2.1 Conceptual Overview

Air quality modelling can often be complex, combining multiple threads of highly detailed assumptions. The relative uncertainty around different assumptions is not always the same and it is not always obvious that the additional complexity gives more accurate results.

The approach taken here seeks to cut through much of the complexity often associated with predictive air quality modelling. It forecasts ambient concentrations without recourse to dispersion algorithms or multi-source emissions inventories. It uses recent measured concentrations, combined with the relative changes to predicted future transport emissions, to estimate future ambient concentrations. While such a simplified approach does have clear limitations, which are identified in Section 2.6 and are intended to be fully transparent, the outcomes are suitable to demonstrate the effects that local traffic interventions might have on worst-case concentrations within each city. While more complex modelling might add detail, it would not necessarily result in more accurate future-year predictions or change the outcomes of this study.

The approach taken can be summarised as:

1) Define the road increment to measured annual mean NO_2 and $PM_{2.5}$ concentrations – in most cases this is taken as the maximum measured concentration minus the measured concentration from a representative local background monitoring site;
2) Predict the change in traffic-related NOx and $PM_{2.5}$ emissions within LEZ area, over time and associated with each LEZ/ZEZ – this was done using a simple emissions model, with fleet projections derived with assistance of CCC and T&E; and
3) Assume that the relative change to local traffic-related NOx and $PM_{2.5}$ emissions will translate directly as a relative change to the local increment of NOx and $PM_{2.5}$ concentrations.

It has also been necessary to make some broad assumptions regarding changes over time to the concentration increment from other sources (i.e. the local background), but this is not the focus of the study and so these assumptions are coarse and intended to be conservative.

The approach taken here does not require, or define, a specific geographical extent of any of the LEZ/ZEZs. It simply assumes that the LEZ/ZEZ will act on the entire local traffic increment to concentrations. In practice, this is usually dominated by roads within 200 m of an assessment point, but while the assessment points are based on the fixed monitoring sites, they are not intended to solely represent these locations. The principal limitations with this approach are that it assumes direct linear relationships between total traffic emissions within each LEZ/ZEZ and those which drive concentrations at each monitor, and between NOx and NO_2 concentrations. The implications of these, and other limitations, are discussed further in Section 2.6, but notwithstanding these limitations, the approach is sufficient to indicate the potential benefits achievable within a city from LEZs and ZEZs.

Further details of the approach are provided in the next subsections.

2.2 Defining Existing Baseline Local Road Increments

As explained in Section 2.1, this study cuts through model complexity by relying on ambient measurements. However, this approach is constrained by the availability of ratified measurements, and by recent temporary effects of the COVID-19 Pandemic [9]. Ratified measurements for 2022 were not available to inform the study, and it was considered that measurements during both 2020 and 2021 risked under-reporting long-term concentrations owing to the COVID-19 Pandemic. The base year for the study was thus defined as 2019. While using concentrations aggregated over multiple years might provide a more robust dataset, it would also have added significant complexity to the approach and was not considered necessary.

For each city, the fixed roadside monitoring site with the highest measured annual mean NO_2 concentration in 2019 was identified. The nearest representative background monitor was also defined. The difference between the concentrations measured at the roadside and background was taken to represent the local road increment. Further details of this process, and a description of the measurements used, is provided in Section 3.

The same approach was taken for $PM_{2.5}$ where suitable data existed. However, in several cases, direct reliance on the reported measurements was the most considered to be appropriate (see Section 3). This was because either the available roadside measurements were not considered to represent a worst-case location within the city, or because the available background measurements did not appear to sufficiently represent the contribution from other sources at the roadside monitoring site. For Brussels, Madrid and Warsaw, local road-$PM_{2.5}$ was calculated from measured road-NOx concentrations, while for Milan it was calculated from measured road-NO_2 concentrations. Details of this approach are given in Section 3.

An alternative approach which was considered was using the changes to concentrations measured during the COVID-19 pandemic as an indicator of the local traffic component. Previous work for the CCC has quantified the effect of lockdowns and mobility restrictions on roadside NO_2 concentrations[6]. However, even during the most stringent lockdowns, appreciable traffic volumes remained on roads and so this approach would underestimate the total road component. As a check on the approach used here, the road component of NO_2 concentrations in Brussels, Madrid, Paris and London calculated in this current study has been compared with the reduction in roadside NO_2 concentrations measured in these cities during the pandemic[6]. The road components of NO_2 calculated here are consistently higher, which is as expected.

[9] https://www.aqconsultants.co.uk/CMSPages/GetFile.aspx?guid=61d3074d-014c-4f7f-896f-3915c7bce75e

2.3 Defining the Contribution from Other Sources

The contribution to concentrations from all other sources in the existing baseline was taken from the background measurements and existing background calculations described above in Section 2.2. In practice, even background monitors which are well away from roads will be affected by emissions from road traffic, and so this contribution does not represent concentrations in the absence of any traffic emissions.

There is significant uncertainty in predicting background concentrations in the future. They will be affected by local, regional, and national trends and policies reflecting non-transport emissions as well as by non-local transport emissions. They will also be affected by natural events. It is not within the scope of this study to predict these effects in any detail. A simple and pragmatic approach was thus taken of projecting future trends in background concentrations based on recent historic trajectories. This has calculated the average rate of decline between 2009 and 2019 (inclusive), as explained further for each city in Section 3, and projected the same rate of change (in $\mu g/m^3$ per year) into the future. However, recognising that emissions from many sources will be almost impossible to remove entirely, the background concentrations were restricted to fall no lower than the lowest concentration measured anywhere within a city in any recent year. In most cases, this limits the background concentrations to fall no lower than those measured during the COVID-19 pandemic. Details of these calculations, in each city, are given in Section 3.

In practice, it is considered likely that the predicted contributions from other sources in the future might be much lower than predicted here. Also, because reductions to road traffic emissions would also be expected to reduce the road traffic component of background concentrations, the predicted effects of future transport interventions are also likely to err on the side of caution.

2.4 Predicting Local Road Increments in the Future

For each city, an emissions model has been generated, as described below.

Emissions Factors for Madrid, Paris, Brussels, Milan and Warsaw

For exhaust emissions, this has used the COPERT V5.6 hot emissions functions with an average speed of 30 kph. $PM_{2.5}$ emissions from road abrasion, tyre wear and brake wear have been estimated using the Tier 2 approach in the 2019 Inventory Guidebook[10], as set out in Table 2-1.

Emissions from resuspension of previously deposited material are not required to be reported in national inventories, since this would double-count national total emissions. No method is therefore provided in the Guidebook. Resuspension emission rates will vary by region, with the moisture content of air and road surface being important, as well as the use of road salts and winter tyres in some parts of Europe[11]. Resuspension is, however, efficient only for particles with a

[10] https://www.eea.europa.eu/publications/emep-eea-guidebook-2019
[11] https://www.sciencedirect.com/science/article/abs/pii/S1352231021004143

diameter greater than 1 µm, which limits its contribution to $PM_{2.5}$ concentrations[12]. Most studies which have quantified resuspension have thus focused on PM_{10} rather than $PM_{2.5}$[11]. AQEG, 2019[12] used measurements made in London to show that the contribution of resuspension was mostly in the coarse ($PM_{2.5}$-PM_{10}) fraction of concentrations. The same report also combined modelling and measurements to source-apportion $PM_{2.5}$ and PM_{10} concentrations at monitoring sites across London, using the assumption that resuspension contributed significantly to PM_{10} concentrations but contributed nothing to $PM_{2.5}$.

Table 2-1: Existing Baseline Non-Exhaust $PM_{2.5}$ Emissions Factors (g/v-km) [a]

Vehicle Class	Road Abrasion [b]	Tyre Wear [c]	Brake Wear [d]	Total
Two-wheel vehicles	0.00162	0.002685	0.00241	0.00672
Passenger cars ICE	0.00405	0.006247	0.007946	0.01824
Passenger cars - Hybrid	0.004293	0.00648	0.006318	0.01709
Passenger cars - PHEV	0.004347	0.006539	0.004299	0.01518
Passenger cars - BEV	0.004563	0.006772	0.002214	0.01355
Light duty trucks (N1-I)	0.00405	0.009866	0.007946	0.02186
Light duty trucks (N1-I,II)	0.00405	0.009866	0.011267	0.02518
Rigid Heavy Duty Trucks	0.02052	0.015198	0.0204	0.05612
Articulated Heavy Duty Trucks	0.02052	0.031603	0.0204	0.07252
Buses	0.02052	0.014954	0.021438	0.05691

[a] The number of significant figures links to the source data and is not intended to indicate data accuracy.

[b] Taken from Tables 3.8 and 3.9 of 1.A.3b.vi(i) (2019)[10]

[c] Taken from Tables 3.4 and 3.58 of 1.A.3b.vi(i) (2019)[10] with speed correction for <40kph. For trucks and buses, values based on fleet assumptions published in the UK NAEI[13]

[d] Taken from Tables 3.6 and 3.7 of 1.A.3b.vi(i) (2019)[10] with speed correction for <40kph. For trucks and buses, values based on fleet assumptions published in the UK NAEI[13]

While resuspension may contribute to $PM_{2.5}$ concentrations, it is of principal concern for PM_{10}. Furthermore, there is no accepted and universal approach to estimate $PM_{2.5}$ emissions from resuspension. This study has not, therefore, included emissions from resuspension. This may mean that the contributions from other sources will effectively have been over-predicted to compensate for the absence of a resuspension emissions source, but the extent of this is expected to be very small.

[12] https://uk-air.defra.gov.uk/assets/documents/reports/cat09/1907101151_20190709_Non_Exhaust_Emissions_typeset_Final.pdf
[13] https://naei.beis.gov.uk/

A separate sensitivity test has also been carried out using NOx emissions factors derived by Mulholland et al., 2022[14] (Figure 2-1). These were derived from remote sensing campaigns across Europe, and the values were provided for use in this study by the report's authors. For these calculations, the COPERT functions have been replaced by those from Mulholland et al., 2022. For vehicle types not covered in the Mulholland et al. study, the COPERT emissions functions were retained. For the main analysis (i.e. not the separate sensitivity test), COPERT emissions functions were used for all vehicle types.

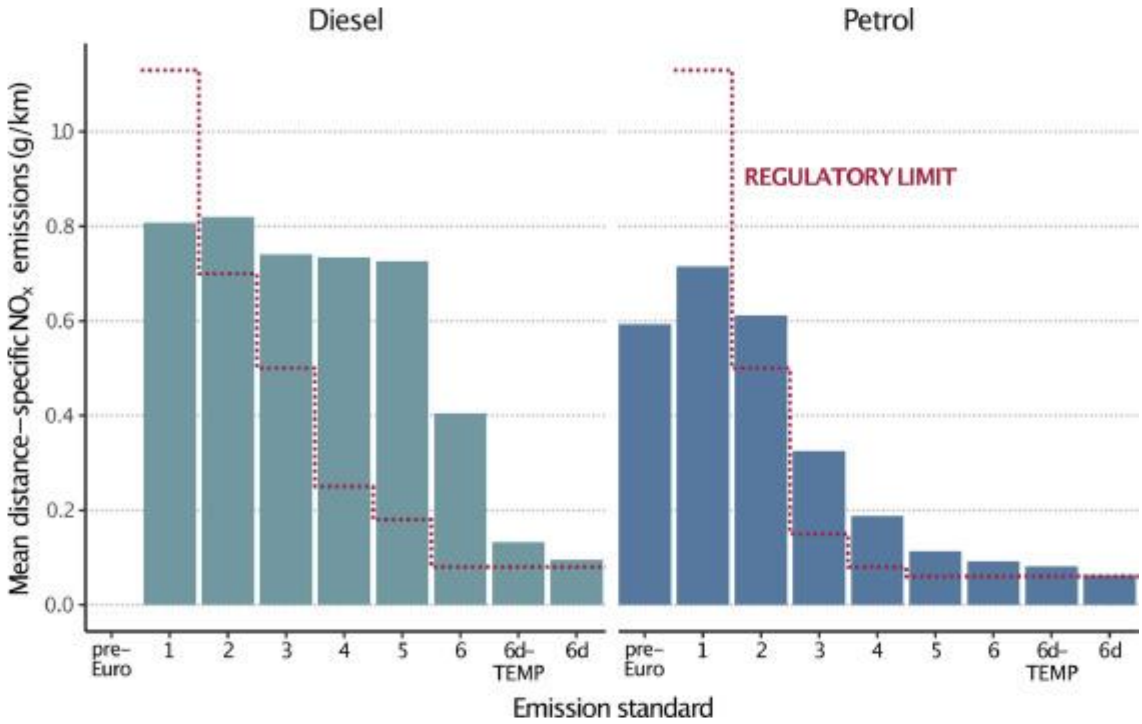


Figure 2-1: Mean distance-specific NOx emissions from all passenger cars measured in four European cities (Brussels, Krakow, London, and Paris) between 2017 and 2020. The laboratory type-approval limits for emission standards are indicated in red. Copied from Mulholland et al., 2022[11]

Baseline Fleet Data for Madrid, Paris, Brussels, Milan and Warsaw

For Madrid, Paris, Brussels and Milan, the existing fleet composition was taken from the national urban average fleet composition for each country in 2018 provided by emisia[15] for previous work carried out for CCC[9]. Where necessary, the vehicle categories were re-mapped onto the latest COPERT V5.6 vehicle descriptors. For Warsaw, the existing fleet composition was taken from local surveys carried out in 2020 by Lee et al., 2022[16] and provided by those authors, with additional vehicle size composition data taken, where necessary, from the average urban composition across the four other cities listed above. The 2018 and 2020 data have both been taken to represent 2019 without any adjustment.

[14] https://www.sciencedirect.com/science/article/pii/S2666691X22000318
[15] https://www.emisia.com/utilities/copert-data/
[16] Evaluation of real-world vehicle emissions in Warsaw (theicct.org)

It has been assumed that total baseline traffic volumes within each LEZ/ZEZ will not change between the existing base year and the 2030 baseline.

Future vehicle fleet composition data were derived with the assistance of CCC and T&E. The baseline assumptions provided by CCC and T&E are summarised in Table 2-2. For cars and vans, they are based on a cautious projection of the uptake of Zero Exhaust Emission Vehicles (ZEEVs), driven only by existing regulations. For trucks, where no similar regulations currently exist, market forecasts were used. It should be noted that in the case of the bus fleet, this does not represent a position which will be achieved without considerable future effort but is one which is considered to be achievable given sufficient will.

Table 2-2: Future Baseline Projections of Zero Exhaust Emissions Vehicles (ZEEVs) in Madrid, Paris, Brussels, Milan and Warsaw *

City	Vehicle Type	2025	2027	2030
Madrid	Cars	2.8%	4.7%	10.8%
	Buses	41% (the rest Euro VI)	63% (the rest Euro VI)	95% (the rest Euro VI)
	Vans	1%	1%	4%
	Light Trucks[a]	1%	2%	10%
	Medium Trucks[b]	0%	1%	6%
Paris	Cars	4.2%	6.5%	13.7%
	Buses	41% (the rest Euro VI)	62% (the rest Euro VI)	95% (the rest Euro VI)
	Vans	2%	2%	8%
	Light Trucks[a]	3%	5%	14%
	Medium Trucks[b]	1%	3%	9%
Brussels	Cars	4.4%	7%	15.5%
	Buses	39% (the rest Euro VI)	61% (the rest Euro VI)	95% (the rest Euro VI)
	Vans	2%	2%	7%
	Light Trucks[a]	4%	9%	20%
	Medium Trucks[b]	1%	2%	6%
Milan	Cars	3.2%	5.2%	11.5%
	Buses	46% (the rest Euro VI)	66% (the rest Euro VI)	95% (the rest Euro VI)
	Vans	1%	1%	5%
	Light Trucks[a]	1%	2%	6%

	Medium Trucks[b]	0%	2%	4%
Warsaw	Cars	0.6%	0.8%	2.2%
	Buses	41% (replacing oldest)	63% (replacing oldest)	95%
	Vans	0%	0%	2%
	Light Trucks[a]	2%	4%	12%
	Medium Trucks[b]	0%	1%	4%

[*] Source: modelling data provided by T&E and the CCC

[a] Assumed to be <=7.5 te.

[b] Assumed to be 7.5 – 14 te.

Other evolution of the baseline vehicle fleet was assumed based on the following basic rules:

- the fleet structure in terms of vehicle size (e.g. % of passenger cars, % of rigid 12-14 te trucks, etc.) will not change over time;
- for passenger cars:
  - the proportions of each model of pre-Euro 6 passenger car will reduce at 10% per year (from 2019 rather than 2018, to account for both the combined 2018/2019 baseline and the effects of the COVID-19 pandemic);
  - non-electric and non-hybrid Euro 6-d cars will make up 15% of the base year fleet of petrol and diesel cars respectively in 2025 rising to 16.5% in 2030;
  - older vehicles removed from the fleet which are replaced with neither ZEEVs nor Euro 6d conventional models will be replaced with Euro 6d petrol-hybrid vehicles, at a ratio of 50% plug-in hybrid and 50% conventional hybrid. 50% of the plug-in models will run on electricity at any time[17];
- for Light Commercial Vehicles (LCVs) and trucks, the proportions of each model of pre-Euro 6/VI vehicle will reduce at 5% per year with the remainder, which is not ZEEV in the CCC projections being replaced by Euro 6d/VI models; and
- the fleet composition of L-Category vehicles has been assumed not to change over time.

In practice, a more complex model would undoubtedly give subtly different future vehicle fleet composition projections, but the simple assumptions above are considered to be fit for purpose in the current study. It is never possible to predict future fleet composition with a high degree of certainty.

The assumed vehicle fleet compositions are set out in Appendix 1.

[17] This is slightly higher than has been observed in the existing fleet: https://theicct.org/publication/real-world-usage-of-plug-in-hybrid-electric-vehicles-fuel-consumption-electric-driving-and-co2-emissions/

Approach for London

Data availability for London was different than for the other cities. Consequently, a different approach has been taken. For London, the 2019 fleet composition for all traffic in central London boroughs has been taken from the London Atmospheric Emissions Inventory[18]. Emissions in 2019 and 2030 have then been calculated using the Emissions Factors Toolkit (EFT V11.0, published by the UK Government[19]), focusing on central London. As with other cities, total traffic volumes have been assumed not to change over this period.

EFT V11.0 has inbuilt projections of future vehicle fleet compositions provided by the UK Department for Transport, Transport for London, and the UK Government. It uses the exhaust emissions functions from COPERT V5, and the non-exhaust emissions factors from COPERT V4. In particular, it assumes no reduction in brake wear emissions from passenger cars using regenerative braking. There is, therefore, a small mismatch between the emissions data used for London and those for other cities, but the emissions data used here are consistent with those used by the UK Government for its own inventory.

The central London fleet composition data built into the EFT have been adjusted to align with the assumptions provided by CCC and T&E, as set out in Table 2-3, and the non-exhaust component from ZEEV vans and trucks has been included by removing the exhaust component of $PM_{2.5}$ for these vehicles.

Table 2-3: Future Baseline Projections of ZEEVs in London*

Vehicle Type	% ZEEV in 2030
Cars	21%
Buses	95%
Vans	7%
Light Trucks[a]	18%
Medium Trucks[b]	10%

* Source: modelling data provided by T&E and the CCC

[a] Assumed to be <=7.5 te.

[b] Assumed to be 7.5 – 14 te.

Fleet Composition with LEZs and ZEZs

CCC defined the LEZ scenarios defined in Table 2-4 and Table 2-5. The scenarios reflect three different time horizons and levels of stringency with regard to LEZs and ZEZs, which have been defined based on each city's policies and plans. For 2025, a tightening of existing or planned low-

[18] https://data.london.gov.uk/dataset/london-atmospheric-emissions-inventory--laei--2019
[19] https://laqm.defra.gov.uk/air-quality/air-quality-assessment/emissions-factors-toolkit/

emission zones has been assumed. For 2027, a further tightening of these zones has been assumed. For 2030, a zero-emission zone has been modelled for all cities. It should be noted that the scenarios set for London differ from the other cities because of the stringency of the Ultra Low Emission Zone as well as the fact that the city is no longer in the EU. The future baseline fleets for each city were thus adjusted to implement these changes. This was done by sharing the non-compliant vehicles evenly among the compliant categories of the same vehicle type; for example in Madrid Scenario A, the removed Euro 1 diesel cars were apportioned equally across Euro 5 and each Euro 6 category of diesel cars. The proportions of non-compliant vehicles were all reduced linearly until the overall non-compliant car fleet reached 5%.
In addition, the following sensitivity tests were carried out:

- For Madrid, sensitivity tests have been run assuming only 60% compliance with the LEZ rules. In practice, the 2025 baseline fleet is already assumed to achieve almost 80% compliance with LEZ Scenario A, meaning that this LEZ would no longer have a direct effect on the fleet composition, but would still affect modal shift[20]. Compliance with the proposed 2027 and 2030 LEZs is expected to be less than 60% in the 2027 and 2030 baselines (49% and 11% respectively) meaning that these LEZs will continue to influence fleet composition even with only 60% compliance.
- For Brussels – 2027 Scenario B Sensitivity Test (ST1) - only Euro 6d petrol cars allowed in the LEZ (95% compliance); and (separately) ST2 – only 5% modal shift. 2030 Scenario C ST – only 10% modal shift.
- For London – 2030 Scenario C3 ST – all non-compliant cars are replaced with ZEEVs.

All of the derived vehicle fleets are summarised in Appendix 1.

[20] Albeit recognizing that additional actions would be required to promote modal shift if the LEZ itself has no effect.

Table 2-4: LEZ and ZEZ Scenario Descriptions for Five Cities

City	2025 - Scenario A	2027 - Scenario B	2030 - Scenario C
Madrid	95% compliance rate with the LEZ rules 5% traffic reduction/modal shift Diesel cars: at least Euro 5 (currently Euro 4) Petrol cars: at least Euro 4 (currently Euro 3)	95% compliance rate with the LEZ rules 10% traffic reduction/modal shift Only Euro 6d(-temp) cars	Only ZEEV cars, vans, buses and trucks, 95% compliance rate, 20% traffic reduction & modal shift
Paris	95% compliance rate with the LEZ rules 5% traffic reduction/modal shift Diesel cars: at least Euro 6 (currently Euro 5) Petrol cars: at least Euro 6 (currently Euro 5)	95% compliance rate with the LEZ rules 10% traffic reduction/modal shift Only Euro 6d(-temp) cars	Only ZEEV cars, vans, buses and trucks, 95% compliance rate, 20% traffic reduction & modal shift
Brussels	95% compliance rate with the LEZ rules 5% traffic reduction/modal shift Diesel cars: at least Euro 6d(-temp) (currently Euro 5) Petrol cars: at least Euro 4 (currently Euro 2)	Compliance rate 95% Only Euro 6d(-temp) cars 10% traffic reduction/modal shift	Only ZEEV cars, vans, buses and trucks, 95% compliance rate, 20% traffic reduction & modal shift
Milan	95% compliance rate with the LEZ rules 5% traffic reduction/modal shift Diesel cars: at least Euro 6d(-temp) (currently Euro 6) Petrol cars: at least Euro 4 (currently Euro 3)	95% compliance rate Only Euro 6d(-temp) cars 10% traffic reduction/modal shift	Only ZEEV cars, vans, buses and trucks, 95% compliance rate, 20% traffic reduction & modal shift
Warsaw	95% compliance rate with the LEZ rules 5% traffic reduction/modal shift Diesel cars: at least Euro 4 (currently no LEZ) Petrol cars: at least Euro 2 (currently no LEZ)	95% compliance rate Only Euro 6d(-temp) cars 10% traffic reduction/modal shift	Only ZEEV cars, vans, buses and trucks, 95% compliance rate, 20% traffic reduction & modal shift

Table 2-5: LEZ and ZEZ Scenario Descriptions for London

2030 - Scenario C1	2030 - Scenario C2	2030 - Scenario C3
Only zero-emission vehicles (cars, vans, buses and trucks), 95% compliance rate,	No more diesel cars, vans and buses, natural turnover, All petrol cars are Euro 6d,	No more diesel cars, replaced with natural turnover All petrol cars are Euro 6d,
27% traffic reduction & modal shift	27% traffic reduction & modal shift	27% traffic reduction & modal shift

Predicting Future Local Road Concentration Increments

The fleet data for each city and scenario described above were used in the emissions model to predict total emissions of NOx and $PM_{2.5}$, expressed per 100 vehicles in each city. The measured/calculated local road increments to concentrations were then scaled linearly based on these calculated emissions. For example, the measured local road increment to annual mean NO_2 concentrations in 2019 at the worst-case fixed monitoring site in Madrid was 26.8 $\mu g/m^3$. The 2018 baseline NOx emissions in Madrid were calculated as 70.2 g/km/100 vehicles. The 2028 baseline NOx emissions in Madrid were calculated as 45.5 g/km/100 vehicles. The 2025 baseline local road increment to NO_2 concentrations was thus predicted to be 26.8 x 45.5 / 70.2 = 17.3 $\mu g/m^3$.

2.5 Calculating the Total Future Concentrations

For each future assessment year, the future local road increment has been added to the future increment from all other sources. This has been done separately for NO_2 and $PM_{2.5}$.

2.6 Limitations

This assessment has a number of limitations which may affect the overall results. An important limitation relates to an assumption that the local road concentration increment at the fixed monitoring site is apportioned directly in line with the city-average emissions profile. In practice this is unlikely to be correct. The concentration at each monitoring site will be driven mainly by emissions from those roads which are closest to it, and the precise fleet composition on these roads will often differ from the city average. For example, monitoring sites which are close to bus lanes are likely to have a stronger response to changes in bus emissions than this approach infers. However, each worst-case fixed monitor is not the only location in a city where air quality must improve. Furthermore, it is very often the case that similar concentrations could be measured elsewhere within a city if a new monitoring site were established there. The measured roadside concentrations are thus used to represent a more general position of worst-case elevated roadside levels across the city which might be affected by the LEZ or ZEZ. The LEZs and ZEZs have not been designed solely to target the single worst-case monitoring site.

Another implicit assumption is that the relationship between NO_2 and NOx is linear. This is also incorrect. Because the NO_2 to NOx relationship is curvilinear, a given percentage reduction in the local road NOx concentration increment will cause a smaller relative change in the local road NO_2 concentration increment. The precise relationship depends on local oxidant (including ozone) concentrations and on primary NO_2 proportions, both of which will change in the future. It has not been possible to include this level of detail in the study. Given the overall intention to broadly demonstrate the potential effects of future LEZs and ZEZs, the assumption of a linear NOx:NO_2 relationship is considered suitable.

The study also assumes that the LEZ/ZEZ measures, and the forecast changes to baseline traffic fleet composition, will not affect the contribution to concentrations from other sources. In practice, an element of the measured background concentrations will be caused by regional and national traffic emissions and this will change over time. Furthermore, reductions in NOx and ammonia from road traffic is also likely to reduce concentrations of $PM_{2.5}$. It has not been possible to include this detail.

It has been assumed that total baseline traffic volumes within each LEZ/ZEZ will not change between the existing base year and 2030 baseline (this is separate to the assumed reductions associated with the LEZ/ZEZ scenarios). Generally, there is an assumption that traffic volumes will continue to increase year-on-year for the foreseeable future, but flows within large city centres have not all increased in line with historic predictions. It is not known whether total traffic flows in the centres of the six cities will increase, or indeed reduce, between 2019 and 2030 but many cities have defined goals to reduce motorised traffic. The Brussels Capital Region, for example, aims to reduce car traffic by 24% by 2030[21].

The fleet composition projections are relatively coarse and, as explained above, a more complex model would most likely give different future vehicle fleet composition projections. However, the simple assumptions used here are considered to be suitable for the current study.

There are also limitations associated with road traffic emissions factors used. While a sensitivity test has been carried out using alternative real-world emissions factors for NOx, no similar test is possible for $PM_{2.5}$. The level of uncertainty associated with non-exhaust $PM_{2.5}$ emissions factors is considered to be appreciable.

Only basic assumptions have been made regarding the future trajectory in the contributions from other sources (i.e. the trajectory for local background concentrations). Where reductions have been assumed, concentrations have been set to remain no lower than recent observations (including during the COVID-19 pandemic). In practice, it is anticipated that coordinated action to reduce emissions from non-traffic sectors will result in substantial reductions in concentrations of both NO_2 and $PM_{2.5}$. These future actions are not included in the current study and, as a result, the future background concentration projections are likely to be over-predicted.

[21] https://mobilite-mobiliteit.brussels/en/good-move

The results presented in this report do not take account of the European Commission's proposal for Euro 7 type approval standards. A separate study, which is currently being finalised, has considered the effects of the Euro 7 proposals on the conclusions presented in this report. This has shown that the overall conclusions regarding the additional benefits of LEZs and ZEZs are likely to be unaffected if the Euro 7 proposals are adopted.

3 Existing Baseline Concentrations at Worst-case Fixed Monitors and the Contributions from Other Sources

3.1 Madrid

NO_2

Figure 3-1 summarises the measured annual mean NO_2 concentrations in 2019 at the fixed monitoring sites as reported to the European Commission. The locations of four sites are highlighted. These are the two sites which recorded the highest concentrations, and two nearby sites recording low concentrations. Figure 3-2 shows the annual mean concentrations measured at all sites since 2013, highlighting the four sites labelled in Figure 3-1.

Since 2019, the highest annual mean concentrations have been recorded at the Plaza Eliptica site. The location of this monitor is shown in more detail in Figure 3-3. While it might be inferred that higher concentrations could be measured if this site were closer to the nearby roads, Plaza Eliptica remains the monitor reporting the highest NO_2 concentrations in the city as reported to the European Commission.

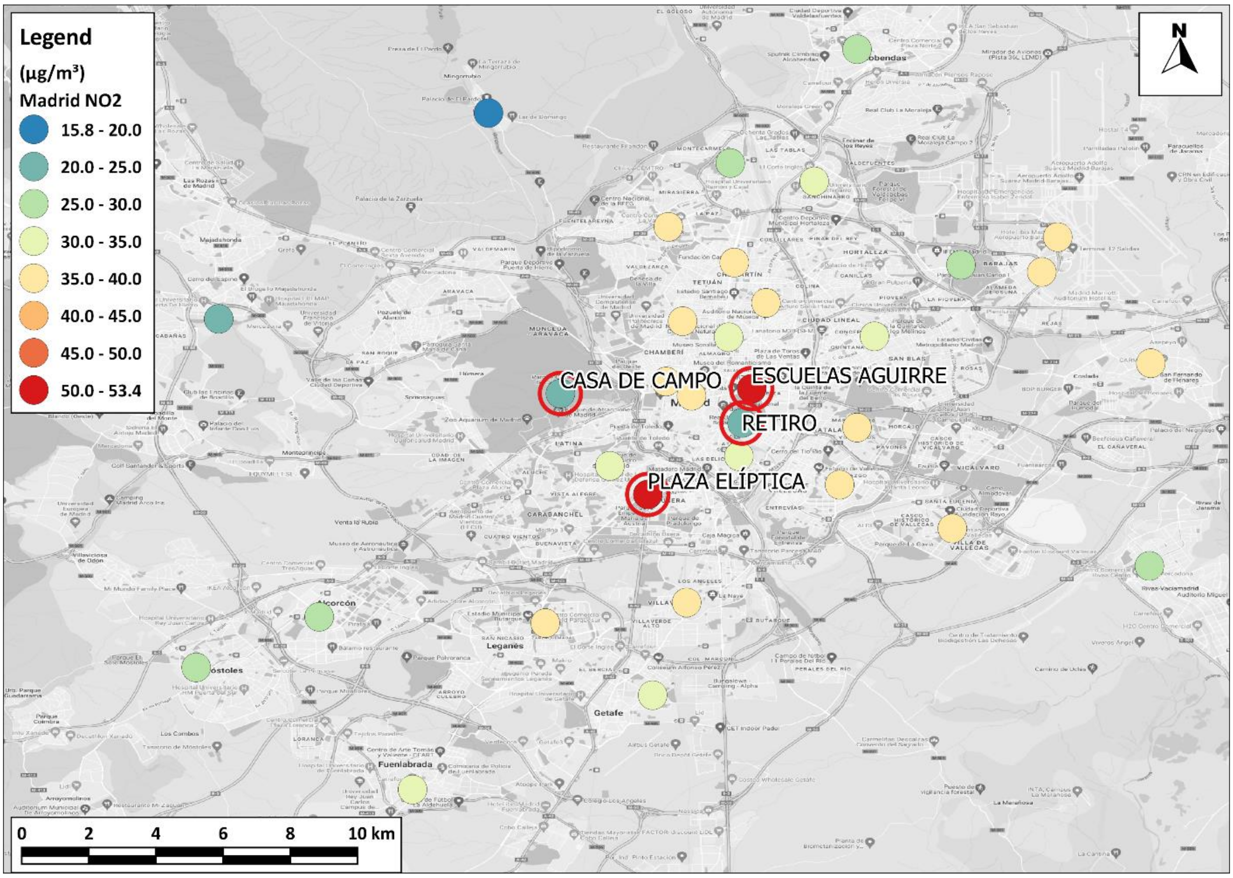


Figure 3-1: 2019 Annual Mean Concentrations NO_2 at Fixed Monitoring Sites in Madrid

Map data ©2023 Google.

