

# In-use vehicle exhaust emissions in London in 2018

In March 2017, the City of London and the TRUE initiative began a collaboration to increase the availability and accessibility of information on exhaust emissions, and particularly nitrogen oxide (NO<sub>x</sub>) emissions, from vehicles being driven in the city.

From November 2017 through February 2018, TRUE conducted a project using remote-sensing technology to measure in-use exhaust emissions from vehicles at several sites in Greater London. More than 100,000 samples were collected at nine locations from passenger cars, light commercial vehicles, taxis, buses, trucks, and motorcycles. The data were analysed separately as well as together with the existing data, collected over the past decade in Europe, from which the TRUE vehicle emissions rating was initially developed.

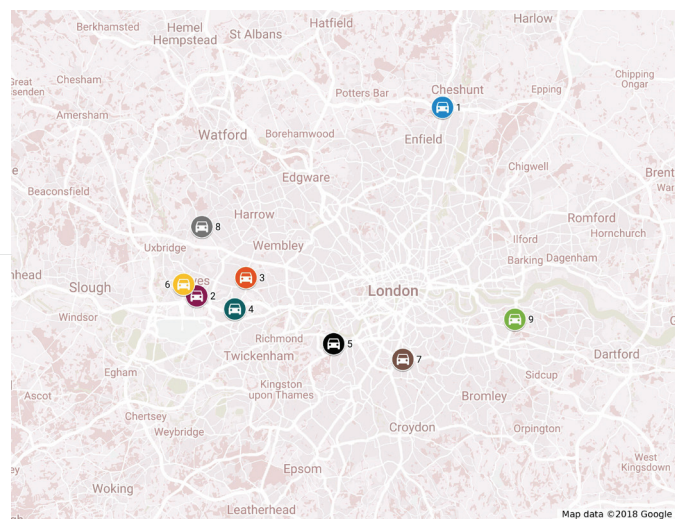
## KEY FINDINGS

- Nitrogen oxide (NO<sub>x</sub>) emissions from diesel cars in London are, on average per kilometer, 6 times those of petrol cars. NO<sub>x</sub> emissions from petrol cars have declined, and on average for Euro 5 and Euro 6 vehicles are within 1.3 times the regulatory limits. Average NO<sub>x</sub> emissions from Euro 5 and 6 diesel cars, however, are approximately 5–6 times higher than the standards.

## London sampling sites

### Site ID and name

- 1 - A10/M25 Junction
- 2 - Dawley Rd., Hillingdon
- 3 - Greenford Rd., Ealing
- 4 - Heston Rd., Hounslow
- 5 - Putney Hill, Wandsworth
- 6 - Stockley Rd., W. Drayton
- 7 - Christchurch Rd.
- 8 - West End Rd., Hillingdon
- 9 - A205 South Circular



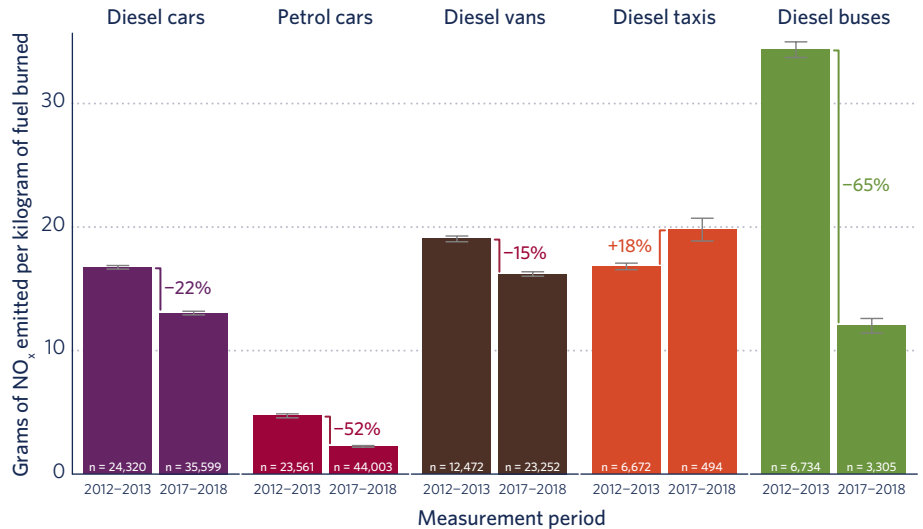
Measurement locations for the TRUE London 2017–2018 remote sensing study.

- Carbon monoxide (CO) emissions from passenger cars are significantly lower for newer vehicles, and CO emissions for diesels are, on average, lower than those of petrol vehicles. Average CO emissions from petrol cars appear to increase as a vehicle ages, and this increase is more pronounced for a small subset of the fleet.
- Particulate matter (PM) emissions from passenger cars are low for new diesel and petrol cars. Diesel cars, Euro 5 and newer, come equipped with particulate filters and demonstrate significantly lower PM emissions than older vehicles without filters.
- London Taxi Company black taxi TX diesel models produce, on average, higher NO<sub>x</sub> emissions than diesel passenger cars covered by the same emissions standard. NO<sub>x</sub> emissions from Euro 5 taxis are higher than those from taxis certified to previous Euro standards and are approximately 3 times those of other Euro 5 diesel cars.
- Average NO<sub>x</sub> emissions from buses in London have declined significantly over the past 5 years. NO<sub>x</sub> emissions (grams per kilogram of fuel burned) from buses sampled were 65% lower than those from buses sampled in similar studies conducted in 2012 and 2013. A similar comparison for other vehicle types shows that

over the same time period average emissions from the diesel passenger car and light commercial vehicle fleet have decreased by 22% and 15%, respectively, while average NO<sub>x</sub> emissions from the taxi fleet have not improved (see chart).

- Euro 5 and earlier diesel cars are estimated to be responsible for more than 60% of the NO<sub>x</sub> emissions from passenger cars in Greater London. This is the group of vehicles that will be excluded from central London as part of the upcoming Ultra Low Emission Zone.

These findings illuminate the real-world emissions of London's vehicle fleet. While average vehicle emissions have decreased, a large number of high-emitting vehicles remain on the road. The results also shed new light on the effectiveness of clean-air policies. They show, for example, that efforts to



Average fuel-specific NO<sub>x</sub> emissions by vehicle group, measured in London in 2012-2013 and 2017-2018. The fuel-specific emission rate is a measure of the average grams of NO<sub>x</sub> emitted by a vehicle for every kilogram of fuel that is burned in the vehicle's engine. The number of measurements is presented at the bottom of each bar. Whiskers represent the 95% confidence interval of the mean.

reduce NO<sub>x</sub> emissions from the London bus fleet have been quite effective over the past 5 years. And the results can help estimate the impact of proposed

policies—suggesting, for example, that the proposed Ultra Low Emission Zone will have a significant impact in reducing NO<sub>x</sub> emissions in central London.



**TO FIND OUT MORE**

For details on the London remote-sensing project and related questions, contact **Rachel Muncrief, rachel@theicct.org**. For more information on TRUE, visit **www.trueinitiative.org**.

**DOWNLOAD THE PAPER**

"Remote sensing of motor vehicle emissions in London" **www.theicct.org/publications/true-london-dec2018**