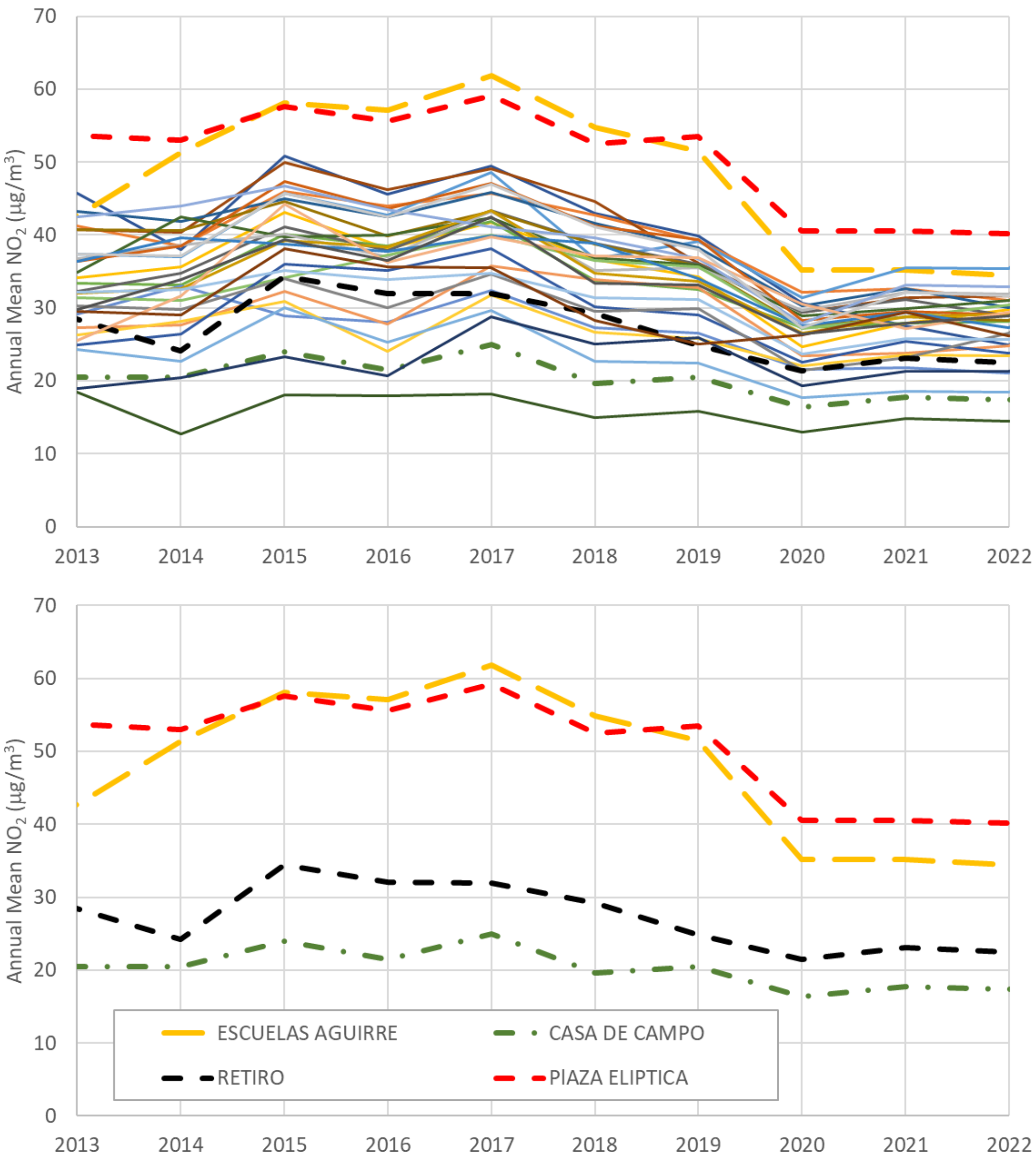


Figure 3-2: Annual Mean NO_2 Concentrations at Fixed Monitoring Sites in Madrid, 2013 to 2022 – Highlighting Four Sites of Particular Relevance

Figure 3-3: Plaza Eliptica Monitoring Station, Madrid

Imagery ©2023 CNES/Airbus, Maxar Technologies, Map data ©2023 Google.

Table 3-1 summarises the measured annual mean NO_2 concentrations in 2019 the four sites labelled above and shows how the local road increment has been calculated. The Casa De Campo site is outside of the main urban area and is unlikely to have the same non-traffic urban influences on concentrations (e.g. emissions from heating and cooking) as the Plaza Eliptica site. Taking the background directly from Casa De Campo thus risks under-predicting the influence of non-traffic sources. The Retiro site is in a dense urban area, but is likely to have a component of local traffic emissions within its measured concentrations. Taking the background directly from Retiro thus risks over-predicting the influence of non-traffic sources. The contribution from other sources has thus been taken as the average concentration measured at the Casa De Campo and Retiro sites. This suggests that local roads contributed 58% to the total measured annual mean concentration at Plaza Eliptica[22].

The road increment shown in Table 3-1 has been taken to represent the local road contribution to NO_2 concentrations, while the 'Background to Use' value has been taken to represent the contribution from all other sources.

Table 3-1: Baseline Annual Mean NO_2 Concentrations in 2019 - Madrid

Monitoring Site	Annual Mean NO_2 ($\mu g/m^3$)
Roadside Total	
Plaza Eliptica	52.5
Escuelas Aguirre	51.5
Background	
Casa De Campo	20.4
Retiro	24.8
(Background to Use)	*(22.6)*
Road Increment (Roadside total minus background)	
Plaza Eliptica	30.8

The average annual mean NO_2 concentration measured in each year 2009 to 2019 (inclusive) at the background sites shown in Table 3-1 has been used to determine an overall recent trend, which suggests that concentrations have been declining at a rate of 0.8 $\mu g/m^3$ per year[23]. For the purpose of this study, it has been assumed that the contribution to NO_2 concentrations from other sources will continue to follow this trajectory until it reaches equivalence with the lowest recent NO_2 concentration measured at any of the Madrid sites shown in Figure 3-2, which is a concentration of 12.9 $\mu g/m^3$. The contribution from other sources has not been allowed to go below this level in any future year.

$PM_{2.5}$

Figure 3-4 summarises the measured annual mean $PM_{2.5}$ concentrations in 2019 at the fixed monitoring sites as reported to the European Commission. The locations of the same four sites

[22] Which is in broad agreement with estimates made in 2016 (Urban NO2 Atlas - Publications Office of the EU (europa.eu)) regarding the relative contributions of different sources to average NOx concentrations in Inner Madrid.
[23] Derived using Ordinary Least Squares (OLS) regression of the annual mean background concentrations averaged across the sites (i.e. the annual means values at the different sites in each year were used to calculate an average background value for each year. The OLS regression line was then fitted through these averages).

highlighted for NO_2 are labelled: $PM_{2.5}$ was not measured at Retiro. Figure 3-5 shows the annual mean concentrations measured at all sites since 2013, highlighting the three sites with valid measurements that are labelled in Figure 3-4.

The likely influence of local, possibly natural, PM emissions at Casa De Campo, and the difficulty in reliably measuring $PM_{2.5}$ concentrations at these levels, means that taking the difference between these measurements does not provide the optimum approach to determine the local road component of $PM_{2.5}$. Instead, the 2019 local road component of NOx concentrations has been derived using the same sites and method as described above for NO_2. The traffic emissions model for Madrid described in Section 2 has then been used to calculate the average ratio between traffic emissions of NOx and $PM_{2.5}$. The local road component of NOx has then been multiplied by this ratio, as shown in Table 3-2. Since the total measured $PM_{2.5}$ concentration at the Plaza Eliptica site is known, the unknown variable is the contribution from other sources at this location. This has been calculated by subtracting the local road contribution from the total measurement, as also shown in Table 3-2. This indicates that local roads contributed 36% to the total measured concentration, which is similar to the values derived for other cities directly from measurements (e.g. for Paris the value is 37% and for London it is 33%). It was not possible to infer any trends over time in this 'background' component and so it has been assumed to not vary.

Table 3-2: Apportioning the Measured $PM_{2.5}$ Concentration in Madrid

Description	Value
Annual Mean NOx from Local Roads (μg/m^3)	80.9
$PM_{2.5}$ to NOx ratio in Existing Baseline Traffic Emissions	0.0525
Annual Mean $PM_{2.5}$ from Local Roads (μg/m^3)	4.2
Total Measured $PM_{2.5}$ (μg/m^3)	11.9
Assumed Contribution from Other Sources (μg/m^3)	7.6

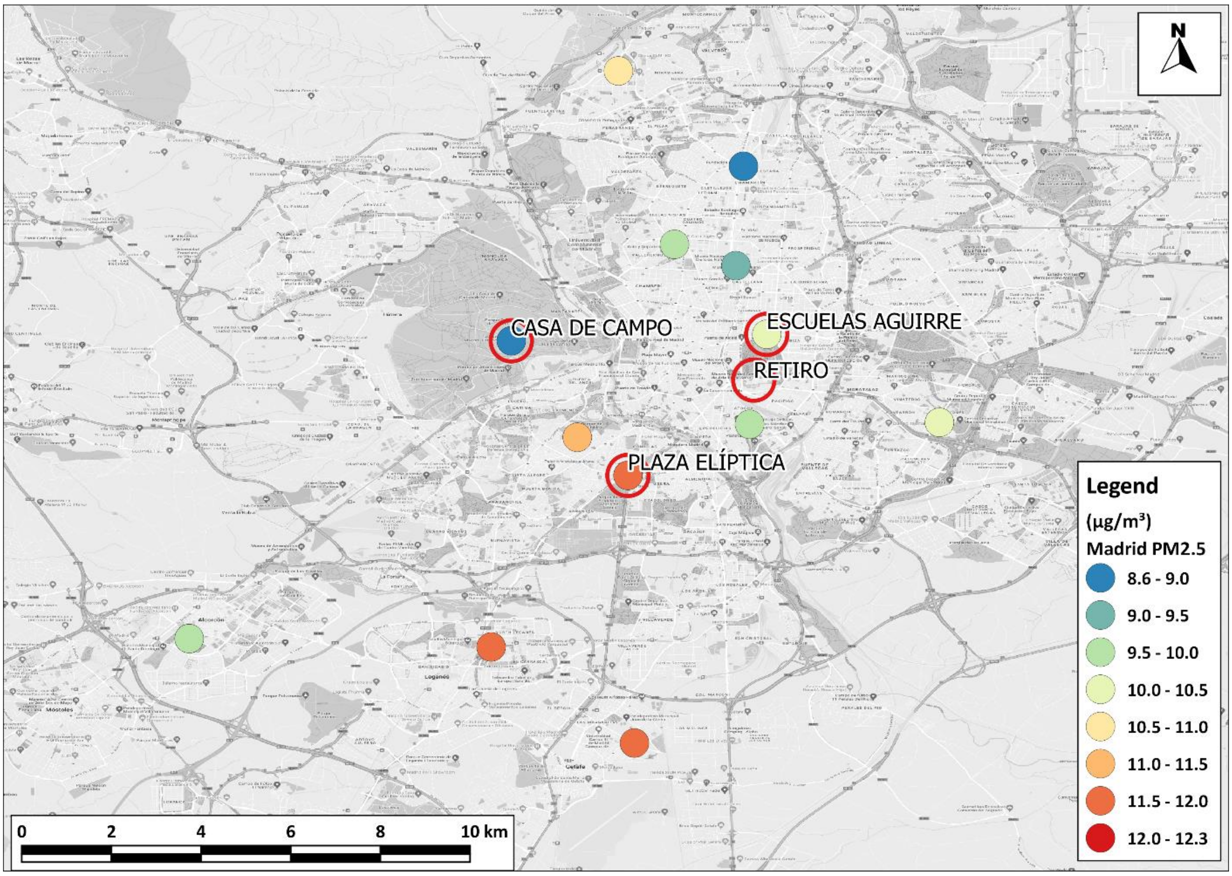


Figure 3-4: 2019 Annual Mean PM_{10} Concentrations at Fixed Monitoring Sites in Madrid (Labelling the four sites highlighted for NO_2 – one of which does not measure $PM_{2.5}$)

Map data ©2023 Google.

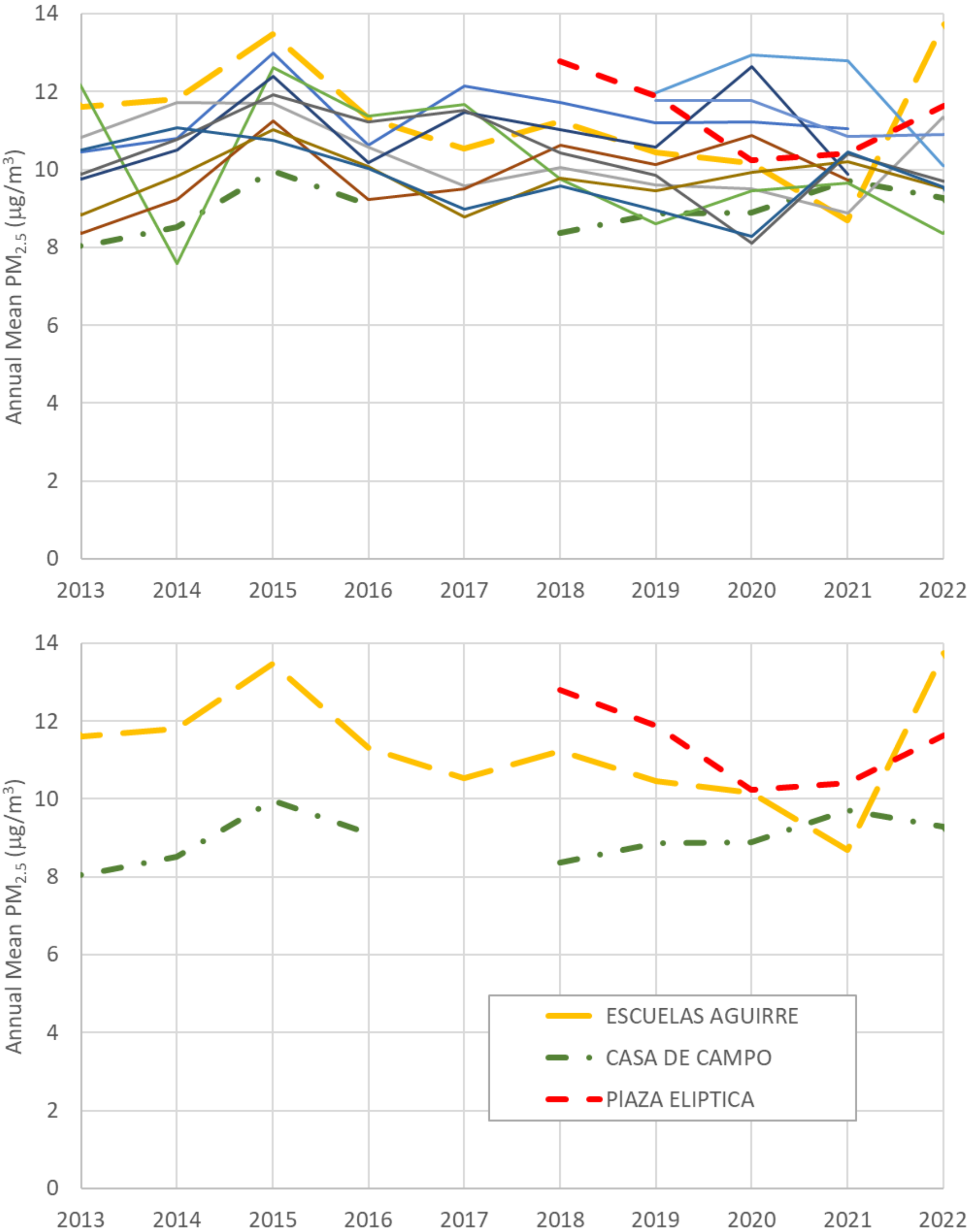


Figure 3-5: Annual Mean $PM_{2.5}$ Concentrations at Fixed Monitoring Sites in Madrid, 2013 to 2022 – Highlighting Three Sites of Particular Relevance

3.2 Greater Paris

NO_2

Figure 3-6 summarises the measured annual mean NO_2 concentrations in 2019 at the fixed monitoring sites in Greater Paris as reported to the European Commission. The locations of five sites are highlighted. These represent the site which recorded the highest concentrations, and four nearby sites recording low concentrations. Figure 3-7 shows the annual mean concentrations measured at all sites since 2013, highlighting the five sites labelled in Figure 3-6.

Since 2013, the highest annual mean concentrations have been recorded at the A1 Auto Saint Denis site. The location of this monitor is shown in more detail in Figure 3-8.

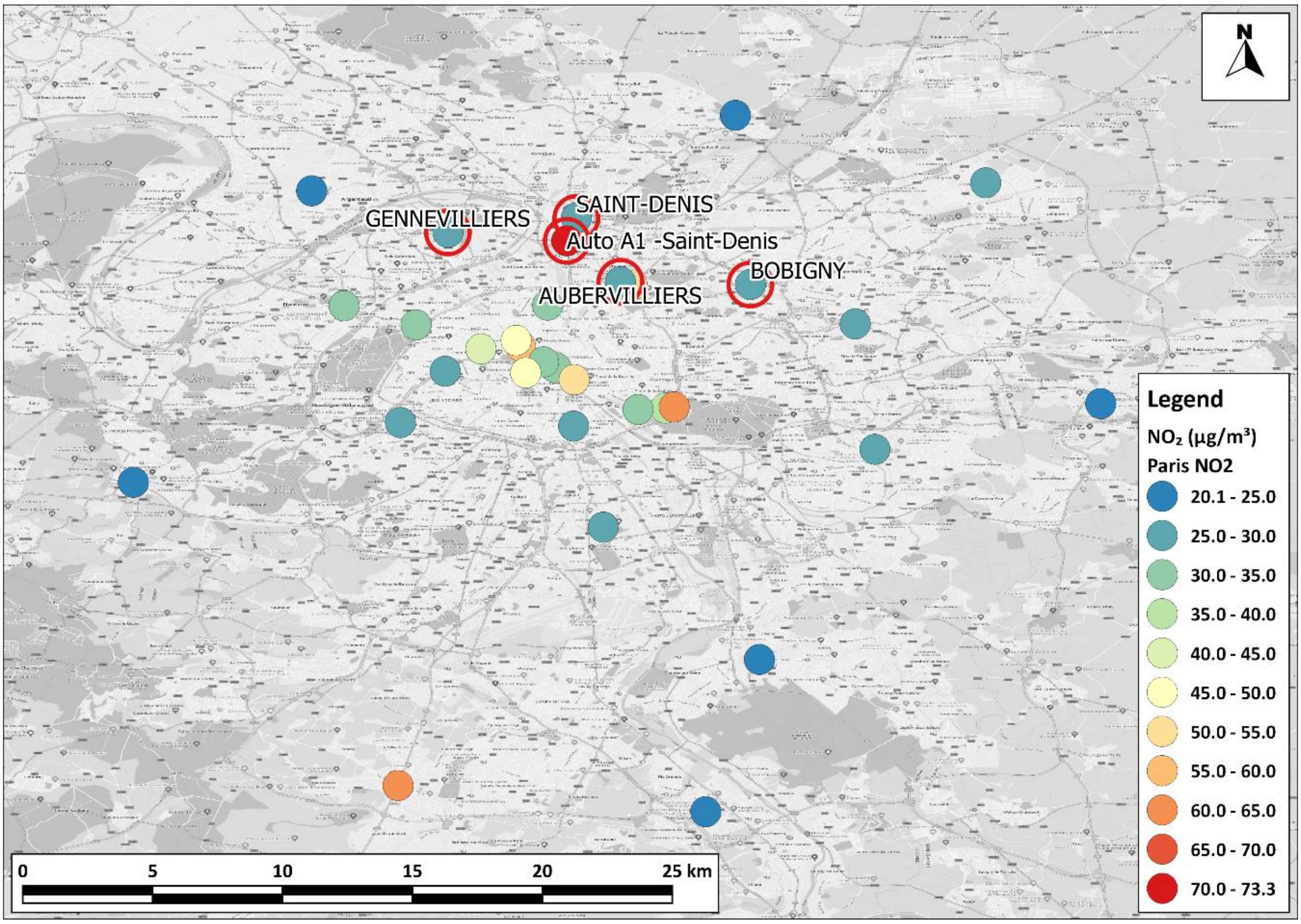
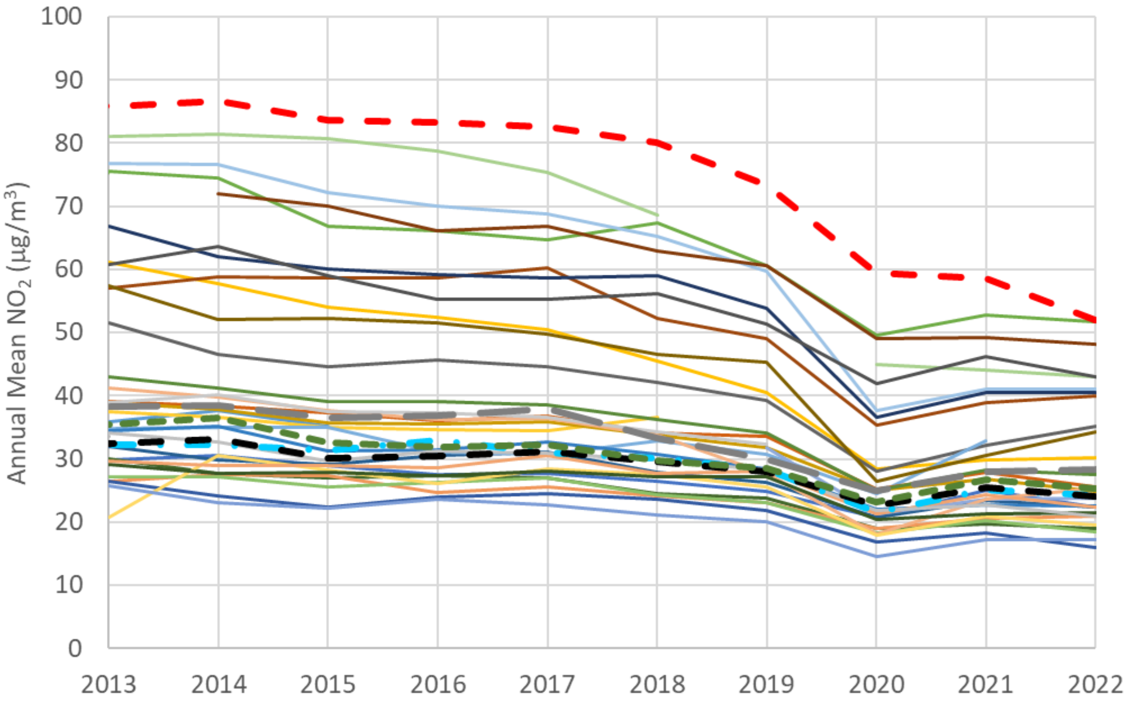


Figure 3-6: 2019 Annual Mean NO_2 Concentrations at Fixed Monitoring Sites in Paris

Map data ©2023 Google.



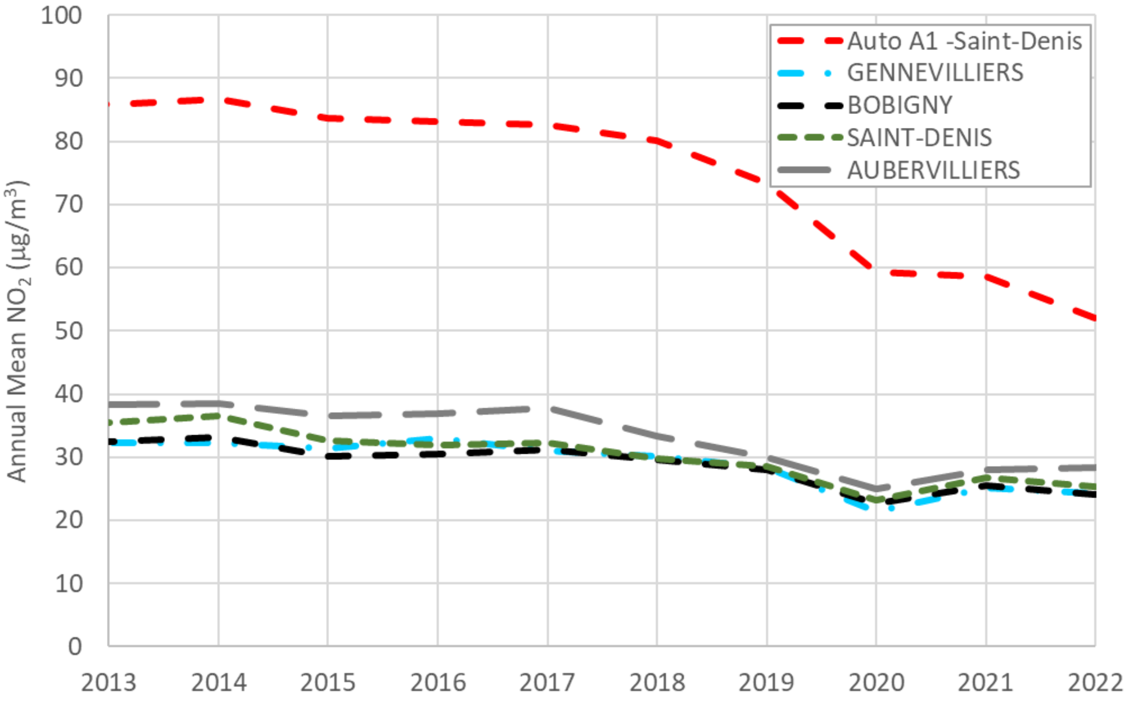


Figure 3-7: Annual Mean NO_2 Concentrations at Fixed Monitoring Sites in Paris, 2013 to 2022 – Highlighting Five Sites of Particular Relevance

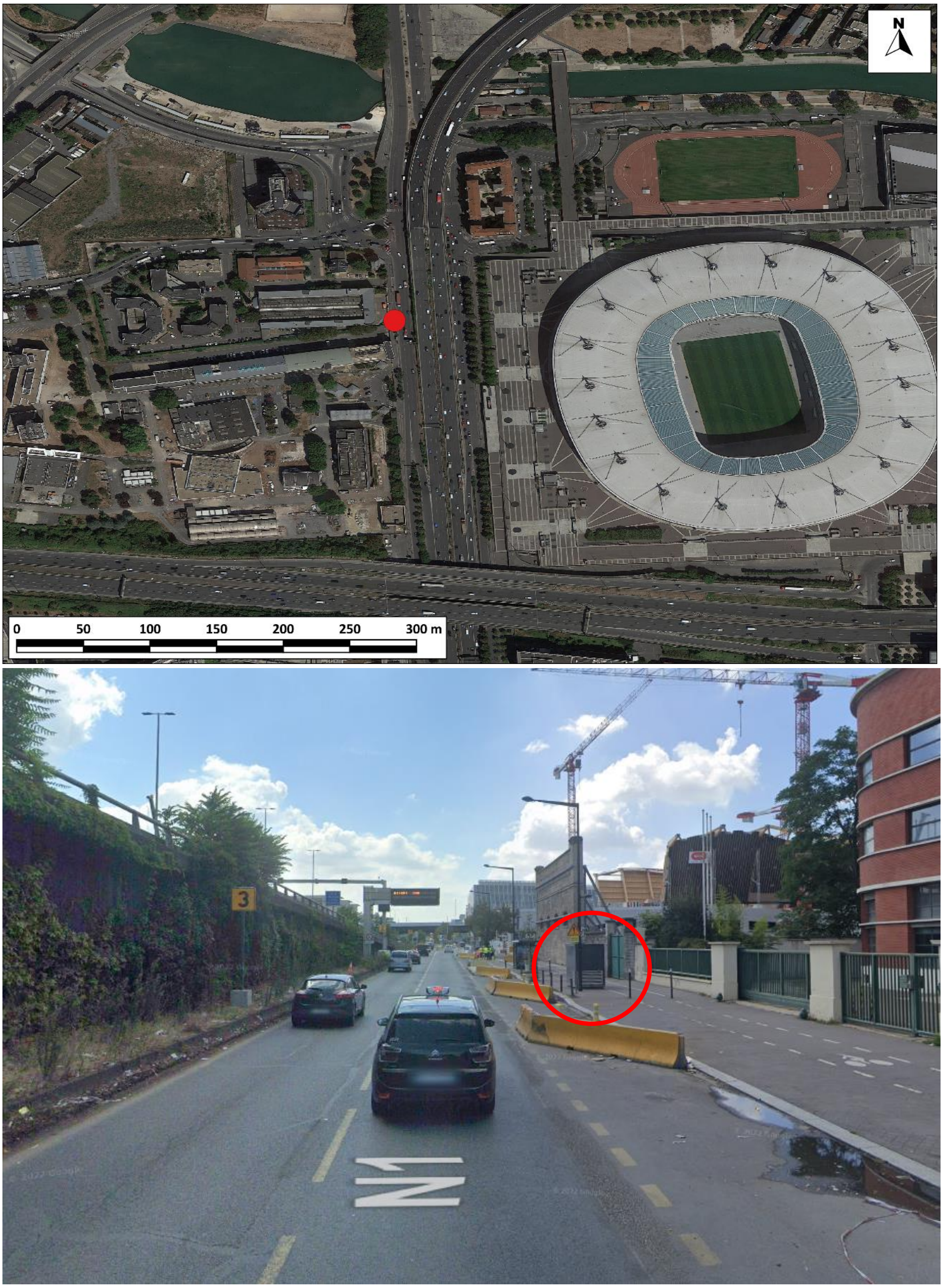


Figure 3-8: Auto A1 - Saint Denis Monitoring Station, Paris

Imagery ©2023 Aerodata International Surveys, CNES/Airbus, Maxar Technologies, The GeoInformation Group InterAtlas, Map data ©2023 Google.

Table 3-3 summarises the measured annual mean NO_2 concentrations in 2019 at the five sites labelled above, and shows how the local road increment has been calculated. The proximity of the Sant Denis background monitor to the Auto A1 site, and its general siting, make it appropriate for defining local background concentrations. The contribution from other sources has been taken as the concentration measured at the Saint Denis background monitor. This suggests that local roads contributed 61% to the total measured concentration at the A1 Auto Saint Denis site.

The road increment shown in Table 3-3 has been taken to represent the local road contribution to NO_2 concentrations, while the 'Background to Use' value has been taken to represent the contribution from all other sources.

Table 3-3: Baseline Annual Mean NO_2 Concentrations in 2019 - Paris

Monitoring Site	Annual Mean NO_2 ($\mu g/m^3$)
Roadside Total	
Auto A1 – Saint Denis	73.3
Background	
GENNEVILLIERS	28.3
BOBIGNY	28.0
SAINT-DENIS	28.5
AUBERVILLIERS	30.0
(Background to Use)	*(28.5)*
Road Increment (Roadside total minus background)	
Auto A1 – Saint Denis	44.8

The average annual mean NO_2 concentration measured in each year 2009 to 2019 (inclusive) at the background sites shown in Table 3-3 has been used to determine an overall recent trend[23], which suggests that concentrations have been declining at an average of 0.7 $\mu g/m^3$ per year. It has been assumed that the contribution to NO_2 concentrations from other sources will continue to follow this trajectory until it reaches equivalence with the lowest recent NO_2 concentration measured at any of the Paris sites shown in Figure 3-7, which is 14.6 $\mu g/m^3$. The contribution from other sources has not been allowed to go below this level in any future year.

$PM_{2.5}$

Figure 3-9 summarises the measured annual mean $PM_{2.5}$ concentrations in 2019 at the fixed monitoring sites in Paris as reported to the European Commission. The locations of three sites are highlighted. These represent the site which recorded the highest concentrations, and two nearby sites recording low concentrations. Figure 3-10 shows the annual mean concentrations measured at all sites since 2013, highlighting the three sites labelled Figure 3-9.

As with NO_2, since 2013, the highest annual mean concentrations have been recorded at the A1 Auto Saint Denis site.

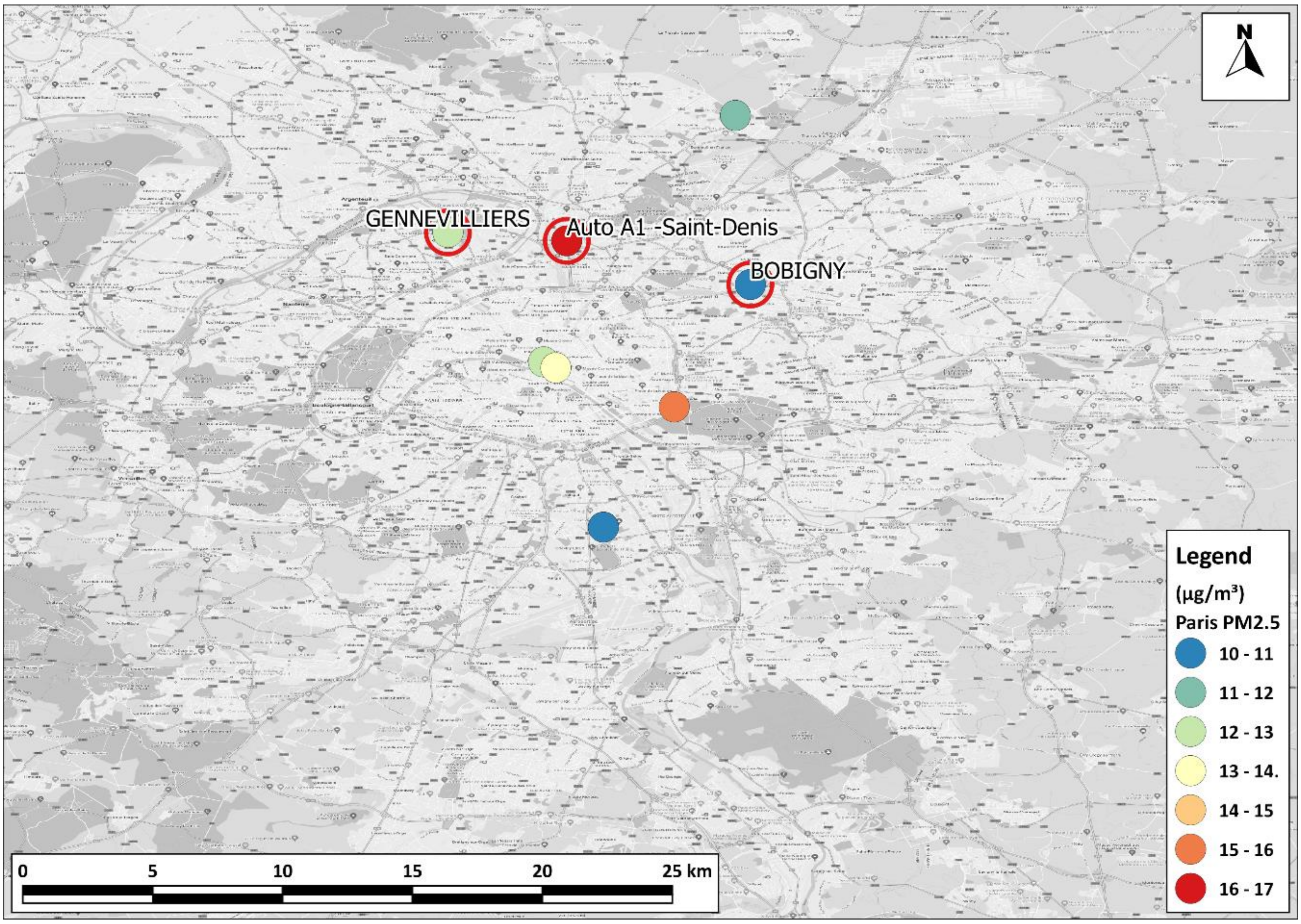
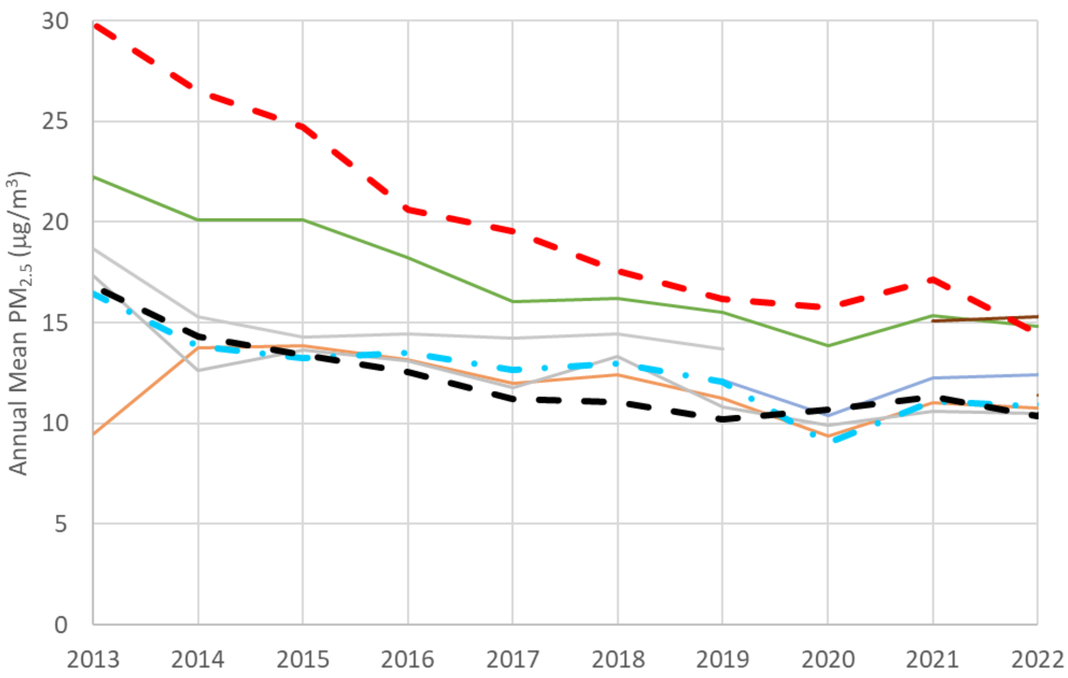


Figure 3-9: 2019 Annual Mean $PM_{2.5}$ Concentrations at Fixed Monitoring Sites in Paris

Map data ©2023 Google.

Table 3-4 summarises the measured annual mean $PM_{2.5}$ concentrations in 2019 at the three sites labelled above and shows how the local road increment has been calculated. The Saint Denis background monitor does not measure $PM_{2.5}$, but measurements from the Bobigny site are considered suitable to define the background component. The contribution from other sources has been taken as the concentration measured at the Bobigny background monitor. This suggests that local roads contributed 37% to the total measured concentration at the A1 Auto Saint Denis site.

The road increment shown in Table 3-4 has been taken to represent the local road contribution to $PM_{2.5}$ concentrations, while the 'Background to Use' value has been taken to represent the contribution from all other sources.



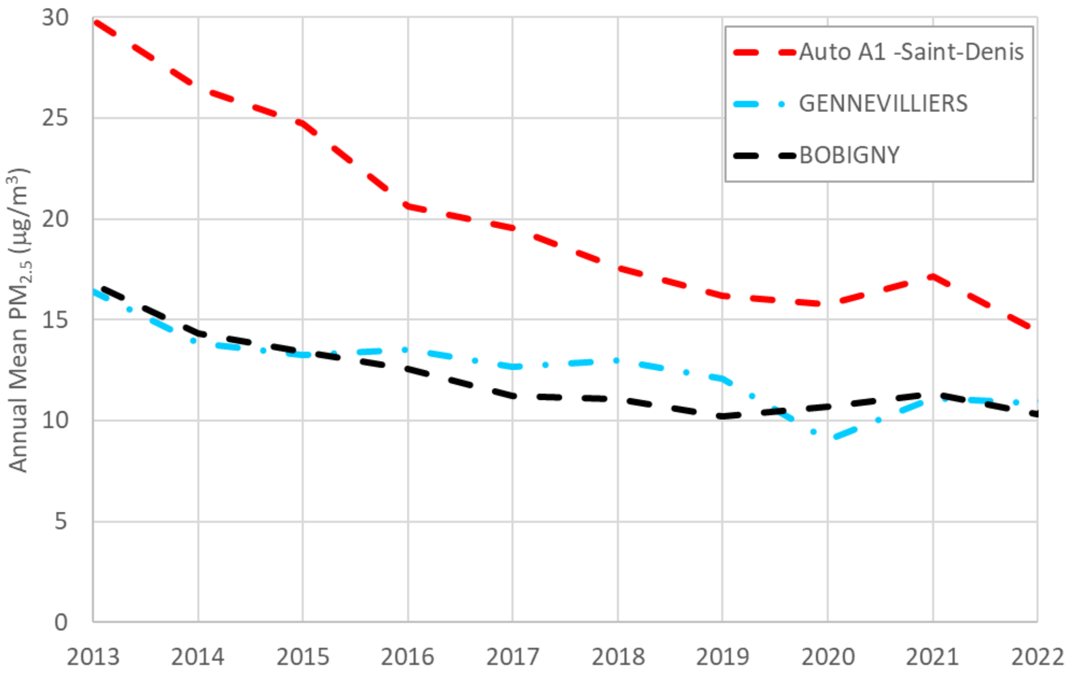


Figure 3-10: Annual Mean $PM_{2.5}$ Concentrations at Fixed Monitoring Sites in Paris, 2013 to 2022 – Highlighting Three Sites of Particular Relevance

The average annual mean $PM_{2.5}$ concentration measured in each year 2009 to 2019 (inclusive) at the background sites shown in Table 3-4 has been used to determine an overall recent trend[23], which suggests that concentrations have been declining at a rate of 0.9 µg/m^3 per year. It has been assumed that the contribution to $PM_{2.5}$ concentrations from other sources will continue to follow this trajectory until it reaches equivalence with the lowest recent $PM_{2.5}$ concentration measured at any of the sites shown in Figure 3-10, which is 9.0 μg/m³. The contribution from other sources has not been allowed to go below this level in any future year.

Table 3-4: Baseline Annual Mean $PM_{2.5}$ Concentrations in 2019 - Paris

Monitoring Site	Annual Mean $PM_{2.5}$ (μg/m³)
Roadside Total	
Auto A1 – Saint Denis	16.2
Background	
GENNEVILLIERS	12.1
BOBIGNY	10.2
(Background to Use)	*(10.2)*
Road Increment (Roadside total minus background)	
Auto A1 – Saint Denis	6.0

3.3 Brussels

NO_2

Figure 3-11 summarises the measured annual mean NO_2 concentrations in 2019 at the fixed monitoring sites in Brussels as reported to the European Commission. The locations of five sites are highlighted. These represent the two sites which have recorded the highest concentrations, and three nearby sites recording low concentrations. Figure 3-12 shows the annual mean concentrations measured at all sites since 2013, highlighting the five sites labelled in Figure 3-11.

In 2019, the highest annual mean concentration was recorded at the Kunst-Wet site.

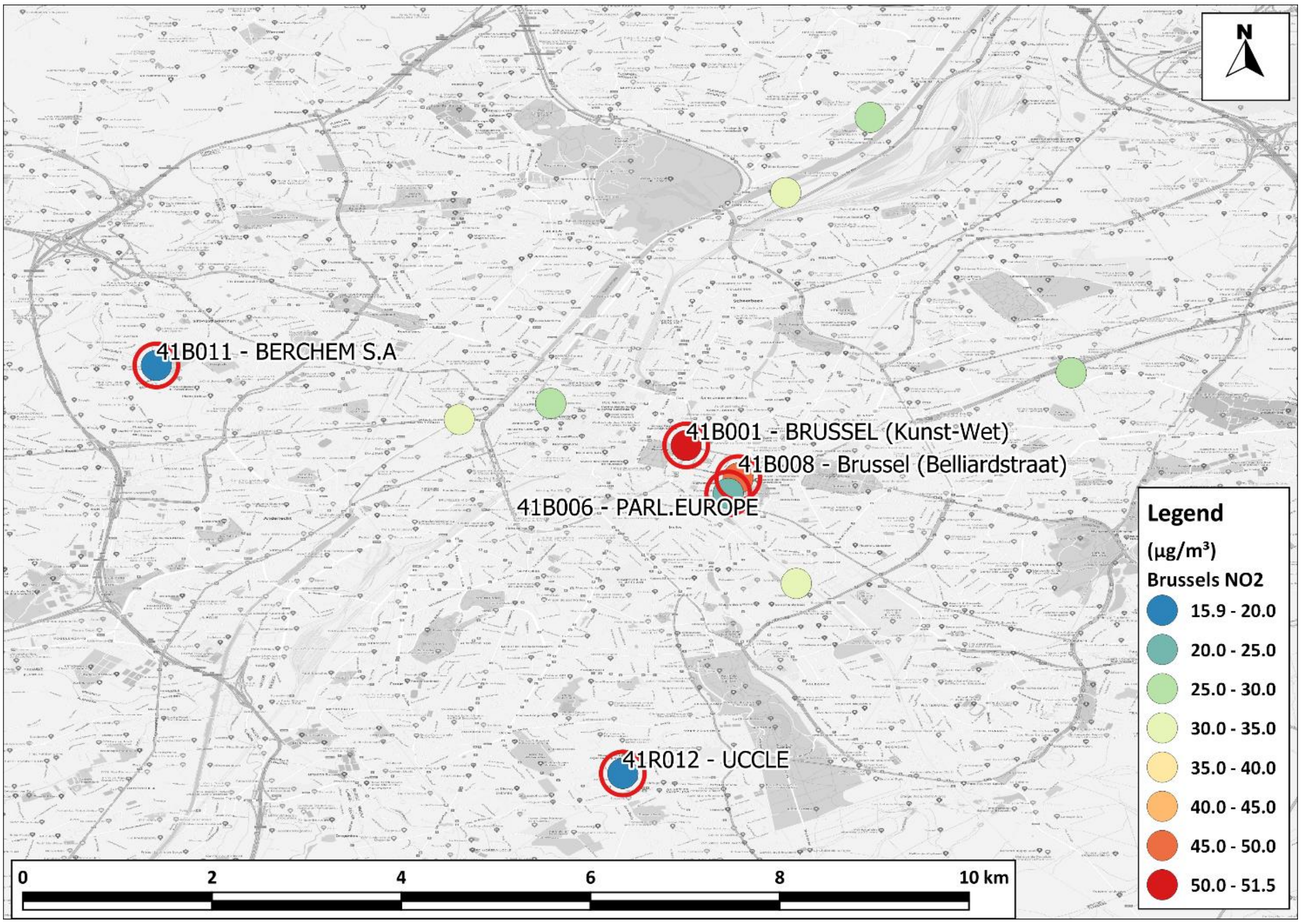


Figure 3-11: 2019 Annual Mean NO_2 Concentrations at Fixed Monitoring Sites in Brussels

Map data ©2023 Google.

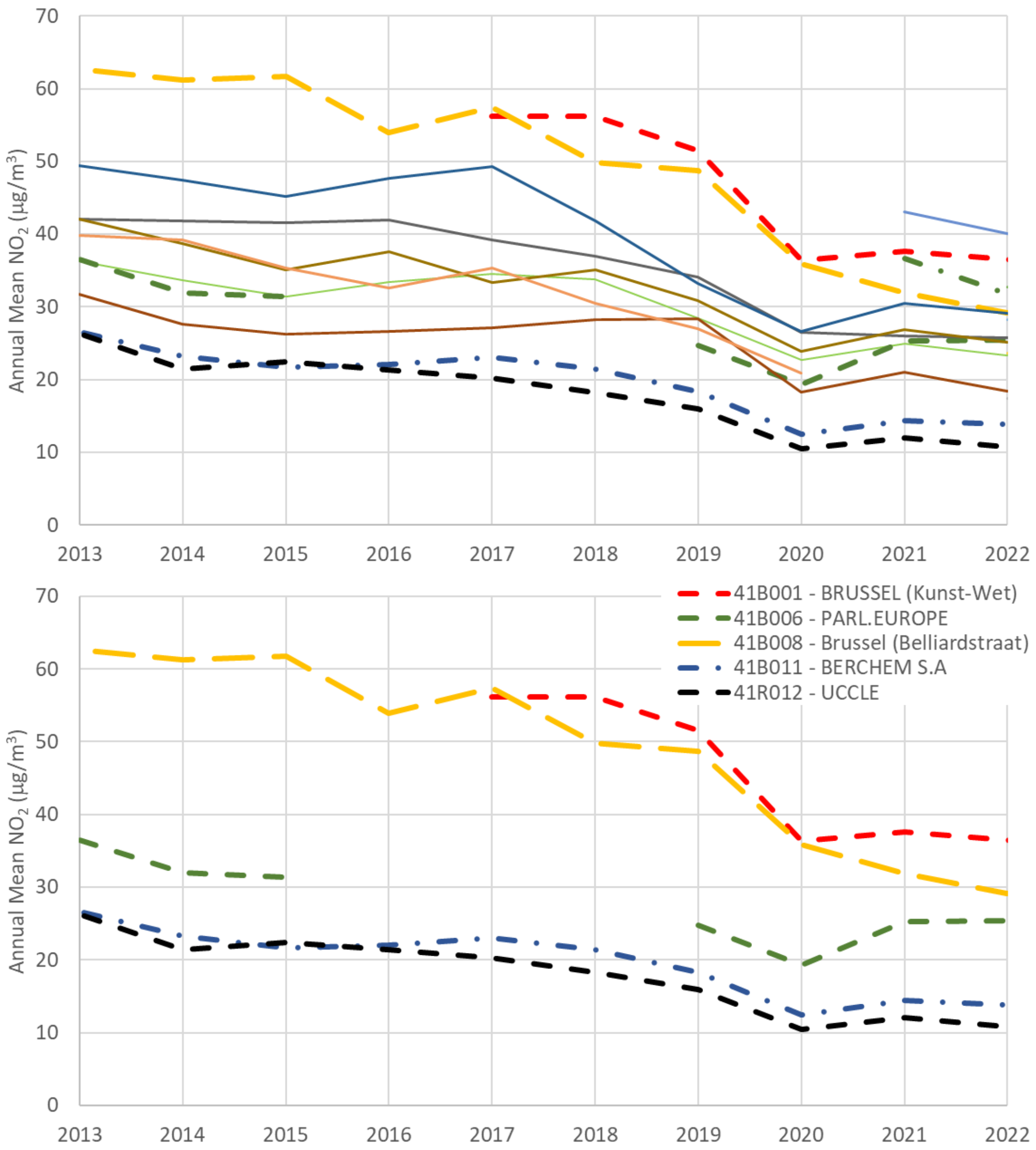


Figure 3-12: Annual Mean NO_2 Concentrations at Fixed Monitoring Sites in Brussels, 2013 to 2022 – Highlighting Five Sites of Particular Relevance

Table 3-5 summarises the measured annual mean NO_2 concentrations in 2019 at the five sites labelled above and shows how the local road increment has been calculated. The contribution from other sources has been taken as the concentration measured at the Parl Europe background monitor, owing to its greater proximity to the Kunst-Wet site. While there will inevitably be an appreciable contribution from local road traffic to concentrations measured at Parl Europe, both of the other background monitoring sites are outside of the central urban area and so are unlikely to fully capture the non-road contributions of concentrations at Kunst-Wet. This suggests that local roads contributed 58% to the total measured concentration at the Kunst-Wet site, which is similar to the worst-case sites in other cities considered in this section.

The road increment shown in Table 3-5 has been taken to represent the local road contribution to NO_2 concentrations, while the 'Background to Use' value has been taken to represent the contribution from all other sources.

Table 3-5: Baseline Annual Mean NO_2 Concentrations in 2019 - Brussels

Monitoring Site	Annual Mean NO_2 (μg/m^3)
Roadside Total	
Kunst-Wet	51.5
Belliardstraat	48.7
Background	
Uccle	15.9
Berchem S.A	18.3
Parl Europe	*24.8*
(Background to Use)	*(24.8)*
Road Increment (Roadside total minus background)	
Kunst-Wet	26.8

The Parl Europe monitor does not have sufficient data capture to consider long-term trends in concentrations, but the average concentrations measured in each year 2009 to 2019 (inclusive) at the other background sites shown in Table 3-5 has been used to determine an overall recent trend[23]; this suggests that concentrations have been declining at a rate of 1.1 μg/m^3 per year. It has been assumed that the contribution to NO_2 concentrations from other sources will continue to follow this trajectory until it reaches equivalence with the lowest recent NO_2 concentration measured at any of the sites shown in Figure 3-12, which is 10.5 μg/m^3. The contribution from other sources has not been allowed to go below this level in any future year.

$PM_{2.5}$

Figure 3-13 summarises the measured annual mean $PM_{2.5}$ concentrations in 2019 at the fixed monitoring sites in Brussels as reported to the European Commission. The highest concentrations were measured in the vicinity of an industrial area outside of the city centre. Figure 3-14 shows the annual mean concentrations measured at all sites since 2013, highlighting the Molenbeek site, which is the only monitor labelled as roadside (another roadside site has been commissioned since 2019).

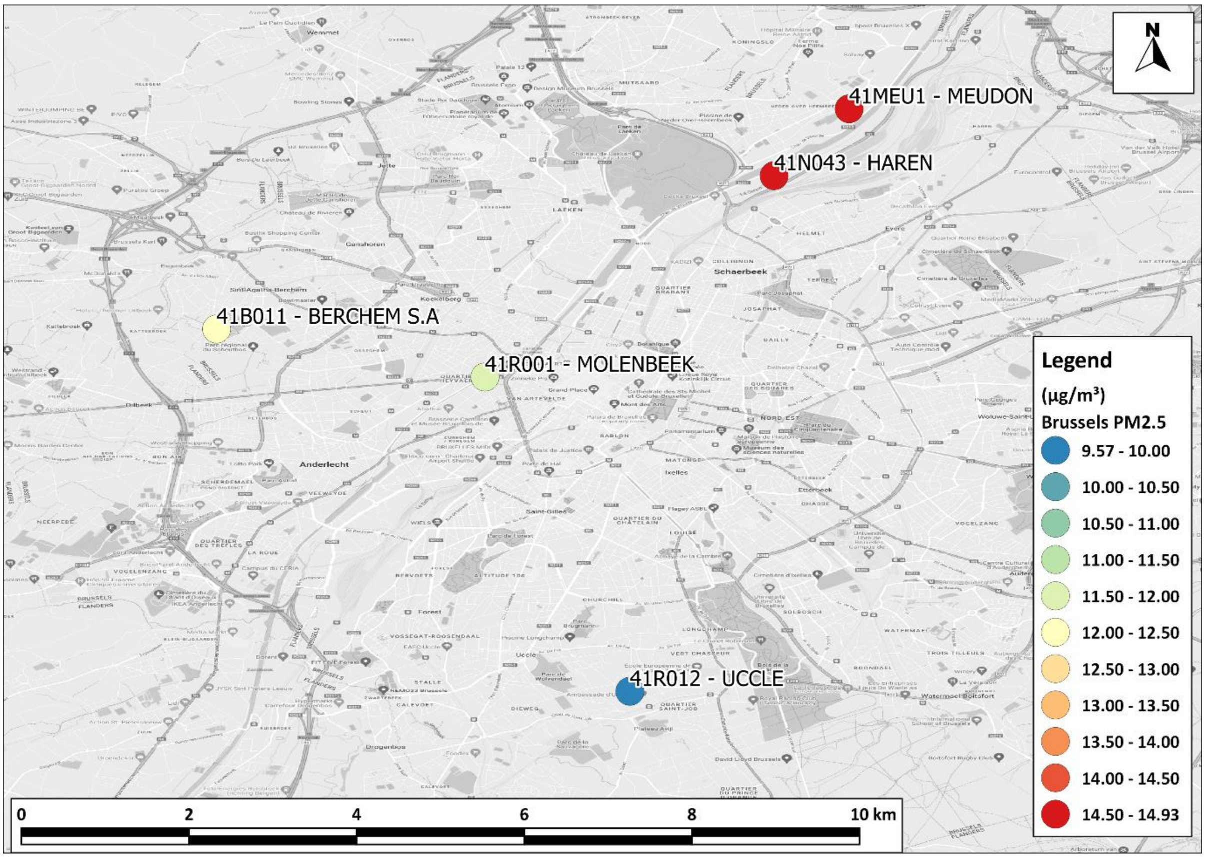


Figure 3-13: 2019 Annual Mean $PM_{2.5}$ Concentrations at Fixed Monitoring Sites in Brussels

Map data ©2023 Google.

Taking the difference between any of these measurements does not provide the optimum approach to determine the local road component of $PM_{2.5}$. Instead, the 2019 local road component of NOx concentrations at the Kunst-Wet site has been derived using the same sites and method as described above for NO_2. The traffic emissions model for Brussels described in Section 2 has then been used to calculate the average ratio between traffic emissions of NOx and $PM_{2.5}$. The local road component of NOx has then been multiplied by this ratio, as shown in Table 3-6. This estimates the local road component of $PM_{2.5}$ that would be measured at the Kunst-Wet site if $PM_{2.5}$ were measured there.

The average $PM_{2.5}$ concentration measured at the Uccle and Berchem S.A sites has been used to estimate the contribution from other sources. In 2019, this 10.8 µg/m^3. This suggests that local roads contributed 23% to the total roadside concentration.

The average annual mean $PM_{2.5}$ concentration measured in each year 2009 to 2019 (inclusive) at the Uccle and Berchem S.A sites has been used to determine an overall recent trend[23], which suggests that concentrations have been declining at an average of 0.8 µg/m^3 per year. It has been assumed that the contribution to $PM_{2.5}$ concentrations from other sources will continue to follow this trajectory until it reaches equivalence with the lowest recent concentration measured at any of the sites shown in Figure 3-14, which is 8.5 µg/m³. The contribution from other sources has not been allowed to go below this level in any future year.

Table 3-6: Apportioning the Measured $PM_{2.5}$ Concentration in Brussels

Description	Value
Annual Mean NOx from Local Roads (µg/m³)	67.8
$PM_{2.5}$ to NOx ratio in Existing Baseline Traffic Emissions	0.0469
Annual Mean $PM_{2.5}$ from Local Roads (µg/m³)	3.2
Measured Contribution from Other Sources (µg/m³)	10.8
Assumed Total Roadside $PM_{2.5}$ (µg/m³)	14.0

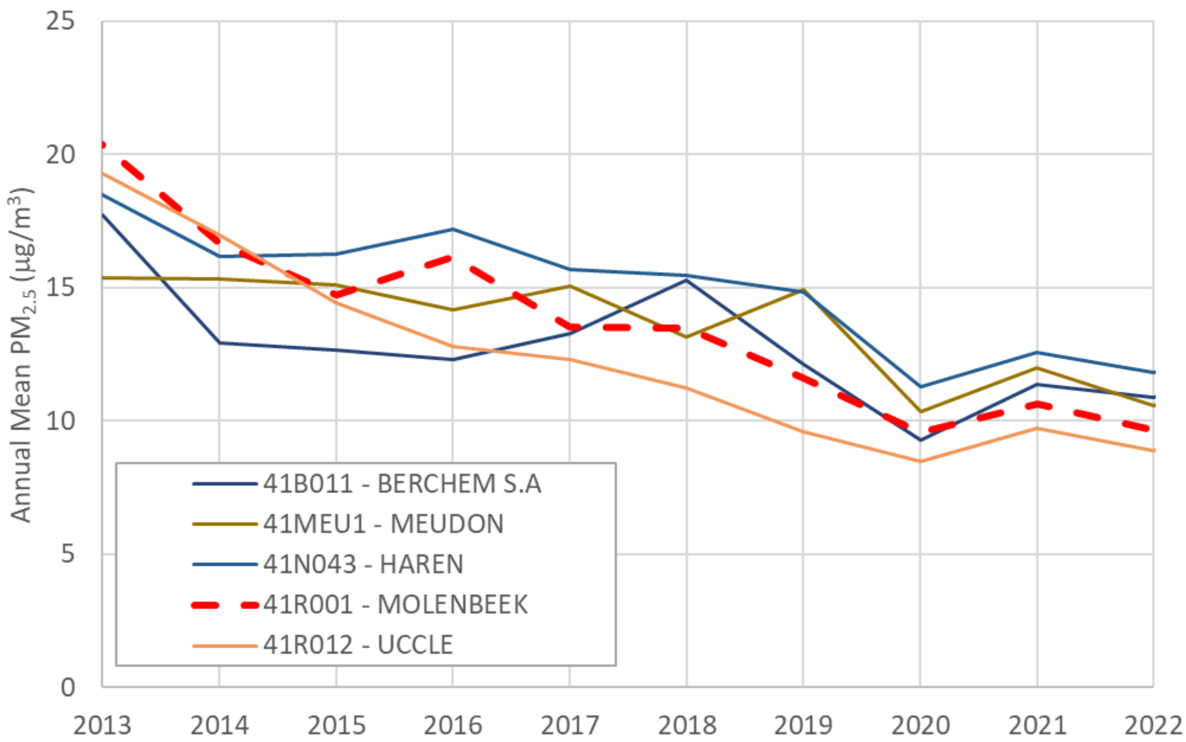


Figure 3-14: Annual Mean $PM_{2.5}$ Concentrations at Fixed Monitoring Sites in Brussels, 2013 to 2022

3.4 Milan

NO_2

Figure 3-15 summarises the measured annual mean NO_2 concentrations in 2019 at the fixed monitoring sites in Milan as reported to the European Commission. The locations of two sites are highlighted. These represent the site which recorded the highest concentration, and a nearby site which is labelled as representing background conditions. Figure 3-16 shows the annual mean concentrations measured at all sites since 2013, highlighting the two sites labelled in Figure 3-15.

In 2019, the highest annual mean concentrations were recorded at the Viale Marche monitoring station. The location of this monitor is shown in more detail in Figure 3-17.

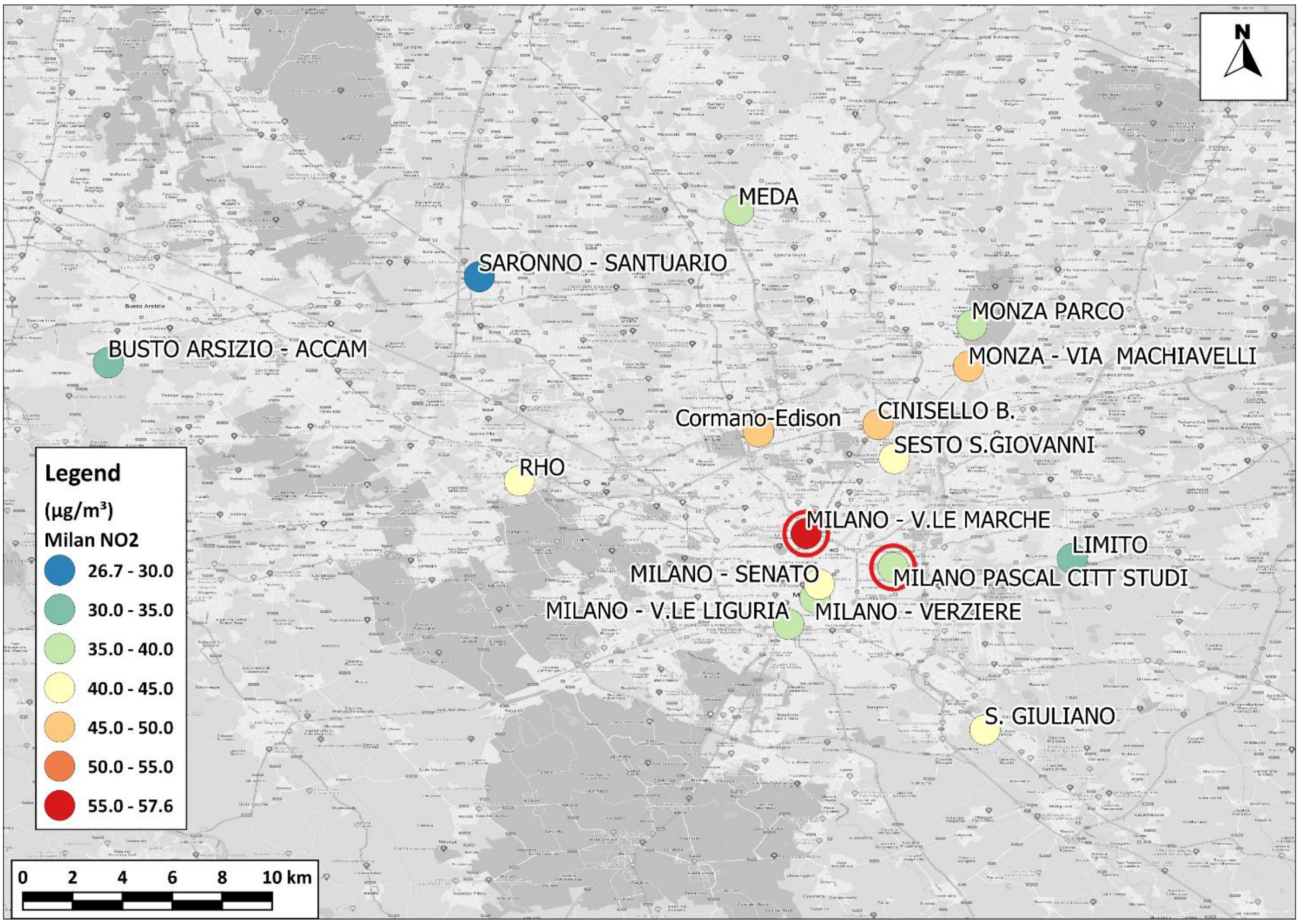


Figure 3-15: 2019 Annual Mean NO_2 Concentrations at Fixed Monitoring Sites in Milan

Map data ©2023 Google.

Advice from a local CCC coordinator was that the Citta Studi site does not provide a good representation of local background concentrations, and is itself likely to be significantly influenced by local emissions sources. However, there are no other suitable monitoring sites which could provide a robust indication of the contribution from other sources. For Milan, an alternative approach has been taken to apportion the concentration measured at the roadside monitor. The official emissions inventory for the city, provided by CCC, suggests that road transport contributes 63% of the total NOx emissions in Milan. The total measured NO_2 concentration in 2019 has been multiplied by 0.63 to estimate the traffic component. Because the size of the required LEZs and ZEZs has not been defined, it is broadly appropriate to take a flexible view on the extent to which the ‘all other sources’ category contains some transport emissions and so this approach is considered reasonable. It might be that a larger LEZ/ZEZ would be required to achieve the calculated reductions in Milan than in other cities, since no transport emissions from within the city are included in the 'other sources' category, but it is noted that 63% is similar to the equivalent value for cities with more robust monitoring (for example the value for the worst-case monitoring site in Paris is assumed to be 61%)[24]. Table 3-7 shows how the NO_2 concentration measured in 2019 at the Viale Marche monitoring site has been apportioned.

There is no reliable basis upon which to predict how the contribution from other sources in Milan might change over time and so it has been assumed to remain constant at 21.3 $\mu g/m^3$.

Table 3-7: Apportioning the 2019 Measured NO_2 Concentration at the Viale Marche Site in Milan

Description	Value
Roadside Total ($\mu g/m^3$)	57.6
Contribution of Road Transport to City Total Emissions %	63
Contribution from Road Traffic ($\mu g/m^3$)	36.3
Contribution from Other Sources ($\mu g/m^3$)	21.3

[24] It is also in broad agreement with estimates made in 2016 (Urban NO2 Atlas - Publications Office of the EU (europa.eu)) regarding the relative contributions of different sources to average NOx concentrations in Milan.

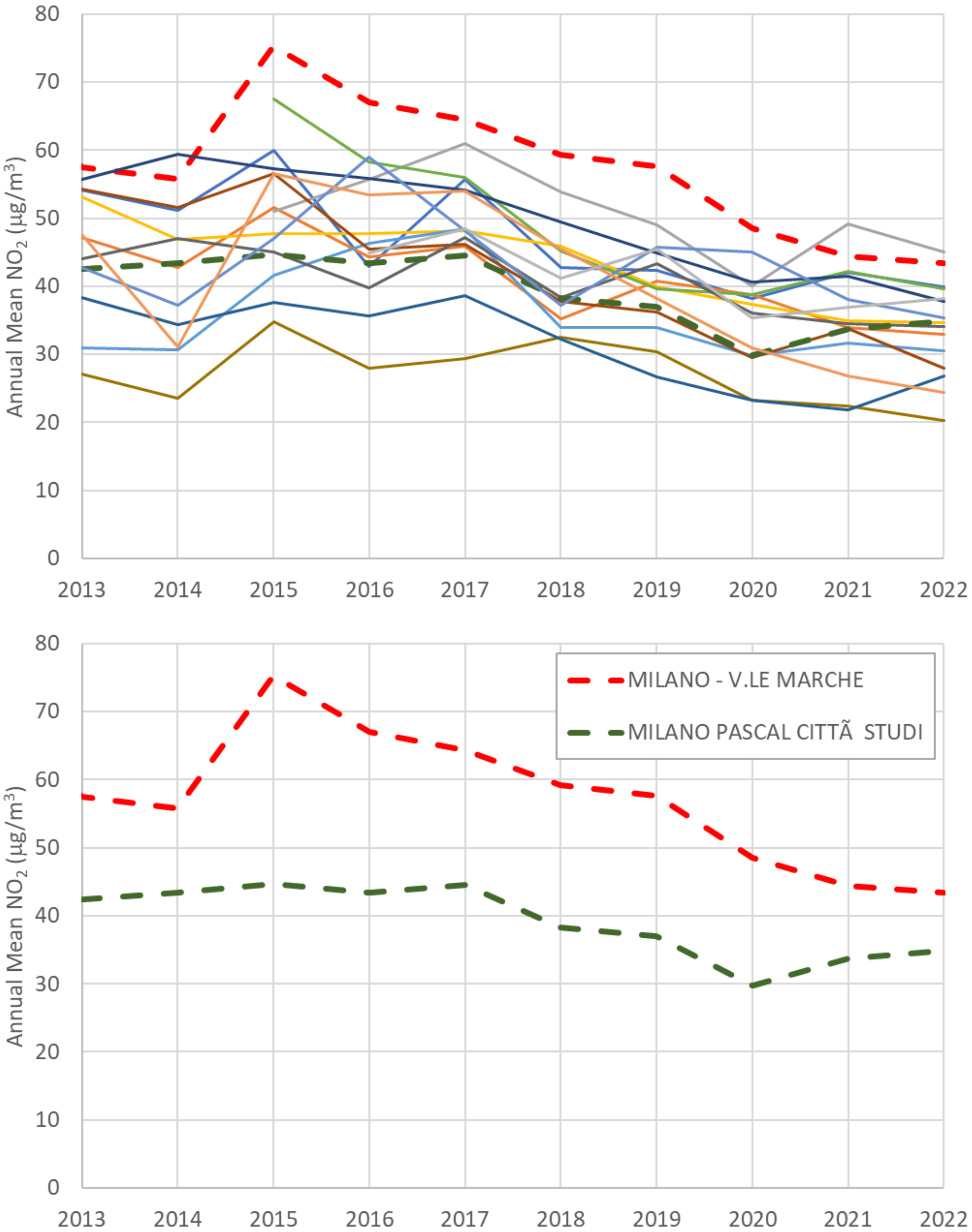


Figure 3-16: Annual Mean NO_2 Concentrations at Fixed Monitoring Sites in Milan, 2013 to 2022 – Highlighting Two Sites of Particular Relevance

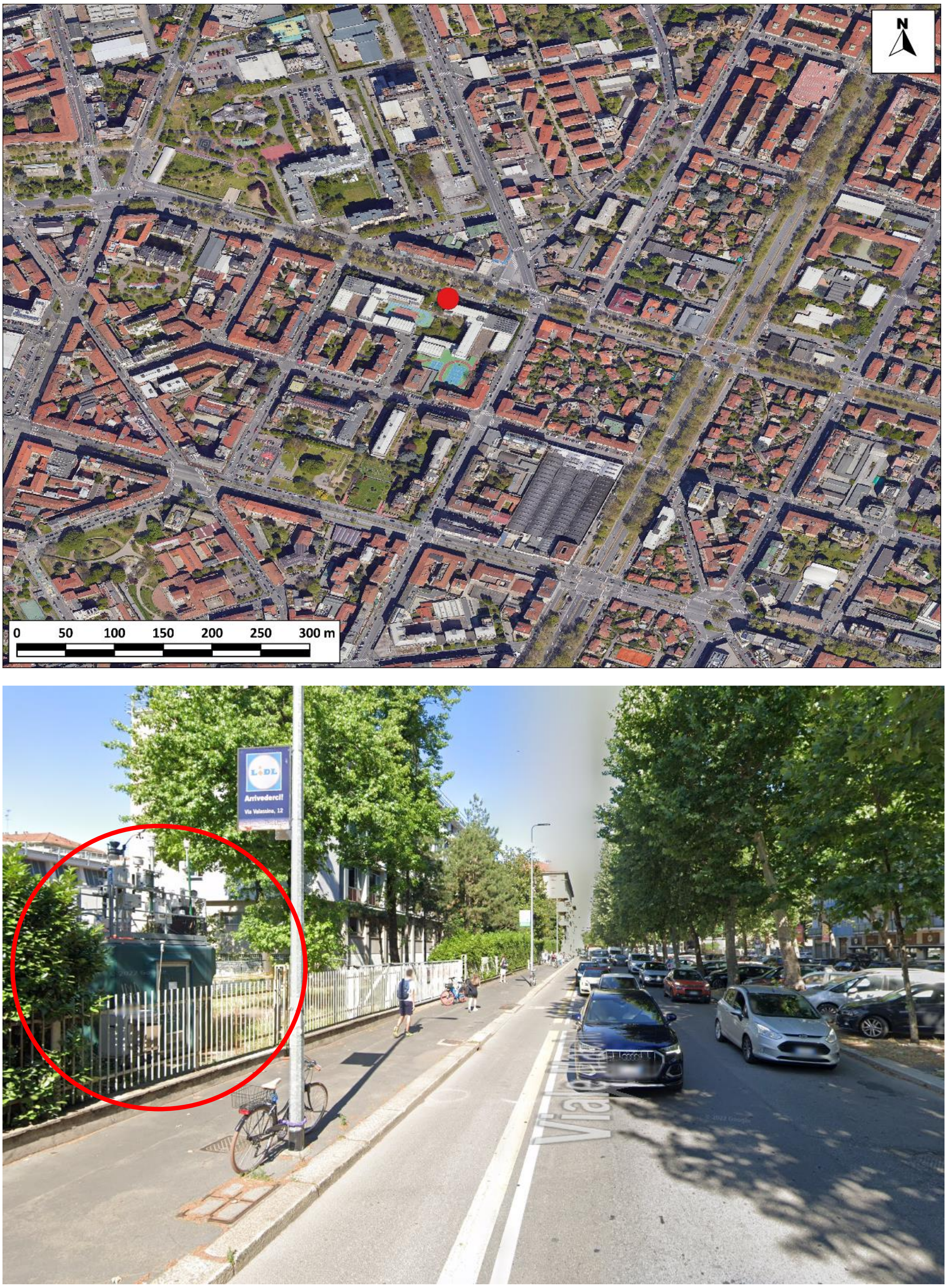


Figure 3-17: Viale Marche Monitoring Station, Milan

Imagery ©2023 CNES/Airbus, Maxar Technologies, Terra Bella Map data ©2023 Google.

$PM_{2.5}$

Figure 3-18 summarises the measured annual mean $PM_{2.5}$ concentrations in 2019 at the fixed monitoring sites as reported to the European Commission. It also labels the two sites described in detail for NO_2. $PM_{2.5}$ was not measured at the Viale Marche site. Figure 3-19 shows the annual mean concentrations measured at all sites since 2013, highlighting the Citta Studi site and also the only site with long-term data which is labelled as roadside. The other roadside site is labelled as Sesto S. Giovanni. Both roadside sites recorded $PM_{2.5}$ concentrations in 2019 which were no higher than those measured at the Citta Studi site.

Given the NO_2 concentrations measured, it seems likely that if $PM_{2.5}$ were measured at Viale Marche, the road component of concentrations would be elevated. With other cities, road-$PM_{2.5}$ has been calculated from measured road-NOx, but this is not possible for Milan since NOx concentrations are not reported. The simplified approach to estimating road-$PM_{2.5}$ at the Viale Marche site has been to multiply the calculated road-NO_2 concentration by the average ratio of road-$PM_{2.5}$: road-NO_2 used in the other five cities considered in this study. These ratios, and the calculation of road $PM_{2.5}$, are set out in Table 3-8.

In the absence of more appropriate data, the contribution from other sources in Milan has been taken from the measurement at the Citta Studi site, as also shown in Table 3-8.

Table 3-8: Estimating the Road-$PM_{2.5}$ Concentration at the Viale Marche Monitoring Site in Milan

Description	Value
road $PM_{2.5}$: road-NO_2 ratio in Madrid	0.14
road $PM_{2.5}$: road-NO_2 ratio in Paris	0.13
road $PM_{2.5}$: road-NO_2 ratio in Brussels	0.12
road $PM_{2.5}$: road-NO_2 ratio in Warsaw	0.16
road $PM_{2.5}$: road-NO_2 ratio in London	0.13
Average road $PM_{2.5}$: road-NO_2 ratio	0.14
Calculated road-NO_2 at Viale Marche ($\mu g/m^3$)	36.3
Calculated road-$PM_{2.5}$ at Viale Marche ($\mu g/m^3$)	4.9
Contribution to $PM_{2.5}$ from other sources ($\mu g/m^3$)	20.9
Estimated total $PM_{2.5}$ Concentration at Viale Marche ($\mu g/m^3$)	25.9

The average annual mean $PM_{2.5}$ concentration measured in each year 2009 to 2019 (inclusive) at the Citta Studi, Saronno – Satuario, and Monza – Via Machiavelli sites has been used to determine an overall recent trend[23], which indicates that concentrations have been declining at an average rate of 1.1 $\mu g/m^3$ per year. It has been assumed that the contribution to $PM_{2.5}$ concentrations from other sources will continue to follow this trajectory until it reaches equivalence with the lowest recent $PM_{2.5}$ concentration measured at any of the sites shown in Figure 3-19, which is 16.8 $\mu g/m^3$. The contribution from other sources has not been allowed to go below this level in any future year.

Using the Citta Studi site to provide a local background $PM_{2.5}$ concentration has probably resulted in the total $PM_{2.5}$ concentration in 2019 being over-predicted. However, the relatively sharp assumed rate of decline means that a value of 16.8 $\mu g/m^3$ is used in 2025, and every year thereafter. This concentration was measured in 2019 at the Saronno Sturario site. The Citta Studi data, thus, have no effect on the future-year predictions.

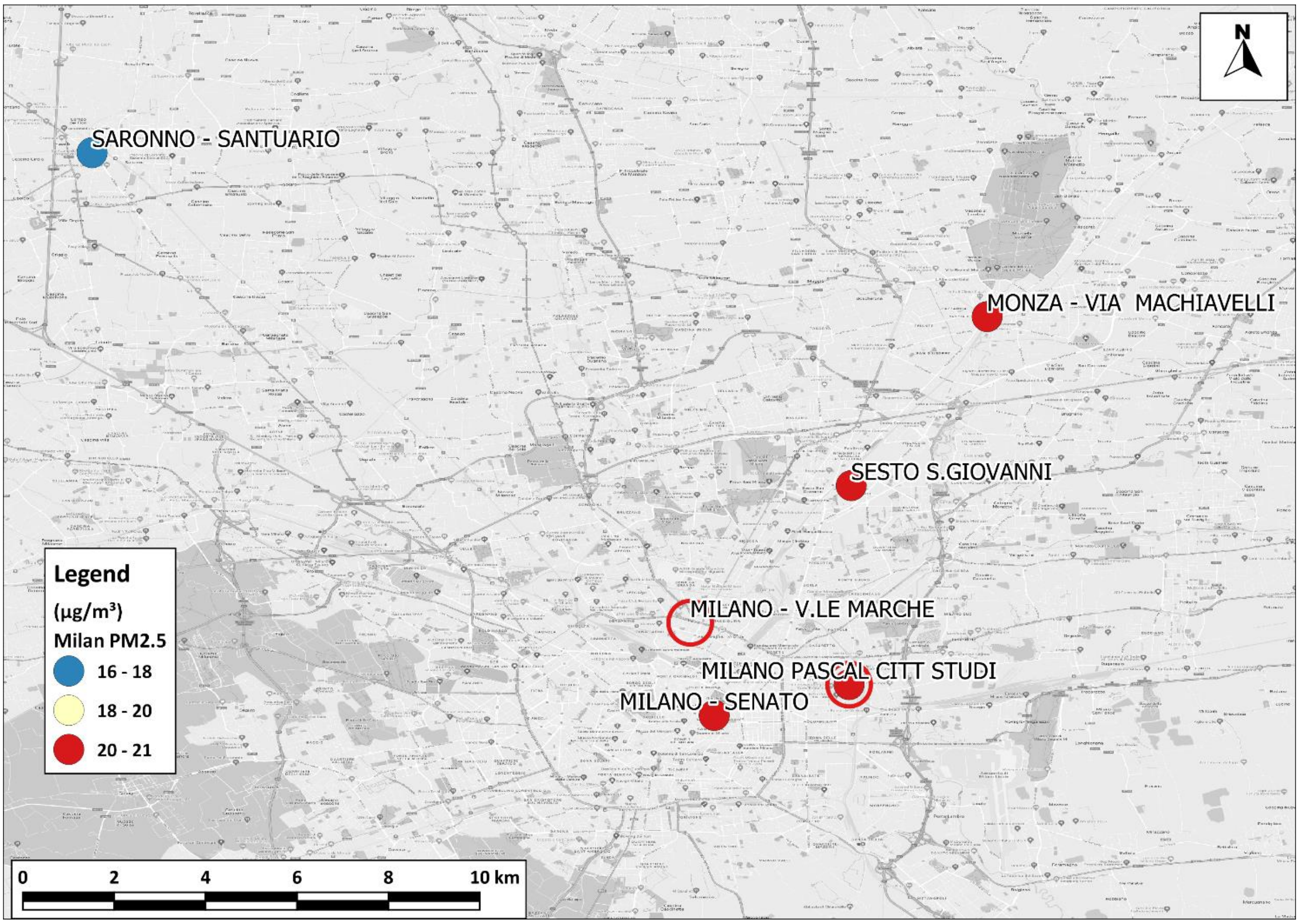


Figure 3-18: 2019 Annual Mean $PM_{2.5}$ Concentrations at Fixed Monitoring Sites in Milan (also showing location of Viale Marche NO_2 Site)

Map data ©2023 Google.

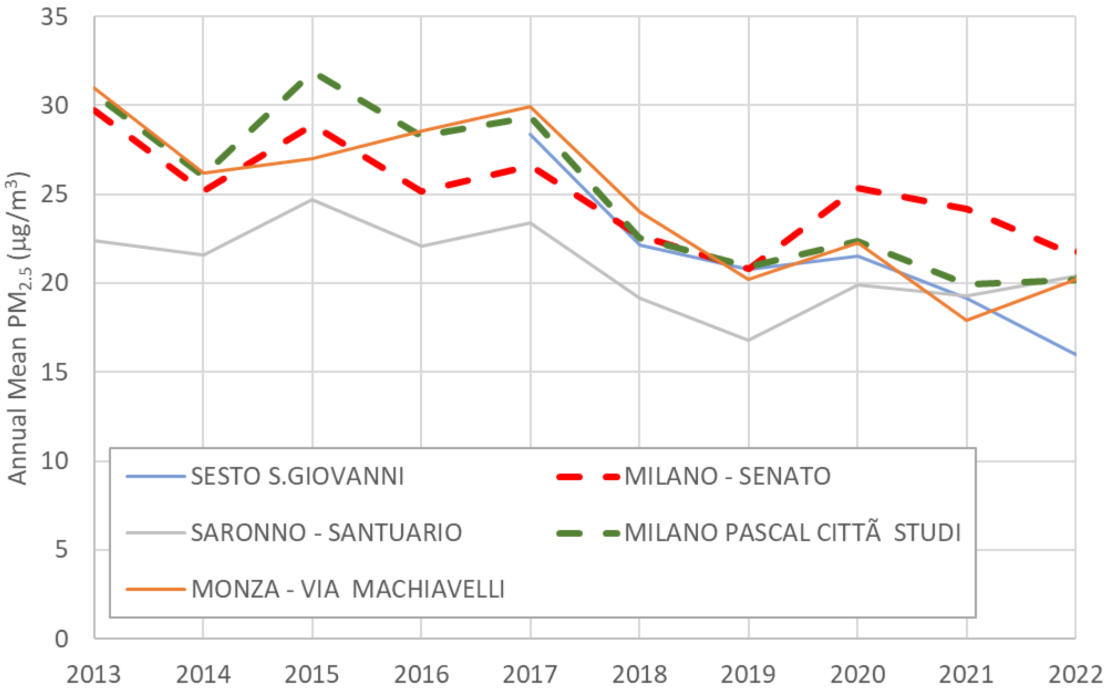


Figure 3-19: Annual Mean $PM_{2.5}$ Concentrations at Fixed Monitoring Sites in Milan, 2013 to 2022

3.5 Warsaw

NO_2

Figure 3-20 summarises the measured annual mean NO_2 concentrations in 2019 at the fixed monitoring sites in Warsaw as reported to the European Commission. Figure 3-21 shows the annual mean concentrations measured at all sites since 2013. By far the highest concentrations have been measured at the al. Niepodleglosci monitoring station, which is shown in Figure 3-22.

The ul. Wokalna background site is considered the most well sited, at nearly 200 m from the nearest main road but within an urban area, and so has been used to represent background conditions. Table 3-9 sets out how the local road increment has been calculated for Warsaw. The road increment shown in Table 3-9 has been taken to represent the local road contribution to NO_2 concentrations, while the 'Background to Use' value has been taken to represent the contribution from all other sources.

There is no clear trend in the annual mean concentrations measured at background sites in Warsaw, and so the 'Background to Use' value in Table 3-9 has been assumed to apply in every future year.

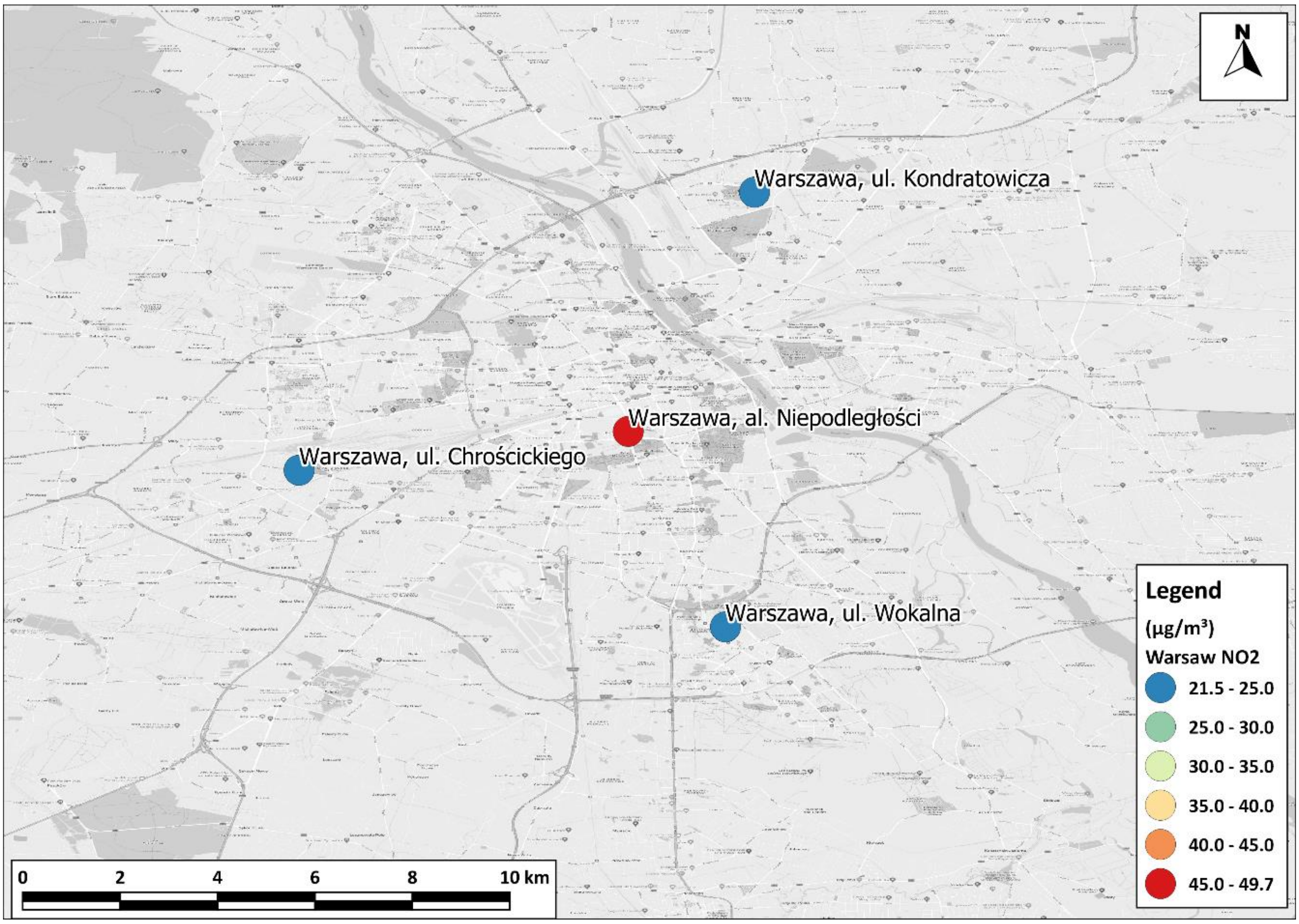


Figure 3-20: 2019 Annual Mean NO_2 Concentrations at Fixed Monitoring Sites in Warsaw

Map data ©2023 Google.

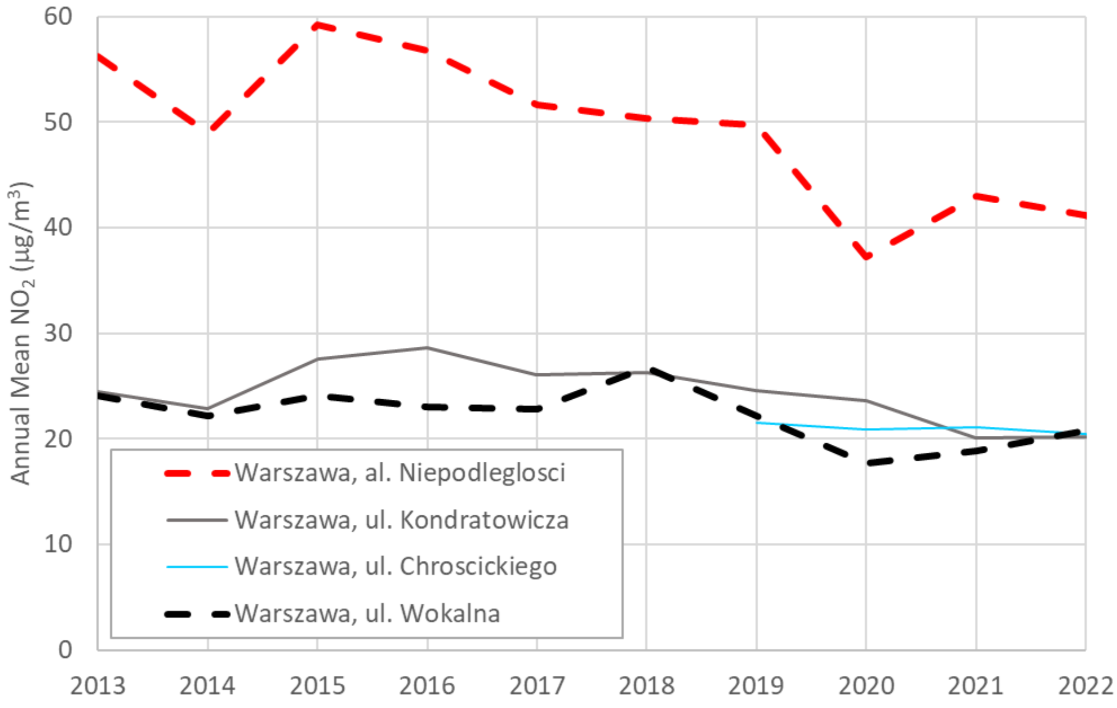


Figure 3-21: Annual Mean NO_2 Concentrations at Fixed Monitoring Sites in Warsaw, 2013 to 2022

Figure 3-22: al. Niepodleglosci Monitoring Station, Warsaw

Imagery ©2023 CNES/Airbus, Maxar Technologies, MGGP Aero, Maxar Technologies, Map data ©2023 Google.

Table 3-9: Baseline Annual Mean NO_2 Concentrations in 2019 - Warsaw

Monitoring Site	Annual Mean NO_2 (µg/m^3)
Roadside Total	
al. Niepodleglosci	49.7
Background	
ul. Kondratowicza	24.5
ul. Wokalna	22.1
Ul. Chroscickiego	21.5
(Background to Use)	*(22.1)*
Road Increment (Roadside total minus background)	
al. Niepodleglosci	27.5

$PM_{2.5}$

Figure 3-23 summarises the measured annual mean $PM_{2.5}$ concentrations in 2019 at the fixed monitoring sites in Warsaw as reported to the European Commission. Figure 3-24 shows the annual mean concentrations measured at all sites since 2013. Subtracting the concentration measured at ul Wokalna from that measured at al Niepodleglosci, suggests that local roads contributed 8.7 µg/m^3 to the annual mean $PM_{2.5}$ concentration. This is significantly higher than for any other city, even though the road-NO_2 values for Warsaw are toward the lower end of the range seen elsewhere. This suggests that measurements made at the ul Wokalna site may not provide a good representation of background conditions at al Niepodleglosci. It is likely that other local emissions sources are also influencing the measurements at al Niepodleglosci.

Taking the difference between these measurements does not, therefore, provides the optimum approach to determine the local road component of $PM_{2.5}$. Instead, the 2019 local road component of NOx concentrations has been derived using the same sites and method as described above for NO_2. The traffic emissions model for Warsaw described in Section 2 has then been used to calculate the average ratio between traffic emissions of NOx and $PM_{2.5}$. The local road component of NOx has then been multiplied by this ratio, as shown in Table 3-10. Since the total measured $PM_{2.5}$ concentration at the al Niepodleglosci site is known, the unknown variable is the contribution from other sources at this location. This has been calculated by subtracting the local road contribution from the total measurement, as shown in Table 3-10.

The average annual mean $PM_{2.5}$ concentration measured in each year 2009 to 2019 (inclusive) at the Wokalna and Kondratowicza background sites has been used to determine an overall recent trend[23], which suggests that concentrations have been declining at an average rate of 1 µg/m^3 per year. Notwithstanding that the non-road contribution al Niepodleglosci is assumed to be affected by other local sources, it has been assumed that the contribution to $PM_{2.5}$ concentrations from other sources will continue to follow this trajectory until it reaches equivalence with the lowest recent concentration measured at any of the sites shown in Figure 3-24, which is 14.1 μg/m^3. The contribution from other sources has not been allowed to go below this level in any future year.

Table 3-10: Apportioning the Measured $PM_{2.5}$ Concentration in Warsaw

Description	Value
Annual Mean NOx from Local Roads (μg/m^3)	87.3
$PM_{2.5}$ to NOx ratio in Existing Baseline Traffic Emissions	0.0490
Annual Mean $PM_{2.5}$ from Local Roads (μg/m^3)	4.3
Total Measured $PM_{2.5}$ (μg/m^3)	24.7
Assumed Contribution from Other Sources (μg/m^3)	20.4

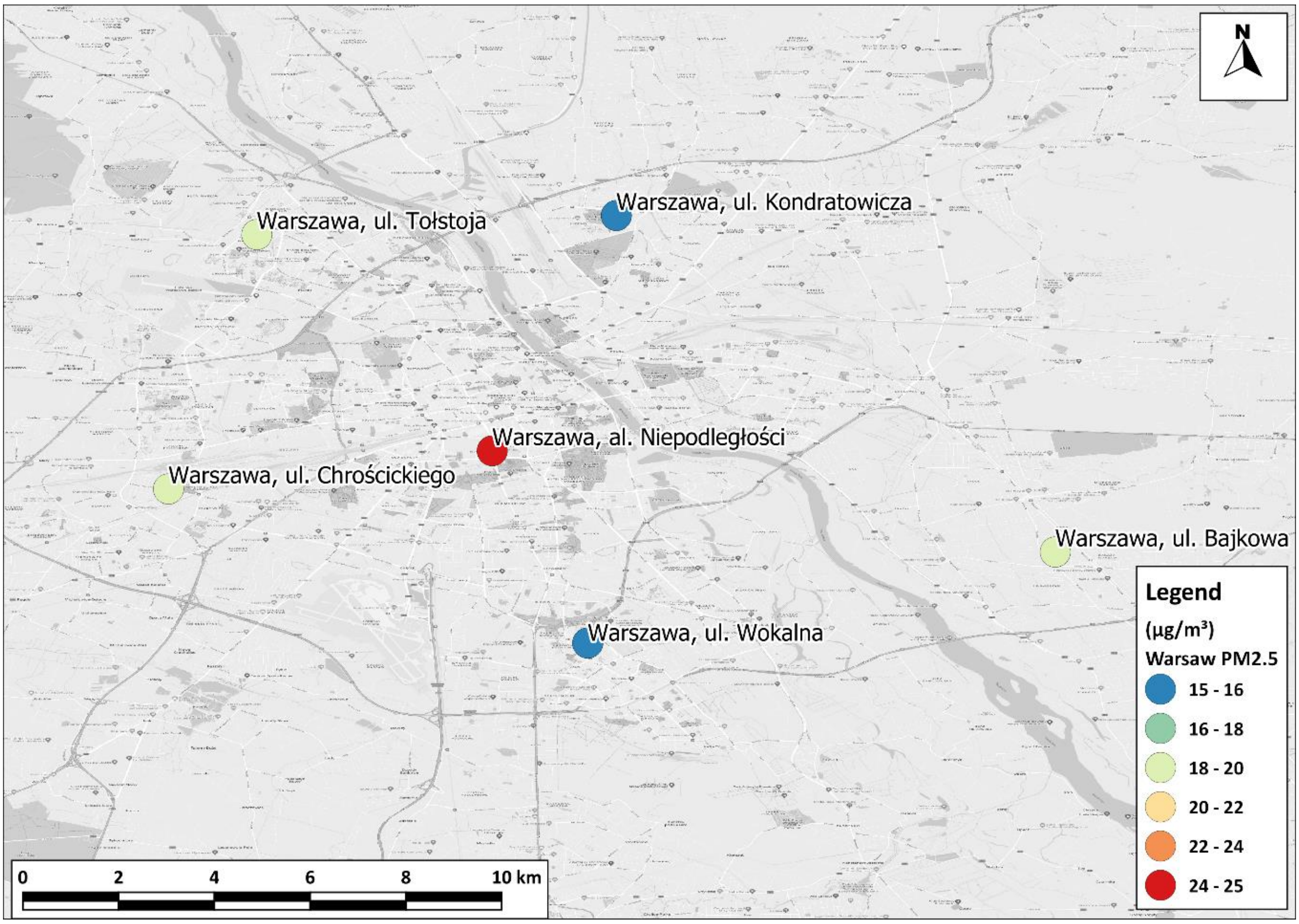


Figure 3-23: 2019 Annual Mean $PM_{2.5}$ Concentrations at Fixed Monitoring Sites in Warsaw

Map data ©2023 Google.

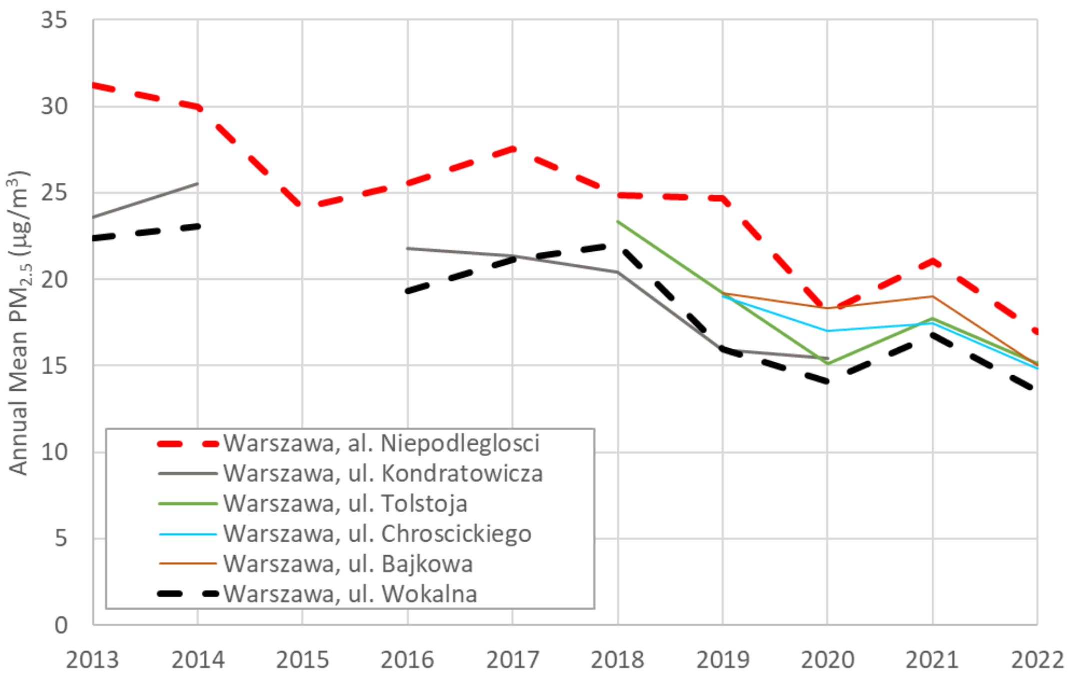


Figure 3-24: Annual Mean $PM_{2.5}$ Concentrations at Fixed Monitoring Sites in Warsaw, 2013 to 2022

3.6 London

NO_2

Figure 3-25 summarises the measured annual mean NO_2 concentrations in 2019 at the fixed monitoring sites in London which were previously reported to the European Commission. The locations of two sites are highlighted. These represent the site which recorded the highest concentrations, and a nearby site recording low concentrations. Figure 3-26 shows the annual mean concentrations measured at all sites since 2013, highlighting the two sites labelled in Figure 3-25.

The highest annual mean concentrations have consistently been recorded at the Marylebone Road site. The location of this monitor is shown in more detail in Figure 3-27.

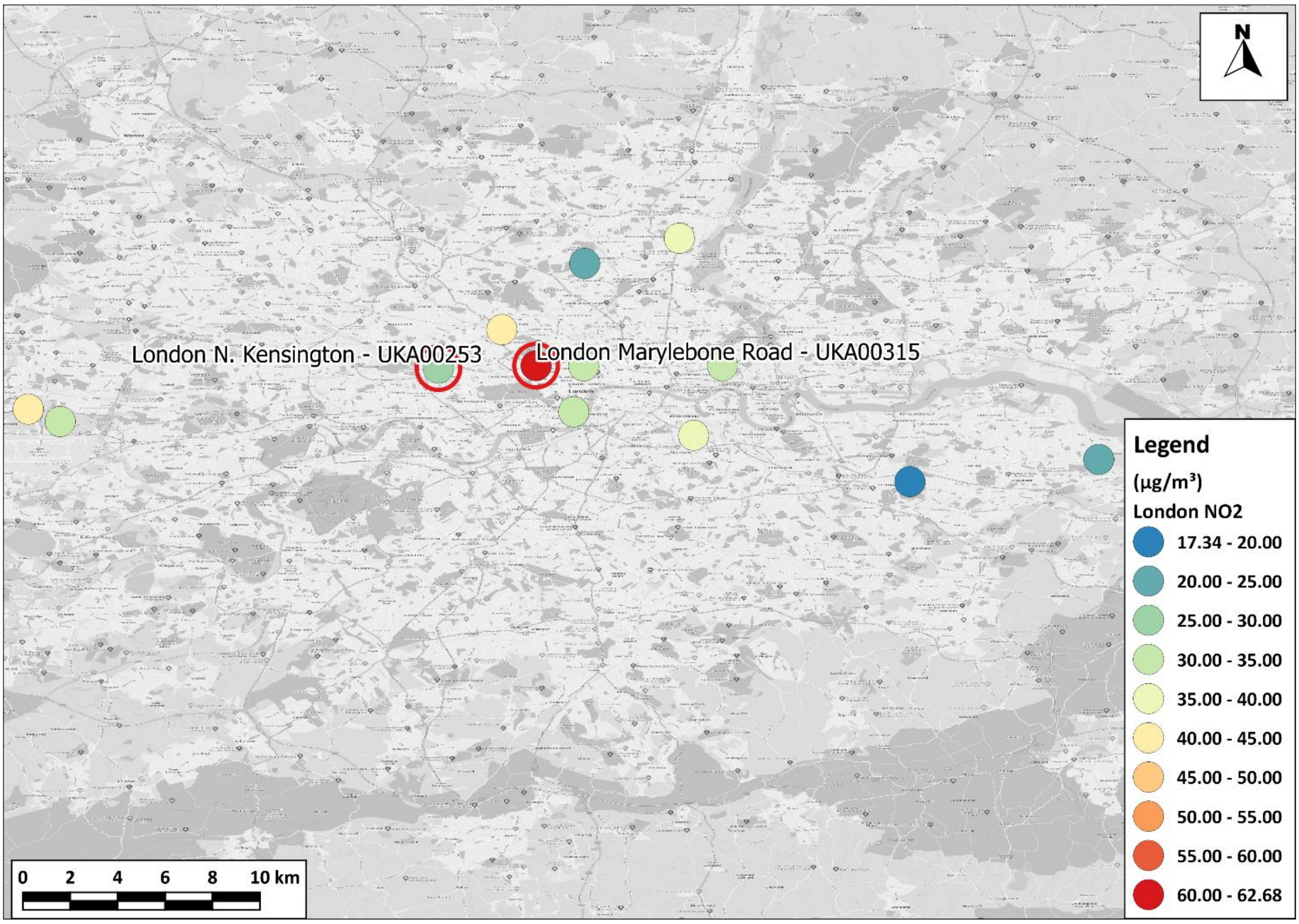


Figure 3-25: 2019 Annual Mean NO_2 Concentrations at Fixed Monitoring Sites in London

Map data ©2023 Google.

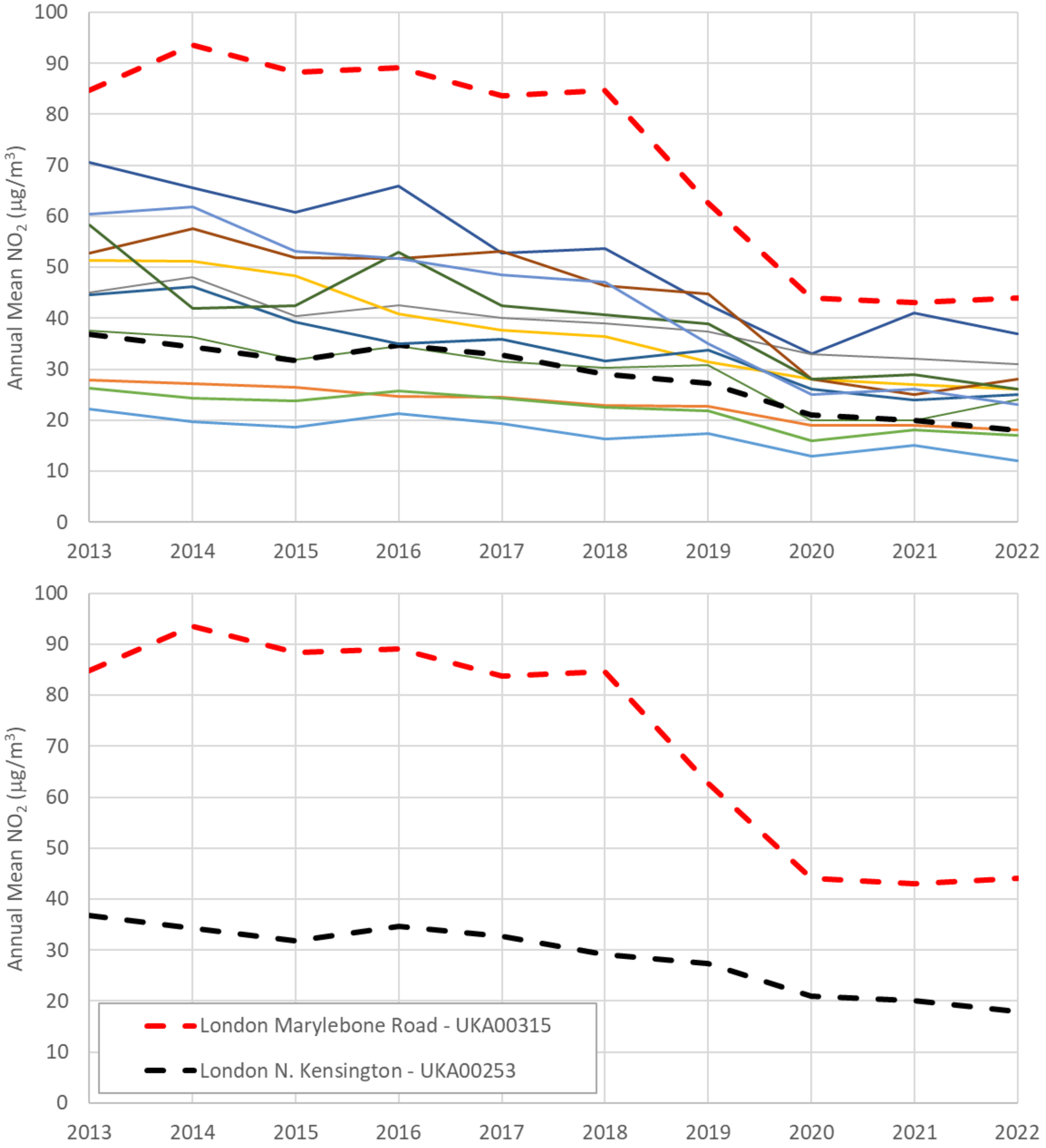


Figure 3-26: Annual Mean NO_2 Concentrations at Fixed Monitoring Sites in London, 2013 to 2022 – Highlighting Two Sites of Particular Relevance

Figure 3-27: Marylebone Road Monitoring Station, London

Imagery ©2023 Bluesky, CNES/Airbus, Getmapping plc, Infoterra Ltd & Bluesky, Maxar Technologies, The GeInformation Group, Map data ©2023 Google.

Table 3-11 shows how the local road increment has been calculated. The contribution from other sources has been taken as the concentration measured at the North Kensington background monitor, which is well sited and frequently used for this purpose[25]. This suggests that local roads contributed 56% to the total measured concentration at the Marylebone Road site.

The road increment shown in Table 3-3 has been taken to represent the local road contribution to NO_2 concentrations, while the measurement from North Kensington has been taken to represent the contribution from all other sources.

Annual mean NO_2 concentrations measured in each year 2009 to 2019 (inclusive) at the North Kensington site have been used to determine an overall recent trend[26], which suggests that concentrations have been declining at a rate of 0.7 $\mu g/m^3$ per year. It has been assumed that the contribution to NO_2 concentrations from other sources will continue to follow this trajectory until it reaches equivalence with the lowest recent NO_2 concentration measured at any of the sites shown in Figure 3-26, which is 13 $\mu g/m^3$. The contribution from other sources has not been allowed to go below this level in any future year.

Table 3-11: Baseline Annual Mean Concentrations NO_2 in 2019 - London

Monitoring Site	Annual Mean NO_2 ($\mu g/m^3$)
Roadside Total	
Marylebone Road	62.7
Background	
North Kensington	27.3
Road Increment (Roadside total minus background)	
Marylebone Road	35.4

$PM_{2.5}$

Figure 3-28 summarises the measured annual mean $PM_{2.5}$ concentrations in 2019 at the fixed monitoring sites in London that were previously reported to the European Commission, again highlighting the Marylebone Road and North Kensington sites. Figure 3-29 shows the annual mean concentrations measured at all sites since 2013.

The highest $PM_{2.5}$ concentrations in 2019 were measured at Marylebone Road.

[25] e.g. https://pubmed.ncbi.nlm.nih.gov/22642836/

[26] Based on OLS regression of the annual mean measured concentrations.

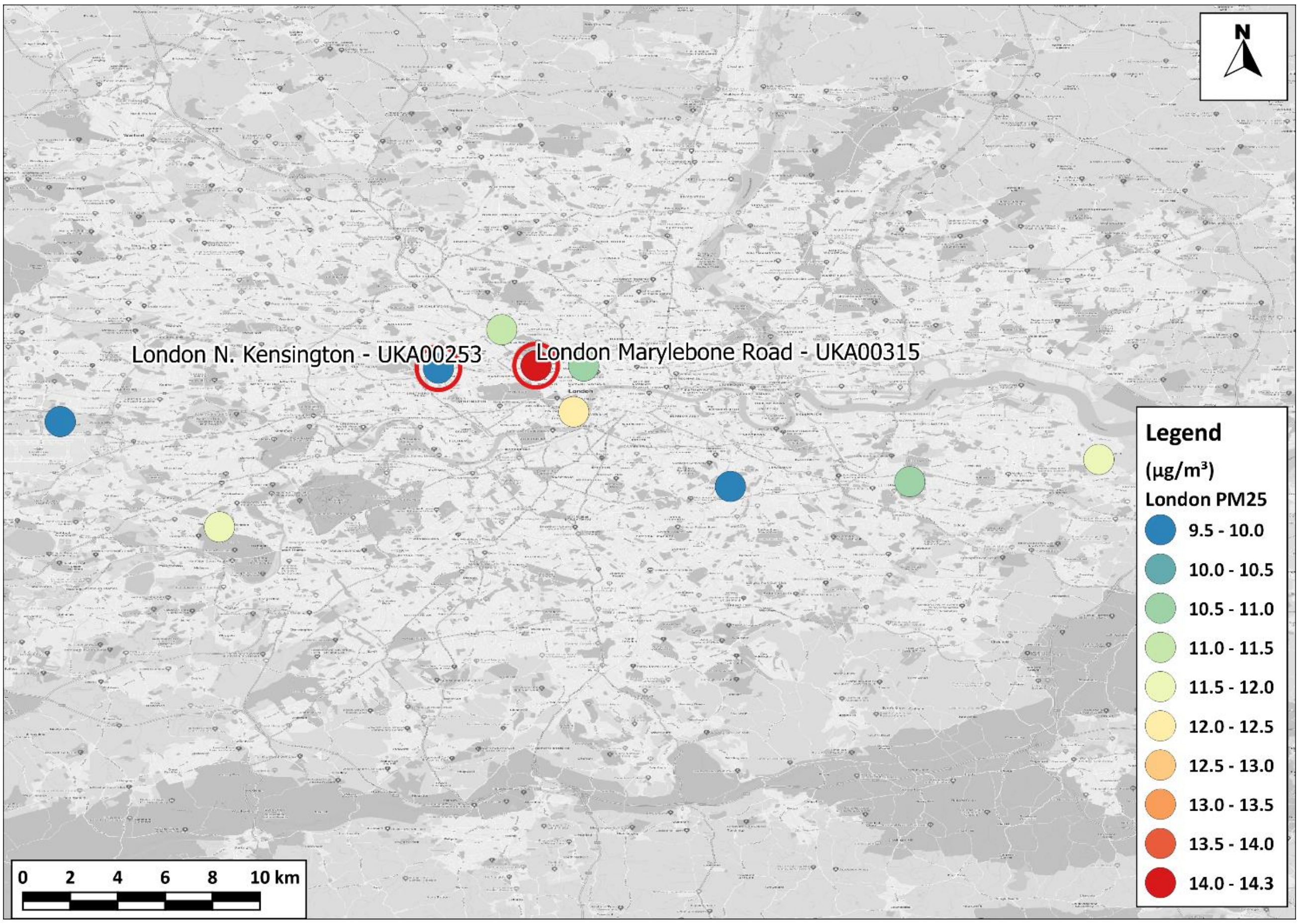


Figure 3-28: 2019 Annual Mean $PM_{2.5}$ Concentrations at Fixed Monitoring Sites in London

Map data ©2023 Google.

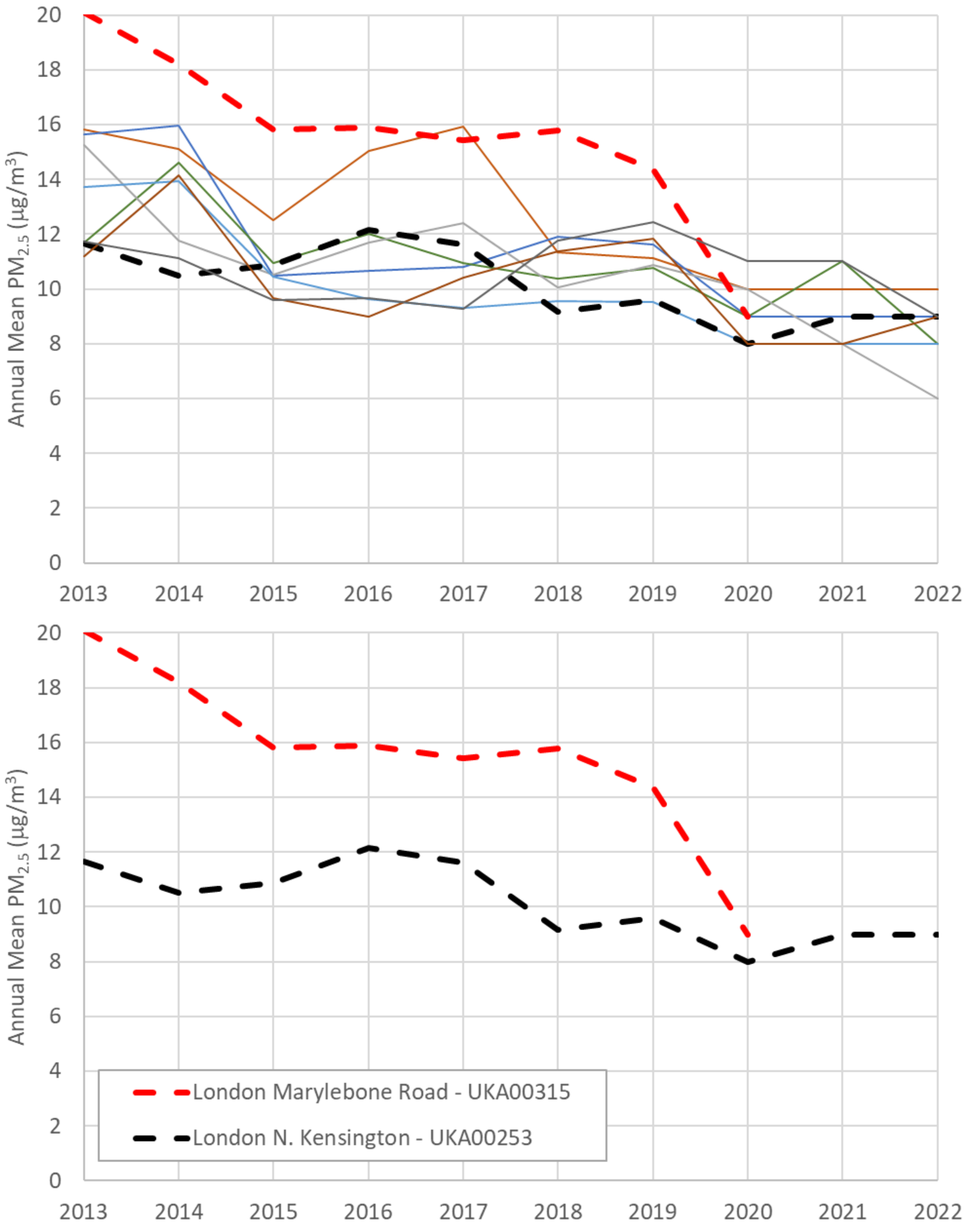


Figure 3-29: Annual Mean $PM_{2.5}$ Concentrations at Fixed Monitoring Sites in London, 2013 to 2022 – Highlighting Two Sites of Particular Relevance

Table 3-12 shows how the local road increment has been calculated. The contribution from other sources has been taken as the concentration measured at the North Kensington background monitor. This suggests that local roads contributed 33% to the total measured concentration at Marylebone Road.

The road increment shown in Table 3-12 has been taken to represent the local road contribution to $PM_{2.5}$ concentrations, while concentration measured at North Kensington has been taken to represent the contribution from all other sources.

Annual mean $PM_{2.5}$ concentrations measured in each year 2009 to 2019 (inclusive) at the North Kensington site have been used to determine an overall recent trend[26], which suggests that concentrations have been declining at a rate of 0.3 $\mu g/m^3$ per year. It has been assumed that the contribution to $PM_{2.5}$ concentrations from other sources will continue to follow this trajectory until it reaches equivalence with the lowest recent ratified $PM_{2.5}$ concentration (i.e. discounting the 2022 values) measured at any of the sites shown in Figure 3-29, which is 8 $\mu g/m^3$. The contribution from other sources has not been allowed to go below this level in any future year.

Table 3-12: Baseline Annual Mean $PM_{2.5}$ Concentrations in 2019 - London

Monitoring Site	Annual Mean $PM_{2.5}$ ($\mu g/m^3$)
Roadside Total	
Marylebone Road	14.3
Background	
North Kensington	9.6
Road Increment (Roadside total minus background)	
Marylebone Road	4.8

4 Results

4.1 Madrid

Table 4-1 shows the assumed specification of the three LEZs/ZEZs in Madrid (Scenarios A, B, and C). This is repeated from Table 2-4 above. Table 4-2 shows the effects that these scenarios are expected to have on ambient annual mean concentrations of NO_2 and $PM_{2.5}$ at worst-case locations in Madrid. This information is also shown in Figure 4-1.

Table 4-1: LEZ and ZEZ Scenario Descriptions for Madrid

2025 - Scenario A	2027 - Scenario B	2030 - Scenario C
95% compliance rate with the LEZ rules 5% traffic reduction/modal shift Diesel cars: at least Euro 5 Petrol cars: at least Euro 4	95% compliance rate with the LEZ rules 10% traffic reduction/modal shift Only Euro 6d(-temp) cars	Only ZEEV cars, vans, buses and trucks, 95% compliance rate, 20% traffic reduction & modal shift

Table 4-2: Predicted Annual Mean NO_2 and $PM_{2.5}$ concentrations (µg/m³) at Worst-case Locations in Madrid under Alternative Future Scenarios

	2019 Base	2025 Base	2025 Sc A	2027 Base	2027 Sc B	2030 Base	2030 Sc C
NO_2 from Local Roads	30.8	19.3	16.7	17.3	9.6	14.8	0.9
NO_2 from All other Sources	22.6	17.8	17.8	16.2	16.2	13.8	13.8
$PM_{2.5}$ from Local Roads	4.2	3.4	2.8	3.3	2.6	3.0	1.6
$PM_{2.5}$ from All Other Sources	7.6	7.6	7.6	7.6	7.6	7.6	7.6
Total NO_2	53.4	37.2	34.5	33.5	25.8	28.6	14.7
Total $PM_{2.5}$	11.9	11.1	10.5	10.9	10.2	10.7	9.2
% reduction in NO_2 from Local Roads caused by LEZ/ZEZ	-	-	-14%	-	-45%	-	-94%
% reduction in $PM_{2.5}$ from Local Roads caused by LEZ/ZEZ	-	-	-17%	-	-21%	-	-48%

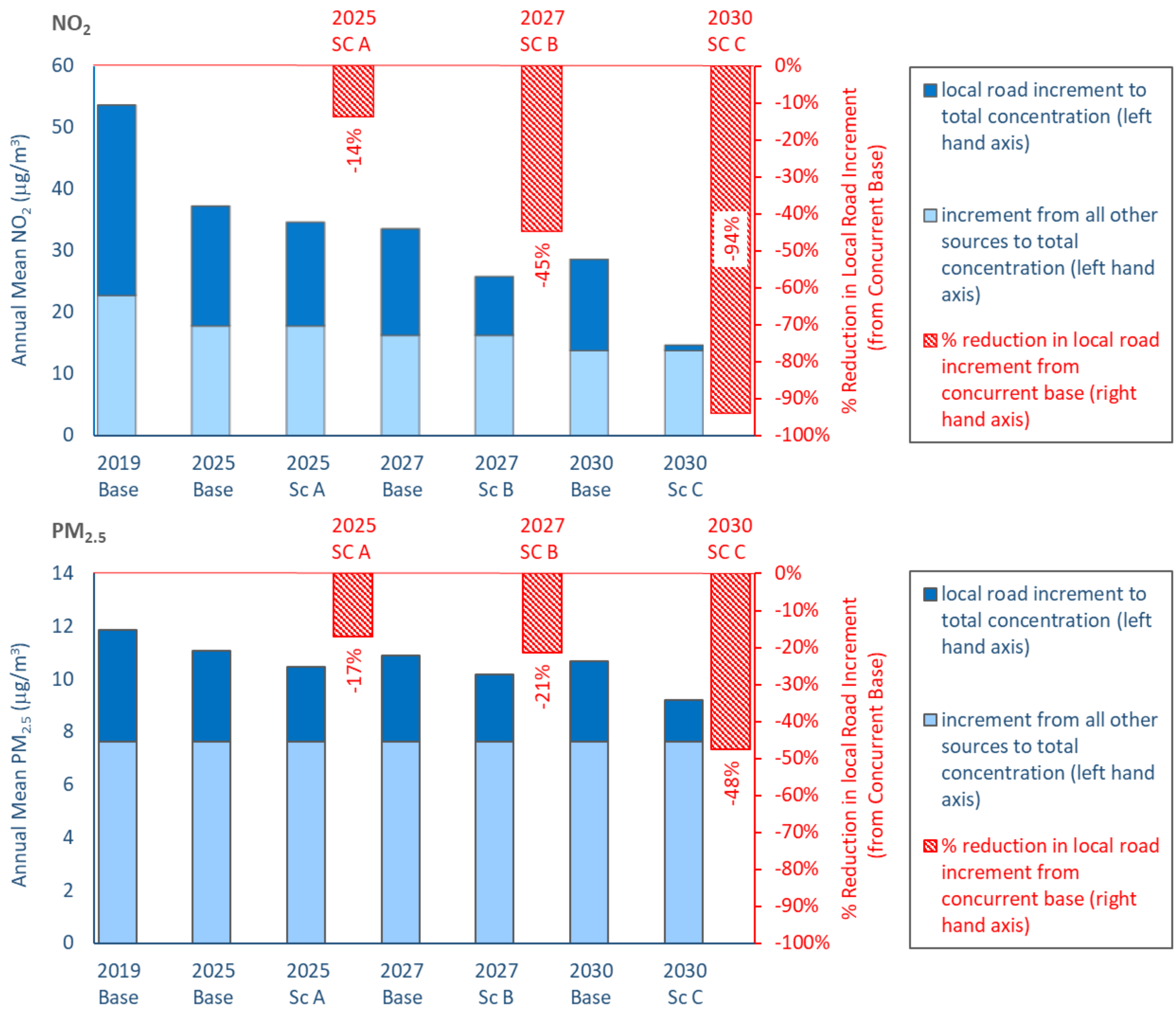


Figure 4-1: Predicted Annual Mean NO_2 and $PM_{2.5}$ Concentrations at Worst-case Locations in Madrid under Alternative Future Scenarios

NO_2 concentrations are predicted to fall appreciably by 2025 and continue to fall further by 2030. LEZ Scenario A in 2025 is predicted to further reduce annual mean NO_2 concentrations, delivering a 14% reduction in the local road increment; this increases to a 45% reduction in the 2027 LEZ Scenario B. ZEZ Scenario C is predicted to remove almost all of the local road increment to NO_2 concentrations leaving only the contribution from other sources. Measures to reduce emissions from other (non-road) sectors will be needed to bring about significant further reductions in NO_2 concentrations but, as explained in Section 2, the increment from sources other than local roads is likely to have been over-predicted in 2030 and lower concentrations are considered to be highly achievable in the future. It is clear that the additional local savings which could be delivered by LEZs and ZEZs are appreciable and, when combined with actions to reduce emissions from other sources, could result in significant reductions in NO_2 concentrations at worst-case reporting locations in Madrid.

Local roads make up a smaller proportion of total $PM_{2.5}$ concentrations than is the case for NO_2. Furthermore, ZEEV vehicles will continue to emit non-exhaust emissions, meaning that the relative changes of ZEZ Scenario C is much smaller for $PM_{2.5}$ than for NO_2. Nevertheless the additional local benefits that could be delivered by LEZs and ZEZs remain appreciable for $PM_{2.5}$. When combined with actions to reduce emissions from other sources, they could result in significant reductions in concentrations in the future.

As explained in Section 2, NO_2 concentrations have also been predicted using alternative emissions factors derived from recent real-world testing. These values are presented as a sensitivity test in Table 4-3. The results are not very different from those in Table 4-2. This is partly because the emissions factors themselves are similar, and partly because the focus of this assessment has been on relative changes over time (from the baseline measurements) and where emissions from individual vehicles are higher in the alternative emissions factors, the average relative changes over time are not.

Table 4-3: Alternative Predicted Annual Mean NO_2 concentrations (μg/m^3) at Worst-case Locations in Madrid using Emissions Factors Provided by Mullholand et al., 2022[14]

	2019 Base	2025 Base	2025 Sc A	2027 Base	2027 Sc B	2030 Base	2030 Sc C
NO_2 from Local Roads	30.8	19.4	16.5	17.3	10.4	14.7	0.9
Total NO_2	53.4	37.2	34.3	33.6	26.6	28.6	14.7
% reduction in NO_2 from Local Roads caused by LEZ/ZEZ	-	-	-15%	-	-40%	-	-94%

Sensitivity tests on the LEZ specifications have also been carried out. These assume only 60% compliance with each LEZ/ZEZ, rather than the 95% compliance assumed above. In practice, the 2025 baseline fleet is already assumed to achieve almost 80% compliance with LEZ Scenario A, meaning that this LEZ would no longer have a direct effect on the fleet composition, but would still affect modal shift. Compliance with the proposed 2027 and 2030 LEZs is expected to be less than 60% in the 2027 and 2030 baselines (49% and 11% respectively) meaning that these LEZs will continue to influence fleet composition even with only 60% compliance. The results of these sensitivity tests are summarised in Table 4-4. Each LEZ continues to deliver a predicted benefit, albeit smaller than with 95% compliance. The improvement shown for 2025 Scenario A Sensitivity Test is entirely the result of assumed changes to modal shift.

Table 4-4: Predicted Annual Mean NO_2 and $PM_{2.5}$ concentrations (µg/m^3) at Worst-case Locations in Madrid under Sensitivity Test LEZ/ZEZ Scenarios

	2025 Sc A ST	2027 Sc B ST	2030 Sc C ST
NO_2 from Local Roads	18.4	14.1	5.2
NO_2 from All other Sources	17.8	16.2	13.8
$PM_{2.5}$ from Local Roads	3.3	2.8	1.9
$PM_{2.5}$ from All Other Sources	7.6	7.6	7.6
Total NO_2	36.2	30.3	19.1
Total $PM_{2.5}$	10.9	10.5	9.6
% reduction in NO_2 from Local Roads caused by LEZ/ZEZ	-5%	-18%	-65%
% reduction in $PM_{2.5}$ from Local Roads caused by LEZ/ZEZ	-5%	-13%	-37%

4.2 Greater Paris

Table 4-5 shows the assumed specification of the three LEZs/ZEZs in Paris (Scenarios A, B, and C). This is repeated from Table 2-4 above. Table 4-6 shows the effects that these scenarios are expected to have on ambient annual mean concentrations of NO_2 and $PM_{2.5}$ at worst-case locations in Paris. This information is also shown in Figure 4-2.

Table 4-5: LEZ and ZEZ Scenario Descriptions for Paris

2025 - Scenario A	2027 - Scenario B	2030 - Scenario C
95% compliance rate with the LEZ rules 5% traffic reduction/modal shift Diesel cars: at least Euro 6 Petrol cars: at least Euro 6	95% compliance rate with the LEZ rules 10% traffic reduction/modal shift Only Euro 6d(-temp) cars	Only ZEEV cars, vans, buses and trucks, 95% compliance rate, 20% traffic reduction & modal shift

Table 4-6: Predicted Annual Mean NO_2 and $PM_{2.5}$ concentrations (µg/m^3) at Worst-case Locations in Paris under Alternative Future Scenarios

	2019 Base	2025 Base	2025 Sc A	2027 Base	2027 Sc B	2030 Base	2030 Sc C
NO_2 from Local Roads	44.8	28.9	22.4	26.0	15.6	22.3	1.2
NO_2 from All other Sources	28.5	24.0	24.0	22.5	22.5	20.3	20.3
$PM_{2.5}$ from Local Roads	6.0	5.0	4.2	4.8	3.9	4.5	2.4
$PM_{2.5}$ from All Other Sources	10.2	9.0	9.0	9.0	9.0	9.0	9.0
Total NO_2	73.3	52.9	46.4	48.5	38.1	42.6	21.5
Total $PM_{2.5}$	16.2	14.0	13.2	13.8	12.9	13.5	11.5
% reduction in NO_2 from Local Roads caused by LEZ/ZEZ	-	-	-22%	-	-40%	-	-95%
% reduction in $PM_{2.5}$ from Local Roads caused by LEZ/ZEZ	-	-	-16%	-	-19%	-	-46%

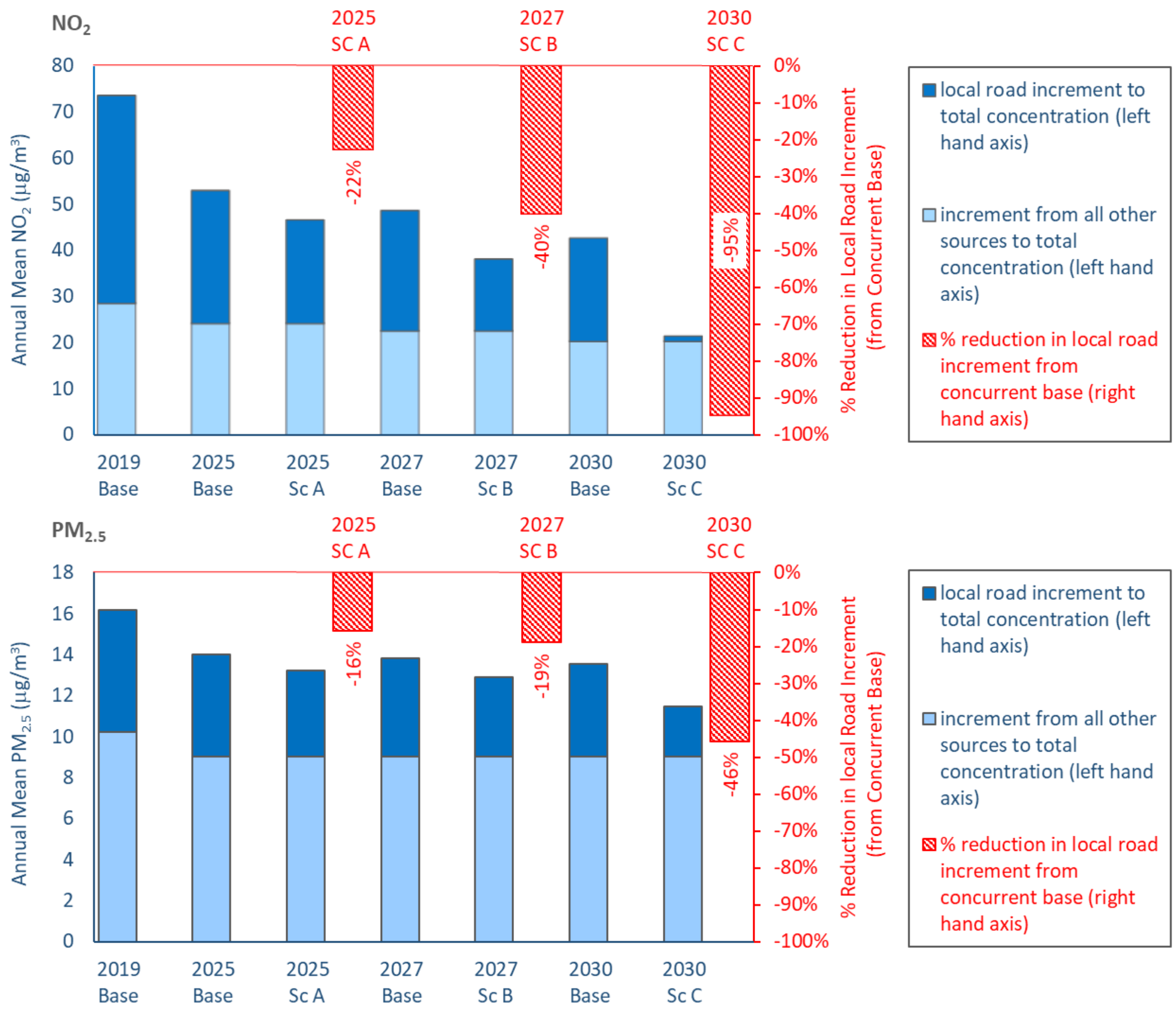


Figure 4-2: Predicted Annual Mean NO_2 and $PM_{2.5}$ Concentrations at Worst-case Locations in Paris under Alternative Future Scenarios

NO_2 concentrations are predicted to fall appreciably by 2025 and continue to fall further by 2030. LEZ Scenario A in 2025 is predicted to further reduce annual mean NO_2 concentrations, delivering a 22% reduction in the local road increment; this increases to a 40% reduction in the 2027 LEZ Scenario B. ZEZ Scenario C is predicted to remove almost all of the local road increment to NO_2 concentrations leaving only the contribution from other sources. Measures to reduce emissions from other (non-road) sectors will be needed to bring about significant further reductions in NO_2 concentrations but, as explained in Section 2, the increment from sources other than local roads is likely to have been over-predicted in 2030 and lower concentrations are considered to be highly achievable in the future. It is clear that the additional local savings which could be delivered by LEZs and ZEZs are appreciable and, when combined with actions to reduce emissions from other sources, could result in significant reductions in NO_2 concentrations at worst-case reporting locations in Paris.

Local roads make up a smaller proportion of total $PM_{2.5}$ concentrations than is the case for NO_2. Furthermore, ZEEV vehicles will continue to emit non-exhaust emissions, meaning that the relative changes of ZEZ Scenario C is much smaller for $PM_{2.5}$ than for NO_2. Nevertheless, the additional local benefits that could be delivered by LEZs and ZEZs remain appreciable for $PM_{2.5}$. When combined with actions to reduce emissions from other sources, they could result in significant reductions in concentrations in the future.

As explained in Section 2, NO_2 concentrations have also been predicted using alternative emissions factors derived from recent real-world testing. These values are presented as a sensitivity test in Table 4-7. The results are not very different from those in Table 4-6. This is partly because the emissions factors themselves are similar, and partly because the focus of this assessment has been on relative changes over time (from the baseline measurements) and where emissions from individual vehicles are higher in the alternative emissions factors, the average relative changes over time are not.

Table 4-7: Alternative Predicted Annual Mean NO_2 concentrations ($\mu g/m^3$) at Worst-case Locations in Paris using Emissions Factors Provided by Mullholand et al., 2022[14]

	2019 Base	2025 Base	2025 Sc A	2027 Base	2027 Sc B	2030 Base	2030 Sc C
NO_2 from Local Roads	44.8	29.0	21.7	26.1	16.6	22.3	1.2
Total NO_2	73.3	53.1	45.8	48.7	39.1	42.7	21.5
% reduction in NO_2 from Local Roads caused by LEZ/ZEZ	-	-	-25%	-	-36%	-	-95%

4.3 Brussels

Table 4-8 shows the assumed specification of the three LEZs/ZEZs in Brussels (Scenarios A, B, and C). This is repeated from Table 2-4 above. Table 4-9 shows the effects that these scenarios are expected to have on ambient annual mean concentrations of NO_2 and $PM_{2.5}$ at worst-case locations in Brussels. This information is also shown in Figure 4-3.

Table 4-8: LEZ and ZEZ Scenario Descriptions for Brussels

2025 - Scenario A	2027 - Scenario B	2030 - Scenario C
95% compliance rate with the LEZ rules 5% traffic reduction/modal shift Diesel cars: at least Euro 6d(-temp) Petrol cars: at least Euro 4	Compliance rate 95% Only Euro 6d(-temp) cars 10% traffic reduction/modal shift	Only ZEEV cars, vans, buses and trucks, 95% compliance rate, 20% traffic reduction & modal shift

Table 4-9: Predicted Annual Mean NO_2 and $PM_{2.5}$ concentrations ($\mu g/m^3$) at Worst-case Locations in Brussels under Alternative Future Scenarios

	2019 Base	2025 Base	2025 Sc A	2027 Base	2027 Sc B	2030 Base	2030 Sc C
NO_2 from Local Roads	26.8	17.3	11.4	15.7	9.8	13.5	0.6
NO_2 from All other Sources	24.8	18.3	18.3	16.2	16.2	12.9	12.9
$PM_{2.5}$ from Local Roads	3.2	2.7	2.4	2.6	2.2	2.5	1.4
$PM_{2.5}$ from All Other Sources	10.8	8.5	8.5	8.5	8.5	8.5	8.5
Total NO_2	51.5	35.6	29.7	31.8	26.0	26.5	13.6
Total $PM_{2.5}$	14.0	11.2	10.9	11.1	10.7	11.0	9.9
% reduction in NO_2 from Local Roads caused by LEZ/ZEZ	-	-	-34%	-	-37%	-	-95%
% reduction in $PM_{2.5}$ from Local Roads caused by LEZ/ZEZ	-	-	-12%	-	-16%	-	-44%

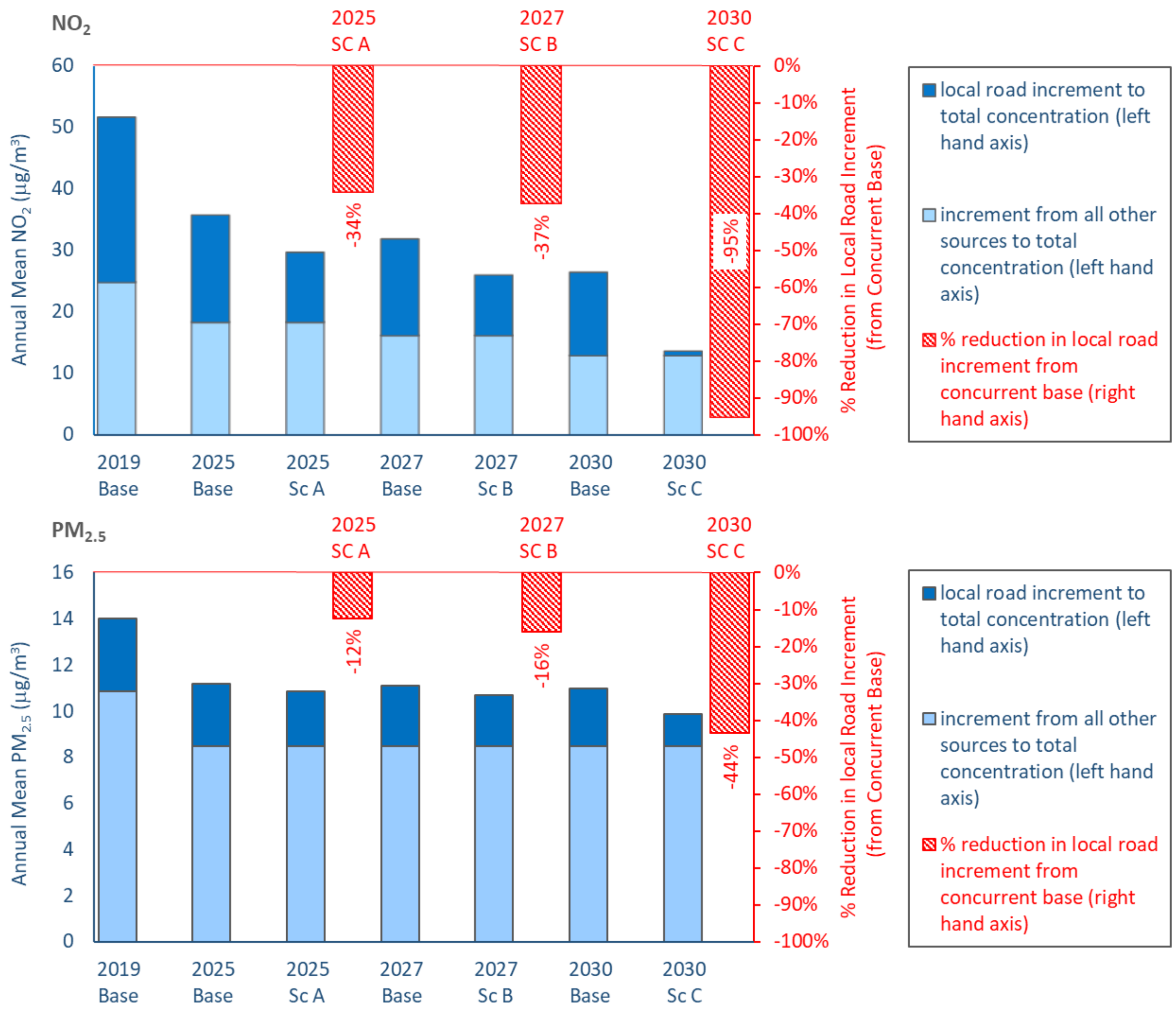


Figure 4-3: **Predicted Annual Mean NO_2 and $PM_{2.5}$ Concentrations at Worst-case Locations in Brussels under Alternative Future Scenarios**

NO_2 concentrations are predicted to fall appreciably by 2025 and continue to fall further by 2030. LEZ Scenario A in 2025 is predicted to further reduce annual mean NO_2 concentrations, delivering a 34% reduction in the local road increment; this increases to a 37% reduction in the 2027 LEZ Scenario B. ZEZ Scenario C is predicted to remove almost all of the local road increment to NO_2 concentrations leaving only the contribution from other sources. Measures to reduce emissions from other (non-road) sectors will be needed to bring about significant further reductions in NO_2 concentrations but, as explained in Section 2, the increment from sources other than local roads is likely to have been over-predicted in 2030 and lower concentrations are considered to be highly achievable in the future. It is clear that the additional local savings which could be delivered by LEZs and ZEZs are appreciable and, when combined with actions to reduce emissions from other sources, could result in significant reductions in NO_2 concentrations at worst-case reporting locations in Brussels.

Local roads make up a smaller proportion of total $PM_{2.5}$ concentrations than is the case for NO_2. Furthermore, ZEEV vehicles will continue to emit non-exhaust emissions, meaning that the relative changes of ZEZ Scenario C is much smaller for $PM_{2.5}$ than for NO_2. Nevertheless the additional local benefits that could be delivered by LEZs and ZEZs remain appreciable for $PM_{2.5}$. When combined with actions to reduce emissions from other sources, they could result in significant reductions in concentrations in the future.

As explained in Section 2, NO_2 concentrations have also been predicted using alternative emissions factors derived from recent real-world testing. These values are presented as a sensitivity test in Table 4-10. The results are not very different from those in Table 4-9. This is partly because the emissions factors themselves are similar, and partly because the focus of this assessment has been on relative changes over time (from the baseline measurements) and where emissions from individual vehicles are higher in the alternative emissions factors, the average relative changes over time are not.

Table 4-10: Alternative Predicted Annual Mean NO_2 concentrations (µg/m^3) at Worst-case Locations in Brussels using Emissions Factors Provided by Mullholand et al., 2022[14]

	2019 Base	2025 Base	2025 Sc A	2027 Base	2027 Sc B	2030 Base	2030 Sc C
NO_2 from Local Roads	26.8	17.4	12.2	15.7	10.5	13.5	0.6
Total NO_2	51.5	35.7	30.5	31.9	26.6	26.5	13.6
% reduction in NO_2 from Local Roads caused by LEZ/ZEZ	-	-	-30%	-	-34%	-	-95%

Sensitivity tests on the LEZ specifications have also been carried out. For 2027 Scenario B, two sensitivity tests have been run. The first (ST1) assumes that only Euro 6d petrol cars are allowed in the LEZ (with 95% compliance). The second (ST2) assumes only 5% modal shift rather than the 10% in the main test. For 2030 Scenario B, the sensitivity test assumes only 10% model shift, rather than 20% in the main test. The results of these sensitivity tests are summarised in Table 4-11. The NO_2 improvements under Scenario B ST1 are understandably much greater than those under the basic Scenario B. For the two tests which assume less modal shift, the improvements are smaller.

Table 4-11: Predicted Annual Mean NO_2 and $PM_{2.5}$ at Worst-case Locations in Brussels under Sensitivity Test LEZ/ZEZ Scenarios

	2027 Sc B ST1	2027 Sc B ST2	2030 Sc C ST
NO_2 from Local Roads	9.2	10.4	0.7
NO_2 from All other Sources	16.2	16.2	12.9
$PM_{2.5}$ from Local Roads	2.2	2.3	1.6
$PM_{2.5}$ from All Other Sources	8.5	8.5	8.5
Total NO_2	25.4	26.5	13.7
Total $PM_{2.5}$	10.7	10.8	10.1
% reduction in NO_2 from Local Roads caused by LEZ/ZEZ	-41%	-34%	-95%
% reduction in $PM_{2.5}$ from Local Roads caused by LEZ/ZEZ	-16%	-11%	-36%

4.4 Milan

Table 4-12 shows the assumed specification of the three LEZs/ZEZs in Milan (Scenarios A, B, and C). This is repeated from Table 2-4 above. Table 4-13 shows the effects that these scenarios are expected to have on ambient annual mean concentrations of NO_2 and $PM_{2.5}$ at worst-case locations in Milan. This information is also shown in Figure 4-4.

Table 4-12: LEZ and ZEZ Scenario Descriptions for Milan

2025 - Scenario A	2027 - Scenario B	2030 - Scenario C
95% compliance rate with the LEZ rules 5% traffic reduction/modal shift Diesel cars: at least Euro 6d(-temp) Petrol cars: at least Euro 4	95% compliance rate Only Euro 6d(-temp) cars 10% traffic reduction/modal shift	Only ZEEV cars, vans, buses and trucks, 95% compliance rate, 20% traffic reduction & modal shift

Table 4-13: Predicted Annual Mean NO_2 and $PM_{2.5}$ concentrations (µg/m^3) at Worst-case Locations in Milan under Alternative Future Scenarios

	2019 Base	2025 Base	2025 Sc A	2027 Base	2027 Sc B	2030 Base	2030 Sc C
NO_2 from Local Roads	36.3	22.5	15.3	20.4	13.1	17.7	1.7
NO_2 from All other Sources	21.3	21.3	21.3	21.3	21.3	21.3	21.3
$PM_{2.5}$ from Local Roads	4.9	4.1	3.5	3.9	3.2	3.7	2.0
$PM_{2.5}$ from All Other Sources	20.9	16.8	16.8	16.8	16.8	16.8	16.8
Total NO_2	57.6	43.9	36.6	41.7	34.4	39.0	23.0
Total $PM_{2.5}$	25.9	20.9	20.3	20.7	20.0	20.5	18.8
% reduction in NO_2 from Local Roads caused by LEZ/ZEZ	-	-	-32%	-	-36%	-	-91%
% reduction in $PM_{2.5}$ from Local Roads caused by LEZ/ZEZ	-	-	-14%	-	-17%	-	-45%

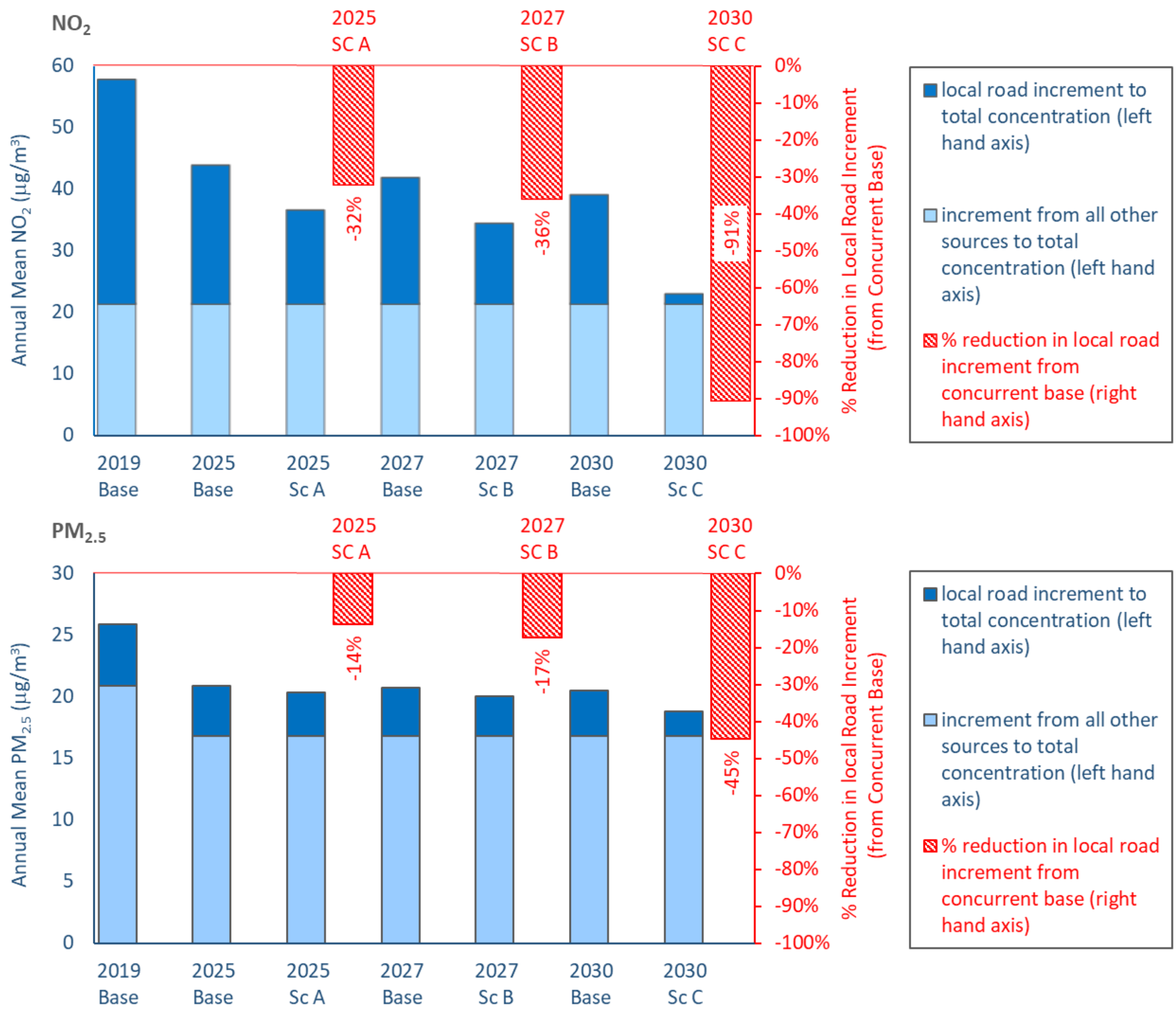


Figure 4-4: Predicted Annual Mean NO_2 and $PM_{2.5}$ Concentrations at Worst-case Locations in Milan under Alternative Future Scenarios

NO_2 concentrations are predicted to fall appreciably by 2025 and continue to fall further by 2030. LEZ Scenario A in 2025 is predicted to further reduce annual mean NO_2 concentrations, delivering a 32% reduction in the local road increment; this increases to a 36% reduction in the 2027 LEZ Scenario B. ZEZ Scenario C is predicted to remove most of the local road increment to NO_2 concentrations leaving only the contribution from other sources. The relative effect of ZEZ Scenario C in Milan is predicted to be slightly smaller than in other cities considered, owing to nature of the baseline fleet (which is assumed to have a higher proportion of ZEEVs and more L-category vehicles than other cities). The predicted improvements are nevertheless appreciable. Measures to reduce emissions from other (non-road) sectors will be needed to bring about significant further reductions in NO_2 concentrations but, as explained in Section 2, the increment from sources other than local roads is likely to have been over-predicted in 2030 and lower concentrations are considered to be highly achievable in the future. It is clear that the additional local savings which could be delivered by LEZs and ZEZs are appreciable and, when combined with actions to reduce emissions from other sources, could result in significant reductions in NO_2 concentrations at worst-case reporting locations in Milan.

Local roads make up a smaller proportion of total $PM_{2.5}$ concentrations than is the case for NO_2. Furthermore, ZEEV vehicles will continue to emit non-exhaust emissions, meaning that the relative changes of ZEZ Scenario C is much smaller for $PM_{2.5}$ than for NO_2. Nevertheless the additional local benefits that could be delivered by LEZs and ZEZs remain appreciable for $PM_{2.5}$. When combined with actions to reduce emissions from other sources, they could result in significant reductions in concentrations in the future.

As explained in Section 2, NO_2 concentrations have also been predicted using alternative emissions factors derived from recent real-world testing. These values are presented as a sensitivity test in Table 4-14. The results are not very different from those in Table 4-13. This is partly because the emissions factors themselves are similar, and partly because the focus of this assessment has been on relative changes over time (from the baseline measurements) and where emissions from individual vehicles are higher in the alternative emissions factors, the average relative changes over time are not.

Table 4-14: Alternative Predicted Annual Mean NO_2 concentrations (µg/m³) at Worst-case Locations in Milan using Emissions Factors Provided by Mullholand et al., 2022[14]

	2019 Base	2025 Base	2025 Sc A	2027 Base	2027 Sc B	2030 Base	2030 Sc C
NO_2 from Local Roads	36.3	22.6	16.0	20.4	13.6	17.6	1.6
Total NO_2	57.6	43.9	37.3	41.7	34.9	38.9	22.9
% reduction in NO_2 from Local Roads caused by LEZ/ZEZ	-	-	-29%	-	-34%	-	-91%

4.5 Warsaw

Table 4-15 shows the assumed specification of the three LEZs/ZEZs in Warsaw (Scenarios A, B, and C). This is repeated from Table 2-4 above. Table 4-16 shows the effects that these scenarios are expected to have on ambient annual mean concentrations of NO_2 and $PM_{2.5}$ at worst-case locations in Warsaw. This information is also shown in Figure 4-5.

Table 4-15: LEZ and ZEZ Scenario Descriptions for Warsaw

2025 - Scenario A	2027 - Scenario B	2030 - Scenario C
95% compliance rate with the LEZ rules 5% traffic reduction/modal shift Diesel cars: at least Euro 4 Petrol cars: at least Euro 2	95% compliance rate Only Euro 6d(-temp) cars 10% traffic reduction/modal shift	Only ZEEV cars, vans, buses and trucks, 95% compliance rate, 20% traffic reduction & modal shift

Table 4-16: Predicted Annual Mean NO_2 concentrations (µg/m³) and $PM_{2.5}$ at Worst-case Locations in Warsaw under Alternative Future Scenarios

	2019 Base	2025 Base	2025 Sc A	2027 Base	2027 Sc B	2030 Base	2030 Sc C
NO_2 from Local Roads	27.5	20.6	19.5	18.1	11.1	15.3	0.9
NO_2 from All other Sources	22.1	22.1	22.1	22.1	22.1	22.1	22.1
$PM_{2.5}$ from Local Roads	4.3	3.8	3.6	3.6	2.9	3.4	1.9
$PM_{2.5}$ from All Other Sources	20.4	14.3	14.3	14.1	14.1	14.1	14.1
Total NO_2	49.7	42.7	41.7	40.2	33.2	37.4	23.0
Total $PM_{2.5}$	24.7	18.1	17.9	17.7	17.0	17.5	16.0
% reduction in NO_2 from Local Roads caused by LEZ/ZEZ	-	-	-5%	-	-39%	-	-94%
% reduction in $PM_{2.5}$ from Local Roads caused by LEZ/ZEZ	-	-	-5%	-	-19%	-	-45%

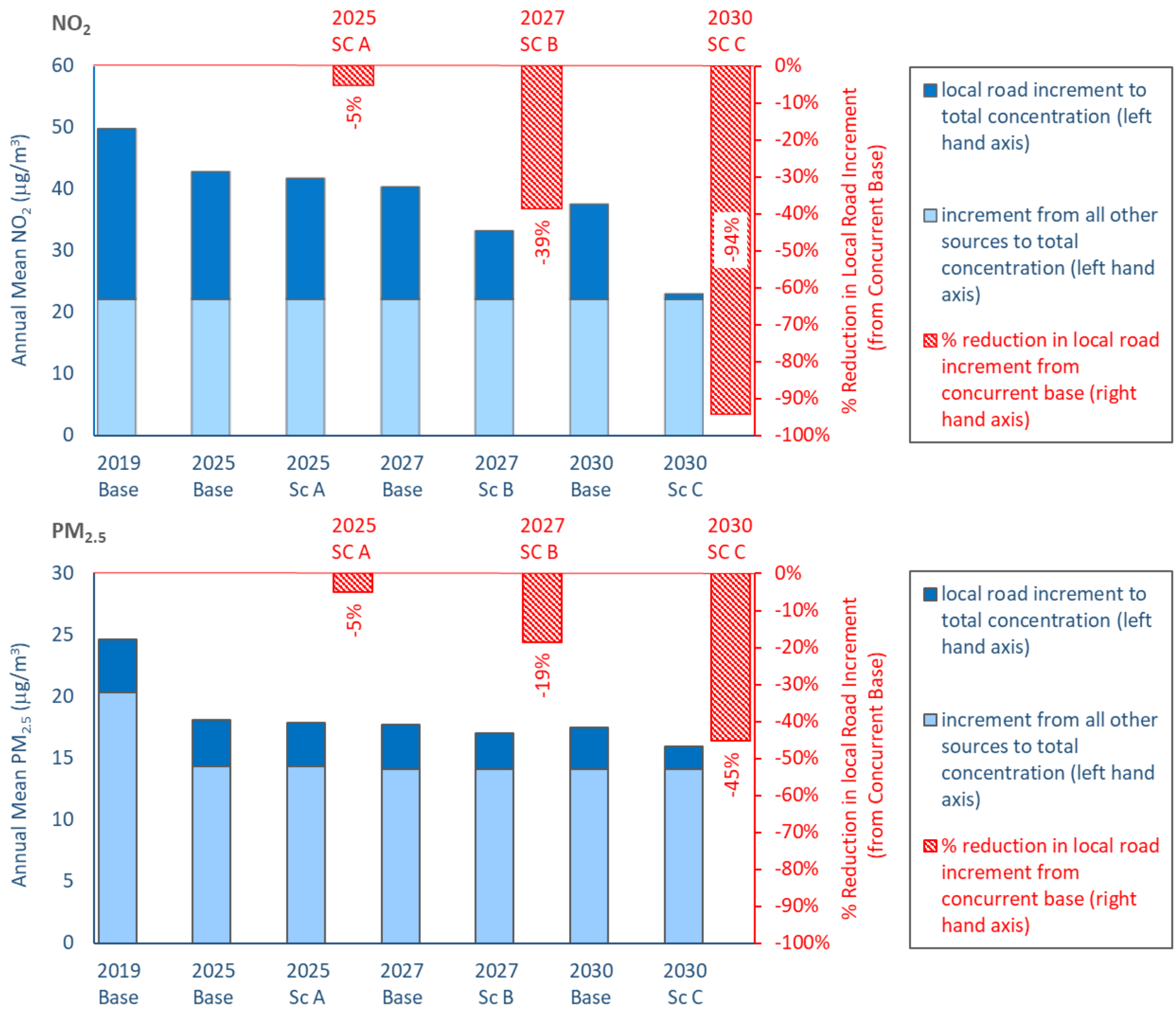


Figure 4-5: Predicted Annual Mean NO_2 and $PM_{2.5}$ Concentrations at Worst-case Locations in Warsaw under Alternative Future Scenarios

NO_2 concentrations are predicted to fall appreciably by 2025 and continue to fall further by 2030. LEZ Scenario A in 2025 is predicted to further reduce annual mean NO_2 concentrations, delivering a 5% reduction in the local road increment. In practice, LEZ Scenario A, which only requires Euro 4 diesel cars and Euro 2 petrol cars, is not predicted to deliver much benefit in and of itself, but the assumed 5% modal shift has the expected effect of reducing local concentrations.

It is relevant to compare these results with those predicted by the ICCT[27] which predicted a larger effect of the proposed LEZ in Warsaw. This reflects several methodological differences, most important being the assumed compliance rate with the LEZ. The difference highlights that the improvements predicted in the current study are likely to be precautionary.

The proposed 2027 Scenario B LEZ is more ambitious and is predicted to deliver a 39% reduction in the local road component of NO_2. ZEZ Scenario C is predicted to remove almost all the local road

[27] https://theicct.org/wp-content/uploads/2023/01/warsaw-lez-true-0123.pdf

increment to NO_2 concentrations leaving only the contribution from other sources. Measures to reduce emissions from other (non-road) sectors will be needed to bring about significant further reductions in NO_2 concentrations but, as explained in Section 2, the increment from sources other than local roads is likely to have been over-predicted in 2030 and lower concentrations are considered to be highly achievable in the future. It is clear that the additional local savings which could be delivered by ambitious LEZs and ZEZs are appreciable and, when combined with actions to reduce emissions from other sources, could result in significant reductions in NO_2 concentrations at worst-case reporting locations in Warsaw.

Local roads make up a smaller proportion of total $PM_{2.5}$ concentrations than is the case for NO_2. Furthermore, ZEEV vehicles will continue to emit non-exhaust emissions, meaning that the relative changes of ZEZ Scenario C is much smaller for $PM_{2.5}$ than for NO_2. Nevertheless the additional local benefits that could be delivered by LEZs and ZEZs remain appreciable for $PM_{2.5}$. When combined with actions to reduce emissions from other sources, they could result in significant reductions in concentrations in the future.

As explained in Section 2, NO_2 concentrations have also been predicted using alternative emissions factors derived from recent real-world testing. These values are presented as a sensitivity test in Table 4-17. The results are not very different from those in Table 4-16. This is partly because the emissions factors themselves are similar, and partly because the focus of this assessment has been on relative changes over time (from the baseline measurements) and where emissions from individual vehicles are higher in the alternative emissions factors, the average relative changes over time are not.

Table 4-17: Alternative Predicted Annual Mean NO_2 at concentrations ($\mu g/m^3$) Worst-case Locations in Warsaw using Emissions Factors Provided by Mullholand et al., 2022[14]

	2019 Base	2025 Base	2025 Sc A	2027 Base	2027 Sc B	2030 Base	2030 Sc C
NO_2 from Local Roads	27.5	20.5	19.5	18.1	11.9	15.3	0.9
Total NO_2	49.7	42.7	41.6	40.2	34.0	37.4	23.0
% reduction in NO_2 from Local Roads caused by LEZ/ZEZ	-	-	-5%	-	-34%	-	-94%

4.6 London

Table 4-18 shows the assumed specification of the three LEZs/ZEZs in London (Scenarios C1, C2, and C3). Table 4-19 shows the effects that these scenarios are expected to have on ambient annual mean concentrations of NO_2 and $PM_{2.5}$ at worst-case locations in London. This information is also shown in Figure 4-6.

Table 4-18: LEZ and ZEZ Scenario Descriptions for London

2030 - Scenario C1	2030 - Scenario C2	2030 - Scenario C3
Only zero-emission vehicles (cars, vans, buses and trucks), 95% compliance rate, 27% traffic reduction & modal shift	No more diesel cars, vans and buses, natural turnover, All petrol cars are Euro 6d, 27% traffic reduction & modal shift	No more diesel cars, replaced with natural turnover All petrol cars are Euro 6d, 27% traffic reduction & modal shift

Table 4-19: Predicted Annual Mean NO_2 and $PM_{2.5}$ concentrations ($\mu g/m^3$) at Worst-case Locations in London under Alternative Future Scenarios

	2019 Base	2030 Base	2030 SC C1	2030 SC C2	2030 SC C3
NO_2 from Local Roads	35.4	12.6	1.6	3.3	6.4
NO_2 from All other Sources	27.3	19.3	19.3	19.3	19.3
$PM_{2.5}$ from Local Roads	4.8	4.3	2.9	3.0	3.1
$PM_{2.5}$ from All Other Sources	9.6	8.0	8.0	8.0	8.0
Total NO_2	62.7	31.9	20.9	22.6	25.7
Total $PM_{2.5}$	14.3	12.3	10.9	11.0	11.1
% reduction in NO_2 from Local Roads caused by LEZ/ZEZ	-	-	-87%	-74%	-49%
% reduction in $PM_{2.5}$ from Local Roads caused by LEZ/ZEZ	-	-	-32%	-30%	-28%

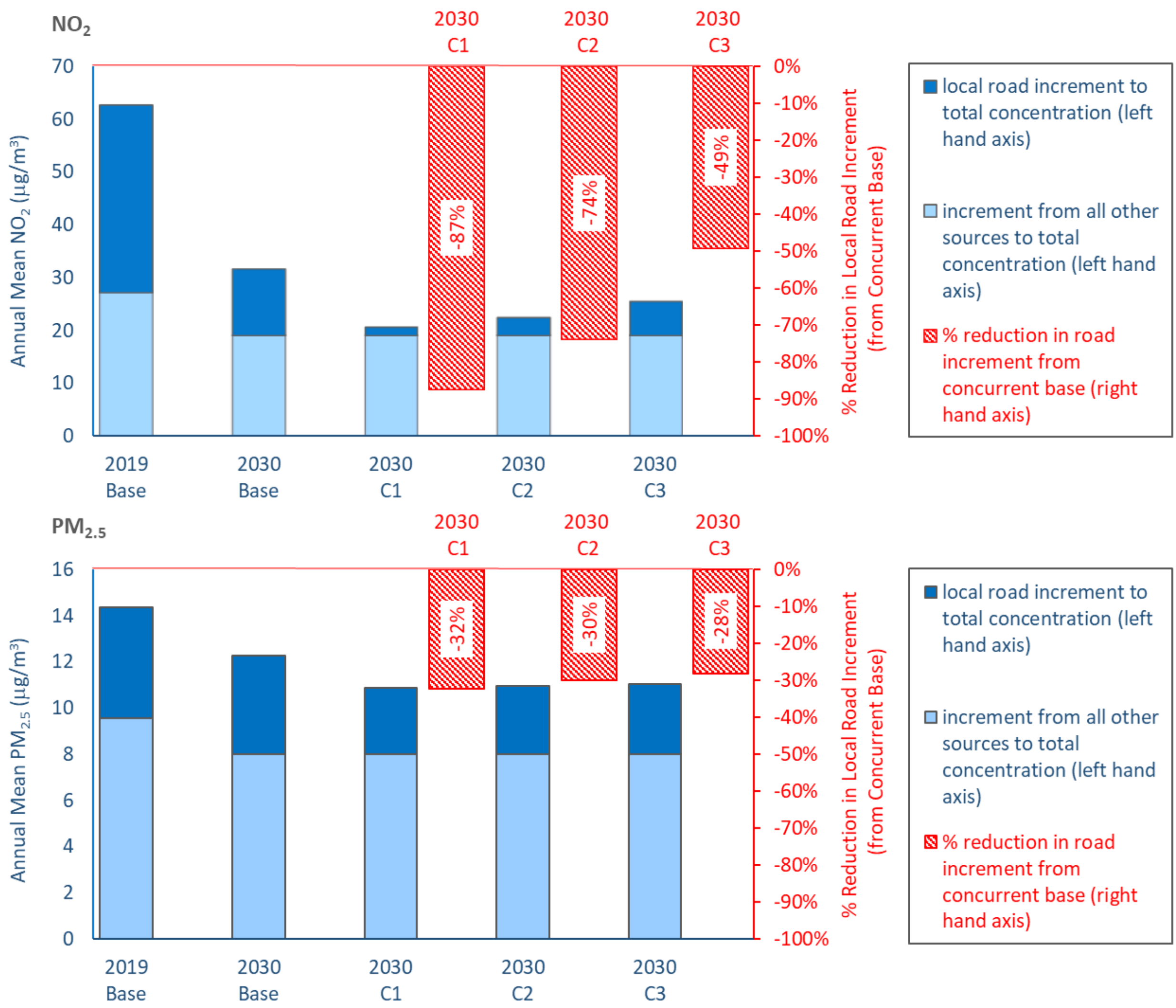


Figure 4-6: Predicted Annual Mean NO_2 and $PM_{2.5}$ Concentrations at Worst-case Locations in London under Alternative Future Scenarios

NO_2 concentrations are predicted to fall appreciably by 2030 with or without the LEZs. Each of the LEZ scenarios would deliver appreciable additional benefits. Scenario C1 would deliver an 87% reduction in the local road increment of annual mean NO_2 concentrations. This would reduce to 74% in Scenario C2 and 49% in Scenario C3. Measures to reduce emissions from other (non-road) sectors will be needed to bring about significant further reductions in NO_2 concentrations but, as explained in Section 2, the increment from sources other than local roads is likely to have been over-predicted in 2030 and lower concentrations are considered to be highly achievable in the future. It is clear that the additional local savings which could be delivered by more ambitious LEZs and ZEZs are appreciable and, when combined with actions to reduce emissions from other sources, could result in significant reductions in NO_2 concentrations at worst-case locations in London.

Local roads make up a smaller proportion of total $PM_{2.5}$ concentrations than is the case for NO_2. Furthermore, ZEEV vehicles will continue to emit non-exhaust emissions, meaning that the relative changes of ZEZ Scenario C1 is much smaller for $PM_{2.5}$ than for NO_2. Nevertheless the additional local benefits that could be delivered by more ambitious LEZs and ZEZs remain appreciable for $PM_{2.5}$. When combined with actions to reduce emissions from other sources, they could result in significant reductions in concentrations at worst-case roadside locations.

Table 4-20 summarises the results for a sensitivity test to 2030 Scenario C3, in which all non-compliant cars are replaced with ZEEVs. The reductions in NO_2 concentrations are much greater than those for base Scenario C3.

Table 4-20: Predicted Annual Mean NO_2 and $PM_{2.5}$ concentrations (µg/m^3) at Worst-case Locations in London under Sensitivity Test LEZ/ZEZ Scenarios

	2030 Sc C3 ST
NO_2 from Local Roads	4.7
NO_2 from All other Sources	19.3
$PM_{2.5}$ from Local Roads	3.0
$PM_{2.5}$ from All Other Sources	8.0
Total NO_2	23.9
Total $PM_{2.5}$	11.0
% reduction in NO_2 from Local Roads caused by LEZ/ZEZ	-63%
% reduction in $PM_{2.5}$ from Local Roads caused by LEZ/ZEZ	-31%

5 Summary and Conclusions

This report quantifies the benefits that future Low Emissions Zones (LEZs) and Zero Emissions Zones (ZEZs) might have on air quality in six major European Cities (Madrid, Paris, Brussels, Milan, Warsaw and London).

For each city, three alternative but targeted scenarios were considered, focussing on the fixed monitor within each city measuring the highest concentrations in the baseline year (2019), broadly taken to represent the worst-case air quality across the city as a whole, in terms of compliance with the limit values. This study has not included other cities in Europe, but studies focused on specific cities have shown similar results[28].

Due the different scenarios assumed in each city, the individual results are also different. However, some general conclusions can be drawn:

Nitrogen Dioxide

- Annual mean NO_2 concentrations are predicted to fall appreciably by 2025, and continue to fall further by 2030;
- LEZ Scenario A in 2025 further reduces annual mean NO_2 concentrations, with a greater reduction associated with LEZ Scenario B in 2027;
- ZEZ Scenario C is predicted to remove almost all of the road increment to NO_2 concentrations, leaving only the contribution from other sources;
- The additional local improvements that could be delivered by LEZs and ZEZs are appreciable, and, when combined with actions to reduce emissions from other sources could result in significant reductions in NO_2 concentrations at worst-case reporting locations in each city.

$PM_{2.5}$

- Emissions from local roads make up a smaller contribution of total $PM_{2.5}$ concentrations than is the case for NO_2. Furthermore, ZEEVs will continue to emit non-exhaust emissions, meaning the relative change of ZEZ Scenario C is much smaller for $PM_{2.5}$ than for NO_2;
- Nevertheless, the additional local benefits that could be delivered by LEZs and ZEZs remain appreciable, and when combined with actions to reduce emissions from other sources, they could result insignificant reductions at worst-case reporting locations in each city.

The modelling presented here contains several worst-case assumptions, and in particular does not allow for any significant ambition in targeting non-transport emissions. This means that the future-year predictions are likely to be precautionary and that lower concentrations than predicted here are highly achievable with combined effort.

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[28] e.g. https://assets.amsterdam.nl/publish/pages/867636/clean_air_action_plan_1.pdf.

1. Appendix 1 – City-specific Fleet Assumptions

The tables set out below summarise the vehicle fleet composition assumptions used for Madrid, Paris, Brussels, Milan and Warsaw in each scenario. The values are expressed as a percentage of passenger cars, percentage of light commercial vehicles, percentage of heavy duty trucks, percentage of L-category vehicles, and percentage of buses. In the case of the LEZ/ZEZ scenarios which involve modal shift, this is shown in the tables; for example the passenger car figures used to simulate a 10% reduction in car volumes sum to 90% rather than 100%. These data have been mapped onto the full list of fleet descriptors in COPERT V5.6 assuming no change over time in the underlying basic fleet assumptions, as described in Section 2. As explained in Section 2, the analysis for London has used a separate set of emissions tools provided by the Greater London Authority and UK Government and so the fleet data are not provided here.

Madrid

2018/2019 Base										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.08	0.26	0.65	3.66	6.55	5.39	4.97	2.18	0.00
	Diesel	0.00	0.54	1.62	10.49	23.80	19.78	14.12	4.53	0.00
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.03	0.21	0.53	0.27	0.00
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.04	0.00
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.00	0.00	0.03	0.06	0.05	0.06	0.00	0.00

	CNG Bifuel	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.02	0.08	0.22	0.18	0.05	0.03	0.01	0.00
	Diesel	0.12	0.69	6.12	25.90	28.57	16.41	18.04	3.55	0.00
	ZEEV	0.00								

Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI
	Petrol	0.09	0.00	0.00	0.00	0.00	0.00	0.00
	Diesel	0.11	0.40	2.54	16.47	29.35	18.49	32.56
	ZEEV	0.00						

L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5
	Petrol	4.40	8.50	28.04	47.74	10.85	0.00
	Diesel	0.00	0.00	0.00	0.32	0.15	0.00
	ZEEV	0.00					

Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.24	4.01	15.96	20.03	21.93	32.62	0.10
	CNG	4.39	0.02	0.17	0.57	0.00	0.00	0.00	0.00
	ZEEV	0.00							

2025 Base

		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
Passenger Cars	Petrol	0.04	0.14	0.34	1.94	3.48	2.86	4.97	2.18	3.56
	Diesel	0.00	0.29	0.86	5.57	12.65	10.51	14.12	4.53	11.23
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.02	0.11	0.53	0.27	8.37
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	4.19
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.80
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	4.19
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.00	0.00	0.01	0.03	0.02	0.06	0.00	0.03
	CNG Bifuel	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.01	0.06	0.16	0.13	0.04	0.03	0.01	0.12
	Diesel	0.09	0.51	4.50	19.04	21.00	12.06	18.04	3.55	19.64
	ZEEV	1.00								

Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI
	Petrol	0.07	0.00	0.00	0.00	0.00	0.00	0.00
	Diesel	0.08	0.29	1.86	12.10	21.57	13.59	50.36
	ZEEV	0.06						

L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5
	Petrol	4.40	8.50	28.04	47.74	10.85	0.00
	Diesel	0.00	0.00	0.00	0.32	0.15	0.00
	ZEEV	0.00					

Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.00	0.00	0.00	0.00	0.00	59.00	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ZEEV	41.00							

ScA										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.01	0.03	0.07	0.42	3.67	3.08	5.08	2.43	3.74
	Diesel	0.00	0.06	0.19	1.21	2.75	13.54	16.96	7.86	14.22
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.02	0.11	0.50	0.26	7.95

	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	3.98
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.66
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	3.98
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.00	0.00	0.00	0.03	0.03	0.06	0.00	0.03
	CNG Bifuel	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.01	0.05	0.16	0.12	0.04	0.03	0.01	0.11
	Diesel	0.08	0.48	4.28	18.09	19.95	11.46	17.14	3.37	18.66
	ZEEV	0.95								
Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI		
	Petrol	0.06	0.00	0.00	0.00	0.00	0.00	0.00		
	Diesel	0.08	0.28	1.77	11.50	20.49	12.91	47.84		
	ZEEV	0.06								
		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5			

L-Category	Petrol	4.18	8.08	26.63	45.35	10.31	0.00
	Diesel	0.00	0.00	0.00	0.30	0.15	0.00
	ZEEV	0.00					

Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.00	0.00	0.00	0.00	0.00	56.05	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ZEEV	38.95							

ScA (ST)										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.04	0.13	0.33	1.85	3.30	2.72	4.72	2.07	3.38
	Diesel	0.00	0.27	0.82	5.29	12.02	9.99	13.42	4.31	10.67
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.02	0.11	0.50	0.26	7.95
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	3.98
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.66
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	3.98
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	LPG Bifuel	0.00	0.00	0.00	0.01	0.03	0.02	0.06	0.00	0.03
	CNG Bifuel	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.01	0.05	0.16	0.12	0.04	0.03	0.01	0.11
	Diesel	0.08	0.48	4.28	18.09	19.95	11.46	17.14	3.37	18.66
	ZEEV	0.00								
Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI		
	Petrol	0.06	0.00	0.00	0.00	0.00	0.00	0.00		
	Diesel	0.08	0.28	1.77	11.50	20.49	12.91	47.84		
	ZEEV	0.06								
L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5			
	Petrol	4.18	8.08	26.63	45.35	10.31	0.00			
	Diesel	0.00	0.00	0.00	0.30	0.15	0.00			
	ZEEV	0.00								
Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional	
	Diesel	0.00	0.00	0.00	0.00	0.00	0.00	56.05	0.00	
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

	ZEEV	38.95

2027 Base										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.03	0.11	0.28	1.58	2.82	2.32	4.97	2.18	3.91
	Diesel	0.00	0.23	0.70	4.51	10.25	8.52	14.12	4.53	12.36
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.01	0.09	0.53	0.27	10.38
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	5.19
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.70
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	5.19
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.00	0.00	0.01	0.02	0.02	0.06	0.00	0.03
	CNG Bifuel	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.01	0.05	0.15	0.12	0.03	0.03	0.01	0.15
	Diesel	0.08	0.46	4.06	17.18	18.96	10.89	18.04	3.55	25.23

	ZEEV	1.00							
Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	
	Petrol	0.06	0.00	0.00	0.00	0.00	0.00	0.00	
	Diesel	0.07	0.26	1.68	10.92	19.47	12.26	55.01	
	ZEEV	0.24							
L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5		
	Petrol	4.40	8.50	28.04	47.74	10.85	0.00		
	Diesel	0.00	0.00	0.00	0.32	0.15	0.00		
	ZEEV	0.00							
Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.00	0.00	0.00	0.00	0.00	37.00	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ZEEV	63.00							

ScB										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.01	0.02	0.14	0.25	0.20	0.44	6.87	8.44
	Diesel	0.00	0.02	0.06	0.40	0.90	0.75	1.24	19.65	26.69

	Petrol Hybrid	0.00	0.00	0.00	0.00	0.00	0.01	0.05	0.50	9.60
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	4.67
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.23
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	4.67
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.05	0.08
	CNG Bifuel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.01	0.05	0.13	0.11	0.03	0.03	0.01	0.14
	Diesel	0.07	0.41	3.66	15.46	17.06	9.80	16.24	3.19	22.71
	ZEEV	0.90								

Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI
	Petrol	0.05	0.00	0.00	0.00	0.00	0.00	0.00
	Diesel	0.07	0.24	1.51	9.83	17.52	11.04	49.51
	ZEEV	0.22						

L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5
	Petrol	3.96	7.65	25.23	42.96	9.76	0.00
	Diesel	0.00	0.00	0.00	0.28	0.14	0.00
	ZEEV	0.00					

Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.00	0.00	0.00	0.00	0.00	33.30	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ZEEV	56.70							

ScB (ST)										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.02	0.08	0.20	1.11	1.98	1.63	3.49	3.15	4.72
	Diesel	0.00	0.16	0.49	3.17	7.20	5.99	9.92	7.86	14.90
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.01	0.06	0.37	0.30	9.40
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	4.67
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.23

	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	4.67
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.00	0.00	0.01	0.02	0.01	0.04	0.01	0.04
	CNG Bifuel	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.01	0.05	0.13	0.11	0.03	0.03	0.01	0.14
	Diesel	0.07	0.41	3.66	15.46	17.06	9.80	16.24	3.19	22.71
	ZEEV	0.90								

Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI
	Petrol	0.05	0.00	0.00	0.00	0.00	0.00	0.00
	Diesel	0.07	0.24	1.51	9.83	17.52	11.04	49.51
	ZEEV	0.22						

L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5
	Petrol	3.96	7.65	25.23	42.96	9.76	0.00
	Diesel	0.00	0.00	0.00	0.28	0.14	0.00
	ZEEV	0.00					

Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.00	0.00	0.00	0.00	0.00	33.30	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ZEEV	56.70							

2030 Base										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.02	0.08	0.20	1.15	2.05	1.69	4.97	2.18	3.91
	Diesel	0.00	0.17	0.51	3.29	7.47	6.21	14.12	4.53	12.36
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.01	0.07	0.53	0.27	11.60
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	5.80
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.80
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	5.80
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.00	0.00	0.01	0.02	0.01	0.06	0.00	0.03
	CNG Bifuel	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.01	0.04	0.13	0.10	0.03	0.03	0.01	0.18
	Diesel	0.07	0.39	3.48	14.73	16.25	9.33	18.04	3.55	29.62
	ZEEV	4.00								

Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI
	Petrol	0.05	0.00	0.00	0.00	0.00	0.00	0.00
	Diesel	0.06	0.23	1.44	9.37	16.69	10.52	60.30
	ZEEV	1.34						

L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5
	Petrol	4.40	8.50	28.04	47.74	10.85	0.00
	Diesel	0.00	0.00	0.00	0.32	0.15	0.00
	ZEEV	0.00					

Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ZEEV	95.00							

ScC

Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.00	0.01	0.05	0.09	0.08	0.22	0.10	0.18
	Diesel	0.00	0.01	0.02	0.15	0.33	0.28	0.63	0.20	0.55
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.52
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	76.00
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	CNG Bifuel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01
	Diesel	0.00	0.02	0.15	0.61	0.68	0.39	0.75	0.15	1.23
	ZEEV	76.00								

		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI

Heavy Duty Trucks	Petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Diesel	0.00	0.01	0.06	0.38	0.68	0.43	2.44
	ZEEV	76.00						

L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5
	Petrol	3.52	6.80	22.43	38.19	8.68	0.00
	Diesel	0.00	0.00	0.00	0.25	0.12	0.00
	ZEEV	0.00					

Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.00	0.00	0.00	0.00	0.00	4.00	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ZEEV	76.00							

ScC (ST)										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.01	0.03	0.07	0.41	0.74	0.61	1.78	0.78	1.40
	Diesel	0.00	0.06	0.18	1.18	2.68	2.23	5.07	1.63	4.43
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.00	0.02	0.19	0.10	4.16
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Plug-in Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	2.08

	running on petrol									
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	48.00
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.08
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.00	0.01
	CNG Bifuel	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.00	0.01	0.04	0.03	0.01	0.01	0.00	0.06
	Diesel	0.02	0.13	1.16	4.91	5.42	3.11	6.01	1.18	9.87
	ZEEV	48.00								

Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI
	Petrol	0.02	0.00	0.00	0.00	0.00	0.00	0.00
	Diesel	0.02	0.07	0.47	3.04	5.41	3.41	19.56
	ZEEV	48.00						

L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5
	Petrol	3.52	6.80	22.43	38.19	8.68	0.00
	Diesel	0.00	0.00	0.00	0.25	0.12	0.00

	ZEEV	0.00	0.00	0.00	0.00	0.00	0.00		
Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.00	0.00	0.00	0.00	0.00	4.00	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ZEEV	76.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Paris

2018/2019 Base										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.18	0.81	3.33	5.28	8.63	9.78	3.88	0.00
	Diesel	0.02	0.38	1.33	8.70	17.00	23.01	11.69	3.70	0.00
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.03	0.37	0.60	0.24	0.00
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.16	0.04	0.00	0.00
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.05	0.00
	BEV	0.00	0.00	0.00	0.00	0.00	0.06	0.15	0.13	0.00
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.00	0.01	0.04	0.09	0.12	0.05	0.00	0.00
	CNG Bifuel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	Bioethanol variants	0.00	0.00	0.00	0.00	0.01	0.05	0.01	0.01	0.00

Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.01	0.09	0.68	1.32	0.80	0.52	0.15	0.00
	Diesel	0.06	1.06	2.11	13.17	24.48	28.74	20.99	5.81	0.00
	ZEEV	0.00								

Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI
	Petrol	0.03	0.00	0.00	0.00	0.00	0.00	0.00
	Diesel	0.01	0.13	2.57	10.75	10.79	32.00	43.72
	ZEEV	0.00						

L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5
	Petrol	0.13	3.20	8.50	61.86	21.69	0.00
	Diesel	0.00	0.08	2.23	1.98	0.32	0.00
	ZEEV	0.00					

Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.01	2.87	13.13	10.09	31.42	32.57	0.00
	CNG	7.15	0.00	0.34	2.41	0.00	0.00	0.00	0.00
	ZEEV	0.00							

2025 Base										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.10	0.43	1.77	2.81	4.59	9.78	3.88	4.78
	Diesel	0.01	0.20	0.70	4.62	9.03	12.23	11.69	3.70	9.87
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.01	0.19	0.60	0.24	6.99
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.08	0.04	0.00	0.03
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.05	3.50
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.20
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	3.50
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.00	0.00	0.02	0.05	0.06	0.05	0.00	0.04
	CNG Bifuel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Bioethanol variants	0.00	0.00	0.00	0.00	0.01	0.03	0.01	0.01	0.01
Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.00	0.07	0.50	0.97	0.59	0.52	0.15	0.61
	Diesel	0.05	0.78	1.55	9.68	18.00	21.13	20.99	5.81	16.60
	ZEEV	2.00								

Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI
	Petrol	0.02	0.00	0.00	0.00	0.00	0.00	0.00
	Diesel	0.01	0.10	1.89	7.90	7.93	23.52	58.40
	ZEEV	0.23						

L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5
	Petrol	0.13	3.20	8.50	61.86	21.69	0.00
	Diesel	0.00	0.08	2.23	1.98	0.32	0.00
	ZEEV	0.00					

Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.00	0.00	0.00	0.00	0.00	59.00	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ZEEV	41.00							

ScA										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.01	0.06	0.23	0.36	0.59	11.94	6.34	7.20
	Diesel	0.00	0.03	0.09	0.59	1.16	1.57	18.45	10.86	16.72
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.00	0.02	0.63	0.29	6.70

	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.01	0.06	0.03	0.05
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.05	3.32
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.99
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	3.32
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.00	0.00	0.00	0.01	0.01	0.08	0.04	0.08
	CNG Bifuel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.02
Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.00	0.07	0.47	0.93	0.56	0.50	0.14	0.58
	Diesel	0.04	0.74	1.47	9.20	17.10	20.07	19.94	5.52	15.77
	ZEEV	1.90								
Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI		
	Petrol	0.02	0.00	0.00	0.00	0.00	0.00	0.00		
	Diesel	0.01	0.09	1.80	7.51	7.53	22.35	55.48		
	ZEEV	0.22								
L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5			

	Petrol	0.12	3.04	8.08	58.77	20.61	0.00		
	Diesel	0.00	0.08	2.12	1.88	0.31	0.00		
	ZEEV	0.00							
Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.00	0.00	0.00	0.00	0.00	56.05	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ZEEV	38.95							

2027 Base										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.08	0.35	1.43	2.27	3.72	9.78	3.88	5.26
	Diesel	0.01	0.17	0.57	3.74	7.32	9.91	11.69	3.70	10.86
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.01	0.16	0.60	0.24	8.61
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.07	0.04	0.00	0.03
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.05	4.31
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.50
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	4.31
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	LPG Bifuel	0.00	0.00	0.00	0.02	0.04	0.05	0.05	0.00	0.05
	CNG Bifuel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Bioethanol variants	0.00	0.00	0.00	0.00	0.01	0.02	0.01	0.01	0.01

Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.00	0.06	0.45	0.88	0.53	0.52	0.15	0.80
	Diesel	0.04	0.70	1.40	8.74	16.24	19.07	20.99	5.81	21.61
	ZEEV	2.00								

Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI
	Petrol	0.02	0.00	0.00	0.00	0.00	0.00	0.00
	Diesel	0.01	0.09	1.71	7.13	7.16	21.23	62.12
	ZEEV	0.55						

L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5
	Petrol	0.13	3.20	8.50	61.86	21.69	0.00
	Diesel	0.00	0.08	2.23	1.98	0.32	0.00
	ZEEV	0.00					

Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.00	0.00	0.00	0.00	0.00	38.00	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	ZEEV	62.00

ScB										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.01	0.03	0.12	0.20	0.32	0.84	10.67	11.91
	Diesel	0.00	0.01	0.05	0.32	0.63	0.85	1.01	16.92	23.37
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.00	0.01	0.05	0.53	8.07
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.05	0.07
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	3.89
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.85
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	3.88
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.11
	CNG Bifuel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02
Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.00	0.06	0.40	0.79	0.48	0.47	0.14	0.72
	Diesel	0.04	0.63	1.26	7.86	14.62	17.16	18.89	5.23	19.45

	ZEEV	1.80

Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI
	Petrol	0.02	0.00	0.00	0.00	0.00	0.00	0.00
	Diesel	0.01	0.08	1.54	6.42	6.44	19.11	55.91
	ZEEV	0.49						

L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5
	Petrol	0.12	2.88	7.65	55.67	19.52	0.00
	Diesel	0.00	0.08	2.01	1.78	0.29	0.00
	ZEEV	0.00					

Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.00	0.00	0.00	0.00	0.00	34.20	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ZEEV	55.80							

2030 Base										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.06	0.25	1.05	1.66	2.71	9.78	3.88	5.26
	Diesel	0.01	0.12	0.42	2.73	5.33	7.22	11.69	3.70	10.86

	Petrol Hybrid	0.00	0.00	0.00	0.00	0.01	0.11	0.60	0.24	9.07
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.05	0.04	0.00	0.03
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.05	4.54
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.70
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	4.54
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.00	0.00	0.01	0.03	0.04	0.05	0.00	0.05
	CNG Bifuel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.01	0.01
Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.00	0.05	0.38	0.75	0.45	0.52	0.15	0.83
	Diesel	0.04	0.60	1.20	7.49	13.92	16.35	20.99	5.81	22.44
	ZEEV	8.00								

Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI
	Petrol	0.02	0.00	0.00	0.00	0.00	0.00	0.00
	Diesel	0.01	0.08	1.46	6.11	6.13	18.20	66.38
	ZEEV	1.61						

		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5
L-Category							
	Petrol	0.13	3.20	8.50	61.86	21.69	0.00
	Diesel	0.00	0.08	2.23	1.98	0.32	0.00
	ZEEV	0.00					

		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
Buses									
	Diesel	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ZEEV	95.00							

ScC

		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
Passenger Cars										
	Petrol	0.00	0.00	0.01	0.05	0.08	0.13	0.45	0.18	0.24
	Diesel	0.00	0.01	0.02	0.13	0.25	0.33	0.54	0.17	0.50
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.01	0.42
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	76.00

	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	CNG Bifuel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.00	0.00	0.02	0.03	0.02	0.02	0.01	0.04
	Diesel	0.00	0.03	0.05	0.33	0.61	0.71	0.91	0.25	0.98
	ZEEV	76.00								

Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI
	Petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Diesel	0.00	0.00	0.06	0.25	0.25	0.74	2.70
	ZEEV	76.00						

L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5
	Petrol	0.10	2.56	6.80	49.49	17.35	0.00
	Diesel	0.00	0.07	1.78	1.58	0.26	0.00
	ZEEV	0.00					

Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional

	Diesel	0.00	0.00	0.00	0.00	0.00	0.00	4.00	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ZEEV	76.00							

Brussels

2018/2019 Base										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.11	0.64	1.97	3.73	9.21	6.13	8.16	0.00
	Diesel	0.00	0.04	0.44	3.50	14.53	26.12	11.98	10.93	0.00
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.08	0.39	0.47	0.22	0.00
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.06	0.03	0.00	0.00
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.01	0.15	0.14	0.00
	BEV	0.00	0.00	0.00	0.00	0.00	0.02	0.06	0.09	0.00
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.00
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.00	0.01	0.04	0.10	0.22	0.09	0.00	0.00
	CNG Bifuel	0.00	0.00	0.00	0.00	0.00	0.02	0.15	0.00	0.00
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00

Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.04	0.18	0.43	0.77	0.61	0.59	0.49	0.00
	Diesel	0.00	0.14	0.68	4.98	20.38	32.39	23.35	14.98	0.00
	ZEEV	0.00								

Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI
	Petrol	0.11	0.00	0.00	0.00	0.00	0.00	0.00
	Diesel	0.07	0.28	2.10	8.67	11.81	27.12	49.84
	ZEEV	0.00						

L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5
	Petrol	3.96	6.73	14.86	56.77	16.42	0.00
	Diesel	0.00	0.04	0.73	0.41	0.09	0.00
	ZEEV	0.00					

Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.00	2.71	20.78	16.45	26.88	33.13	0.02
	CNG	0.01	0.00	0.00	0.02	0.00	0.00	0.00	0.00
	ZEEV	0.00							

2025 Base

Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.06	0.34	1.05	1.98	4.90	6.13	8.16	4.49
	Diesel	0.00	0.02	0.24	1.86	7.72	13.88	11.98	10.93	10.13
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.04	0.21	0.47	0.22	4.86
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.02
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.14	2.43
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.40
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	2.43
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.00	0.00	0.02	0.05	0.11	0.09	0.00	0.07
	CNG Bifuel	0.00	0.00	0.00	0.00	0.00	0.01	0.15	0.00	0.02
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00
Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.03	0.13	0.31	0.57	0.45	0.59	0.49	0.44
	Diesel	0.00	0.11	0.50	3.66	14.98	23.81	23.35	14.98	13.61
	ZEEV	2.00								

Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI

	Petrol	0.08	0.00	0.00	0.00	0.00	0.00	0.00	
	Diesel	0.05	0.21	1.54	6.37	8.68	19.94	62.67	
	ZEEV	0.46							
L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5		
	Petrol	3.96	6.73	14.86	56.77	16.42	0.00		
	Diesel	0.00	0.04	0.73	0.41	0.09	0.00		
	ZEEV	0.00							
Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.00	0.00	0.00	0.00	0.00	61.00	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ZEEV	39.00							

ScA										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.01	0.04	0.13	2.12	4.89	6.06	7.99	4.51
	Diesel	0.00	0.00	0.03	0.24	0.98	1.77	1.53	25.07	24.31
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.04	0.20	0.45	0.21	4.62
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.04
	Plug-in Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.14	2.31

	running on petrol									
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.18
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	2.31
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.00	0.00	0.00	0.05	0.11	0.09	0.00	0.07
	CNG Bifuel	0.00	0.00	0.00	0.00	0.00	0.01	0.14	0.00	0.02
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00
Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.03	0.12	0.30	0.54	0.42	0.56	0.47	0.41
	Diesel	0.00	0.10	0.47	3.47	14.23	22.62	22.18	14.23	12.93
	ZEEV	1.90								
Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI		
	Petrol	0.08	0.00	0.00	0.00	0.00	0.00	0.00		
	Diesel	0.05	0.20	1.47	6.05	8.25	18.94	59.53		
	ZEEV	0.44	0.00	0.00	0.00	0.00	0.00	0.00		
L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5			
	Petrol	3.76	6.39	14.12	53.93	15.60	0.00			
	Diesel	0.00	0.04	0.69	0.39	0.08	0.00			

	ZEEV	0.00							
Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.00	0.00	0.00	0.00	0.00	57.95	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ZEEV	37.05							

2027 Base										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.05	0.28	0.85	1.61	3.97	6.13	8.16	4.94
	Diesel	0.00	0.02	0.19	1.51	6.25	11.24	11.98	10.93	11.15
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.03	0.17	0.47	0.22	5.91
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.02
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.14	2.96
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.00
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	2.96
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.00	0.00	0.02	0.04	0.09	0.09	0.00	0.08
	CNG Bifuel	0.00	0.00	0.00	0.00	0.00	0.01	0.15	0.00	0.03

	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01

Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.02	0.12	0.28	0.51	0.40	0.59	0.49	0.57
	Diesel	0.00	0.10	0.45	3.30	13.52	21.49	23.35	14.98	17.82
	ZEEV	2.00								

Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI
	Petrol	0.08	0.00	0.00	0.00	0.00	0.00	0.00
	Diesel	0.04	0.19	1.39	5.75	7.83	18.00	65.70
	ZEEV	1.02						

L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5
	Petrol	3.96	6.73	14.86	56.77	16.42	0.00
	Diesel	0.00	0.04	0.73	0.41	0.09	0.00
	ZEEV	0.00					

Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.00	0.00	0.00	0.00	0.00	39.00	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ZEEV	61.00							

ScB										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.00	0.03	0.08	0.16	0.39	0.61	12.50	9.60
	Diesel	0.00	0.00	0.02	0.15	0.62	1.11	1.19	22.33	22.53
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.00	0.02	0.05	0.47	5.59
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.04
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.19	2.72
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.30
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.07	2.68
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.10	0.17
	CNG Bifuel	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.06	0.09
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01
Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.02	0.11	0.25	0.46	0.36	0.53	0.44	0.51
	Diesel	0.00	0.09	0.40	2.97	12.17	19.34	21.02	13.48	16.04
	ZEEV	1.80								

Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI
	Petrol	0.07	0.00	0.00	0.00	0.00	0.00	0.00
	Diesel	0.04	0.17	1.25	5.17	7.05	16.20	59.13
	ZEEV	0.92						

L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5
	Petrol	3.56	6.05	13.38	51.09	14.78	0.00
	Diesel	0.00	0.04	0.66	0.37	0.08	0.00
	ZEEV	0.00					

Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.00	0.00	0.00	0.00	0.00	35.10	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ZEEV	54.90							

ScB (ST)										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.00	0.02	0.05	0.09	0.23	0.36	0.48	66.94
	Diesel	0.00	0.00	0.01	0.09	0.37	0.66	0.71	0.65	0.66
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.01	6.14

	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	2.91
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.30
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.75
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.28
	CNG Bifuel	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.15
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.02	0.11	0.25	0.46	0.36	0.53	0.44	0.51
	Diesel	0.00	0.09	0.40	2.97	12.17	19.34	21.02	13.48	16.04
	ZEEV	1.80								
Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI		
	Petrol	0.07	0.00	0.00	0.00	0.00	0.00	0.00		
	Diesel	0.04	0.17	1.25	5.17	7.05	16.20	59.13		
	ZEEV	0.92								
L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5			

	Petrol	3.56	6.05	13.38	51.09	14.78	0.00		
	Diesel	0.00	0.04	0.66	0.37	0.08	0.00		
	ZEEV	0.00							
Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.00	0.00	0.00	0.00	0.00	35.10	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ZEEV	54.90							

ScB (ST2)										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.00	0.03	0.09	0.17	0.41	0.64	13.20	10.14
	Diesel	0.00	0.00	0.02	0.16	0.65	1.18	1.25	23.57	23.78
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.00	0.02	0.05	0.50	5.90
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.04
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.20	2.87
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.65
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.07	2.83
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.11	0.18

	CNG Bifuel	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.06	0.09
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01
Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.02	0.11	0.27	0.49	0.38	0.56	0.47	0.54
	Diesel	0.00	0.09	0.43	3.14	12.84	20.42	22.18	14.23	16.93
	ZEEV	1.90								
Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI		
	Petrol	0.07	0.00	0.00	0.00	0.00	0.00	0.00		
	Diesel	0.04	0.18	1.32	5.46	7.44	17.10	62.42		
	ZEEV	0.97								
L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5			
	Petrol	3.76	6.39	14.12	53.93	15.60	0.00			
	Diesel	0.00	0.04	0.69	0.39	0.08	0.00			
	ZEEV	0.00								
Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional	
	Diesel	0.00	0.00	0.00	0.00	0.00	0.00	37.05	0.00	
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	ZEEV	57.95								

2030 Base

Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.03	0.20	0.62	1.17	2.89	6.13	8.16	4.94
	Diesel	0.00	0.01	0.14	1.10	4.56	8.20	11.98	10.93	11.15
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.02	0.12	0.47	0.22	5.24
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.00	0.02
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.14	2.62
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.50
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	2.62
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.00	0.00	0.01	0.03	0.07	0.09	0.00	0.08
	CNG Bifuel	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.03
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.02	0.10	0.24	0.44	0.34	0.59	0.49	0.59
	Diesel	0.00	0.08	0.38	2.83	11.59	18.43	23.35	14.98	18.53
	ZEEV	7.00								

Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI

	Petrol	0.07	0.00	0.00	0.00	0.00	0.00	0.00
	Diesel	0.04	0.16	1.19	4.93	6.72	15.43	69.07
	ZEEV	2.40						

L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5
	Petrol	3.96	6.73	14.86	56.77	16.42	0.00
	Diesel	0.00	0.04	0.73	0.41	0.09	0.00
	ZEEV	0.00					

Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ZEEV	95.00							

ScC										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.00	0.01	0.03	0.06	0.14	0.29	0.39	0.23
	Diesel	0.00	0.00	0.01	0.05	0.22	0.39	0.57	0.52	0.53
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.01	0.25
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Plug-in Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.12

	running on petrol									
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	76.00
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	CNG Bifuel	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.00	0.00	0.01	0.02	0.01	0.03	0.02	0.03
	Diesel	0.00	0.00	0.02	0.12	0.50	0.79	1.00	0.64	0.80
	ZEEV	76.00								

Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI
	Petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Diesel	0.00	0.01	0.05	0.20	0.28	0.63	2.83
	ZEEV	76.00						

L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5
	Petrol	3.17	5.38	11.89	45.42	13.14	0.00
	Diesel	0.00	0.03	0.58	0.33	0.07	0.00
	ZEEV	0.00					

Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.00	0.00	0.00	0.00	0.00	4.00	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ZEEV	76.00							

ScC (ST										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.00	0.01	0.03	0.06	0.15	0.33	0.43	0.26
	Diesel	0.00	0.00	0.01	0.06	0.24	0.44	0.64	0.58	0.59
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.01	0.28
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.14
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	85.50
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	CNG Bifuel	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.00	0.00	0.01	0.02	0.02	0.03	0.02	0.03
	Diesel	0.00	0.00	0.02	0.14	0.56	0.89	1.13	0.72	0.90
	ZEEV	85.50								

Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI
	Petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Diesel	0.00	0.01	0.06	0.23	0.31	0.71	3.18
	ZEEV	85.50						

L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5
	Petrol	3.56	6.05	13.38	51.09	14.78	0.00
	Diesel	0.00	0.04	0.66	0.37	0.08	0.00
	ZEEV	0.00					

Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.00	0.00	0.00	0.00	0.00	4.50	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ZEEV	85.50							

Milan

2018/2019 Base

Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.02	0.54	3.60	6.18	9.14	6.75	5.86	2.34	0.00
	Diesel	0.00	0.07	1.75	7.43	14.99	13.72	11.65	4.20	0.00
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.01	0.13	0.36	0.18	0.00
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.02	0.41	0.64	1.20	2.01	1.97	1.73	0.00	0.00
	CNG Bifuel	0.00	0.00	0.00	0.00	1.31	1.04	0.67	0.00	0.00
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.03	0.39	1.01	0.99	0.25	0.29	0.10	0.00
	Diesel	0.27	0.73	5.55	16.67	30.58	20.36	17.86	4.91	0.00
	ZEEV	0.00								
Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI		

	Petrol	0.02	0.00	0.00	0.00	0.00	0.00	0.00
	Diesel	0.33	2.13	10.64	29.35	19.72	18.58	19.22
	ZEEV	0.00						

L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5
	Petrol	2.07	26.46	10.06	50.24	10.30	0.00
	Diesel	0.00	0.06	0.48	0.25	0.08	0.00
	ZEEV	0.00					

Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	1.35	7.11	21.98	15.28	24.98	20.43	0.45
	CNG	7.17	0.01	0.07	1.17	0.00	0.00	0.00	0.00
	ZEEV	0.00							

2025 Base										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.01	0.29	1.91	3.28	4.86	3.59	5.86	2.34	5.16
	Diesel	0.00	0.04	0.93	3.95	7.96	7.29	11.65	4.20	8.07
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.01	0.07	0.36	0.18	8.06
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Plug-in Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	4.03

	running on petrol									
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.20
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.03
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.01	0.22	0.34	0.64	1.07	1.05	1.73	0.00	1.20
	CNG Bifuel	0.00	0.00	0.00	0.00	0.70	0.55	0.67	0.00	0.45
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.02	0.28	0.74	0.73	0.19	0.29	0.10	0.59
	Diesel	0.20	0.54	4.08	12.25	22.48	14.97	17.86	4.91	18.76
	ZEEV	1.00								
Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI		
	Petrol	0.01	0.00	0.00	0.00	0.00	0.00	0.00		
	Diesel	0.25	1.57	7.82	21.57	14.50	13.66	40.46		
	ZEEV	0.16								
L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5			
	Petrol	2.07	26.46	10.06	50.24	10.30	0.00			
	Diesel	0.00	0.06	0.48	0.25	0.08	0.00			

	ZEEV	0.00							
Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.00	0.00	0.00	0.00	0.00	54.00	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ZEEV	46.00							

ScA										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.04	0.24	0.40	5.52	4.32	6.48	3.13	5.81
	Diesel	0.00	0.00	0.11	0.49	0.98	0.90	1.44	17.15	20.83
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.01	0.07	0.34	0.17	7.66
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	3.83
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.04
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.83
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.03	0.04	0.08	1.21	1.20	1.84	0.20	1.34
	CNG Bifuel	0.00	0.00	0.00	0.00	0.66	0.52	0.64	0.00	0.43

	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.02	0.27	0.70	0.69	0.18	0.27	0.10	0.56
	Diesel	0.19	0.51	3.87	11.64	21.36	14.22	16.97	4.67	17.83
	ZEEV	0.95								

Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI
	Petrol	0.01	0.00	0.00	0.00	0.00	0.00	0.00
	Diesel	0.23	1.49	7.43	20.50	13.77	12.98	38.44
	ZEEV	0.15						

L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5
	Petrol	1.96	25.13	9.55	47.73	9.79	0.00
	Diesel	0.00	0.06	0.45	0.24	0.08	0.00
	ZEEV	0.00					

Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.00	0.00	0.00	0.00	0.00	51.30	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ZEEV	43.70							

2027 Base										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.01	0.23	1.55	2.66	3.93	2.91	5.86	2.34	5.68
	Diesel	0.00	0.03	0.75	3.20	6.45	5.91	11.65	4.20	8.88
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.00	0.06	0.36	0.18	10.00
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	5.00
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.20
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.01	0.18	0.28	0.52	0.86	0.85	1.73	0.00	1.32
	CNG Bifuel	0.00	0.00	0.00	0.00	0.56	0.45	0.67	0.00	0.50
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.02	0.26	0.67	0.66	0.17	0.29	0.10	0.76
	Diesel	0.18	0.48	3.68	11.06	20.29	13.51	17.86	4.91	24.10
	ZEEV	1.00								

Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI
	Petrol	0.01	0.00	0.00	0.00	0.00	0.00	0.00
	Diesel	0.22	1.42	7.06	19.47	13.08	12.33	45.77
	ZEEV	0.64						

L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5
	Petrol	2.07	26.46	10.06	50.24	10.30	0.00
	Diesel	0.00	0.06	0.48	0.25	0.08	0.00
	ZEEV	0.00					

Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.00	0.00	0.00	0.00	0.00	34.00	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ZEEV	66.00							

ScB										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.02	0.13	0.23	0.34	0.25	0.51	9.08	12.08
	Diesel	0.00	0.00	0.07	0.28	0.56	0.51	1.01	15.16	19.37
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.33	9.17

	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	4.50
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.68
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.50
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.02	0.02	0.05	0.08	0.07	0.15	1.80	2.98
	CNG Bifuel	0.00	0.00	0.00	0.00	0.05	0.04	0.06	0.68	1.13
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.02	0.23	0.60	0.59	0.15	0.26	0.09	0.69
	Diesel	0.16	0.44	3.31	9.95	18.26	12.16	16.07	4.42	21.69
	ZEEV	0.90								
Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI		
	Petrol	0.01	0.00	0.00	0.00	0.00	0.00	0.00		
	Diesel	0.20	1.27	6.35	17.52	11.78	11.10	41.19		
	ZEEV	0.58								
L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5			

	Petrol	1.86	23.81	9.05	45.22	9.27	0.00		
	Diesel	0.00	0.06	0.43	0.23	0.07	0.00		
	ZEEV	0.00							
Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.00	0.00	0.00	0.00	0.00	30.60	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ZEEV	59.40							

2030 Base										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.01	0.17	1.13	1.94	2.87	2.12	5.86	2.34	5.68
	Diesel	0.00	0.02	0.55	2.33	4.70	4.31	11.65	4.20	8.88
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.00	0.04	0.36	0.18	11.10
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	5.55
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.50
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.55
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.01	0.13	0.20	0.38	0.63	0.62	1.73	0.00	1.32

	CNG Bifuel	0.00	0.00	0.00	0.00	0.41	0.33	0.67	0.00	0.50
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.02	0.22	0.57	0.57	0.14	0.29	0.10	0.86
	Diesel	0.16	0.42	3.15	9.48	17.40	11.58	17.86	4.91	27.27
	ZEEV	5.00								
Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI		
	Petrol	0.01	0.00	0.00	0.00	0.00	0.00	0.00		
	Diesel	0.19	1.21	6.05	16.69	11.22	10.57	52.45		
	ZEEV	1.60								
L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5			
	Petrol	2.07	26.46	10.06	50.24	10.30	0.00			
	Diesel	0.00	0.06	0.48	0.25	0.08	0.00			
	ZEEV	0.00								
Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional	
	Diesel	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	ZEEV	95.00								

ScC										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.01	0.05	0.09	0.13	0.10	0.26	0.11	0.26
	Diesel	0.00	0.00	0.02	0.11	0.21	0.19	0.53	0.19	0.40
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.50
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	76.00
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.01	0.01	0.02	0.03	0.03	0.08	0.00	0.06
	CNG Bifuel	0.00	0.00	0.00	0.00	0.02	0.01	0.03	0.00	0.02
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.00	0.01	0.02	0.02	0.01	0.01	0.00	0.04
	Diesel	0.01	0.02	0.13	0.40	0.73	0.49	0.75	0.21	1.15
	ZEEV	76.00								

Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI
	Petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Diesel	0.01	0.05	0.25	0.68	0.46	0.43	2.13
	ZEEV	76.00						

L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5
	Petrol	1.65	21.16	8.05	40.19	8.24	0.00
	Diesel	0.00	0.05	0.38	0.20	0.07	0.00
	ZEEV	0.00					

Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.00	0.00	0.00	0.00	0.00	4.00	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ZEEV	76.00							

Warsaw

2018/2019 Base										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.05	0.11	1.18	3.61	5.50	5.13	10.00	6.40	0.00
	Diesel	0.02	0.15	1.19	7.15	15.28	14.41	17.08	8.73	0.00

	Petrol Hybrid	0.00	0.00	0.00	0.00	0.02	0.19	0.71	0.46	0.00
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.05	0.03	0.00	0.00
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.08	0.00
	BEV	0.00	0.00	0.00	0.00	0.00	0.02	0.09	0.15	0.00
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.00
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.01	0.03	0.09	0.22	0.37	0.32	0.51	0.00	0.00
	CNG Bifuel	0.00	0.00	0.00	0.00	0.20	0.14	0.20	0.00	0.00
	Bioethanol variants	0.00	0.00	0.00	0.00	0.01	0.02	0.01	0.01	0.00
Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.01	0.03	0.20	0.88	0.60	0.53	0.13	0.00
	Diesel	0.04	0.30	0.69	5.50	24.79	30.12	30.13	6.04	0.00
	ZEEV	0.00								
Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI		
	Petrol	0.08	0.00	0.00	0.00	0.00	0.00	0.00		
	Diesel	0.20	0.61	4.13	15.27	18.05	24.67	37.00		
	ZEEV	0.00								

L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5
	Petrol	2.51	16.36	15.07	51.88	12.70	0.00
	Diesel	0.00	0.05	0.68	0.61	0.15	0.00
	ZEEV	0.00					

Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.40	0.00	0.48	0.08	50.60	29.14	19.29	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ZEEV	0.00							

2025 Base										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.03	0.07	0.69	2.13	3.25	3.03	10.00	6.40	4.80
	Diesel	0.01	0.09	0.70	4.22	9.02	8.51	17.08	8.73	9.60
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.01	0.11	0.71	0.46	3.82
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.01
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.08	1.91
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	1.91

	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.02	0.05	0.13	0.22	0.19	0.51	0.00	0.23
	CNG Bifuel	0.00	0.00	0.00	0.00	0.12	0.08	0.20	0.00	0.08
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01
Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.01	0.02	0.16	0.68	0.47	0.53	0.13	0.34
	Diesel	0.03	0.23	0.53	4.26	19.19	23.31	30.13	6.04	13.95
	ZEEV	0.00								

Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI
	Petrol	0.06	0.00	0.00	0.00	0.00	0.00	0.00
	Diesel	0.15	0.47	3.19	11.82	13.97	19.09	51.11
	ZEEV	0.14						

L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5
	Petrol	2.51	16.36	15.07	51.88	12.70	0.00
	Diesel	0.00	0.05	0.68	0.61	0.15	0.00
	ZEEV	0.00					

Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.00	0.00	0.00	10.56	29.14	19.29	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ZEEV	41.00							

ScA										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.03	0.06	0.66	2.02	3.09	2.88	9.51	6.08	4.56
	Diesel	0.01	0.08	0.65	3.90	8.60	8.11	16.25	8.32	9.15
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.01	0.11	0.68	0.44	3.63
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.03	0.02	0.00	0.01
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.07	1.82
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.57
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	1.82
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.02	0.05	0.12	0.21	0.18	0.48	0.00	0.22
	CNG Bifuel	0.00	0.00	0.00	0.00	0.11	0.08	0.19	0.00	0.08
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00
Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.01	0.02	0.15	0.64	0.44	0.50	0.12	0.32
	Diesel	0.03	0.22	0.51	4.04	18.23	22.14	28.63	5.74	13.25

	ZEEV	0.00

Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI
	Petrol	0.06	0.00	0.00	0.00	0.00	0.00	0.00
	Diesel	0.15	0.44	3.03	11.23	13.27	18.13	48.55
	ZEEV	0.13						

L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5
	Petrol	2.39	15.54	14.32	49.28	12.06	0.00
	Diesel	0.00	0.05	0.65	0.58	0.14	0.00
	ZEEV	0.00					

Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.00	0.00	0.00	10.03	27.69	18.33	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ZEEV	38.95							

2027 Base										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.03	0.05	0.56	1.73	2.63	2.45	10.00	6.40	5.28
	Diesel	0.01	0.07	0.57	3.42	7.31	6.89	17.08	8.73	10.56
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.01	0.09	0.71	0.46	6.10

	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.00	0.01
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.08	3.05
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	3.05
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.01	0.04	0.11	0.18	0.15	0.51	0.00	0.26
	CNG Bifuel	0.00	0.00	0.00	0.00	0.10	0.07	0.20	0.00	0.09
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01
Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.01	0.02	0.14	0.61	0.42	0.53	0.13	0.45
	Diesel	0.02	0.21	0.48	3.84	17.31	21.04	30.13	6.04	18.60
	ZEEV	0.00								
Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI		
	Petrol	0.06	0.00	0.00	0.00	0.00	0.00	0.00		
	Diesel	0.14	0.42	2.88	10.67	12.60	17.23	55.60		
	ZEEV	0.40								
L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5			

	Petrol	2.51	16.36	15.07	51.88	12.70	0.00		
	Diesel	0.00	0.05	0.68	0.61	0.15	0.00		
	ZEEV	0.00							
Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.00	0.00	0.00	0.00	17.71	19.29	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ZEEV	63.00							

ScB										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.00	0.05	0.14	0.21	0.20	0.82	12.90	11.89
	Diesel	0.00	0.01	0.05	0.28	0.60	0.56	1.39	22.32	23.97
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.00	0.01	0.06	0.75	5.82
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.03
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	2.76
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.72
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	2.75
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.00	0.00	0.01	0.01	0.01	0.04	0.41	0.64

	CNG Bifuel	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.15	0.23
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01

Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.01	0.02	0.13	0.55	0.38	0.48	0.12	0.41
	Diesel	0.02	0.19	0.43	3.46	15.58	18.93	27.12	5.44	16.74
	ZEEV	0.00								

Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI
	Petrol	0.05	0.00	0.00	0.00	0.00	0.00	0.00
	Diesel	0.12	0.38	2.59	9.60	11.34	15.50	50.04
	ZEEV	0.36						

L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5
	Petrol	2.26	14.72	13.56	46.69	11.43	0.00
	Diesel	0.00	0.04	0.61	0.55	0.13	0.00
	ZEEV	0.00					

Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.00	0.00	0.00	0.00	15.93	17.37	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ZEEV	56.70							

2030 Base

Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.02	0.04	0.41	1.26	1.92	1.79	10.00	6.40	5.28
	Diesel	0.01	0.05	0.42	2.49	5.33	5.03	17.08	8.73	10.56
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.01	0.07	0.71	0.46	8.99
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.00	0.01
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.08	4.50
	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.20
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	4.50
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.01	0.03	0.08	0.13	0.11	0.51	0.00	0.26
	CNG Bifuel	0.00	0.00	0.00	0.00	0.07	0.05	0.20	0.00	0.09
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01

Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.01	0.02	0.12	0.52	0.36	0.53	0.13	0.56
	Diesel	0.02	0.18	0.41	3.29	14.85	18.04	30.13	6.04	22.79
	ZEEV	2.00								

Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI

	Petrol	0.05	0.00	0.00	0.00	0.00	0.00	0.00
	Diesel	0.12	0.36	2.47	9.15	10.81	14.77	60.95
	ZEEV	1.33						

L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5
	Petrol	2.51	16.36	15.07	51.88	12.70	0.00
	Diesel	0.00	0.05	0.68	0.61	0.15	0.00
	ZEEV	0.00					

Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ZEEV	95.00							

ScC										
Passenger Cars		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.00	0.02	0.05	0.08	0.07	0.41	0.26	0.22
	Diesel	0.00	0.00	0.02	0.10	0.22	0.21	0.70	0.36	0.43
	Petrol Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.02	0.37
	Diesel/biodiesel Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Plug-in Hybrid running on petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18

	BEV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	76.00
	PHEV running on electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18
	Fuel Cell	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	LPG Bifuel	0.00	0.00	0.00	0.00	0.01	0.00	0.02	0.00	0.01
	CNG Bifuel	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
	Bioethanol variants	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Commercial Vehicles		Older Misc	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6 a/b/c	Euro 6 d-temp	Euro 6 d
	Petrol	0.00	0.00	0.00	0.00	0.02	0.01	0.02	0.01	0.02
	Diesel	0.00	0.01	0.02	0.13	0.61	0.74	1.23	0.25	0.93
	ZEEV	76.00								
Heavy Duty Trucks		Conventional	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI		
	Petrol	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	Diesel	0.00	0.01	0.10	0.37	0.44	0.60	2.47		
	ZEEV	76.00								
L-Category		Conventional	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5			
	Petrol	2.01	13.09	12.06	41.50	10.16	0.00			
	Diesel	0.00	0.04	0.54	0.49	0.12	0.00			
	ZEEV	0.00								

Buses		EEV	Euro I	Euro II	Euro III	Euro IV	Euro V	Euro VI	Conventional
	Diesel	0.00	0.00	0.00	0.00	0.00	0.00	4.00	0.00
	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	ZEEV	76.00							