THE REAL URBAN EMISSIONS INITIATIVE

FACT SHEET

JULY 2026

AFRICA

Real-world vehicle emissions in Johannesburg, South Africa

BACKGROUND

In 2024, transport-related pollution in Johannesburg, South Africa, contributed to a notable health burden, including preventable premature deaths and pediatric asthma cases, underscoring the need for cleaner transport policies. National vehicle exhaust emission standards have not been updated since 2006, when Euro 2/II was introduced, leaving the country lagging behind comparable economies worldwide.

In recent years, the City of Johannesburg has committed to reducing air pollution in the city through policy action, including the introduction of future clean air zones (CAZs) and encouraging the expansion of public transportation.

To support the further development of actionable policies, the TRUE Initiative conducted a real-world vehicle emissions study that aimed to:

- Provide a comprehensive picture of vehicle fleets and their emissions in Johannesburg
- Present evidence-based policy recommendations to effectively and equitably address emissions from high-emitting vehicles in Johannesburg

TESTING DETAILS

Date: July-September 2025

Sample: ~250,000 measurements (approximately 162,000 valid for analysis)

Measured fleet: Passenger cars, light commercial vehicles (LCVs), minibus taxis, trucks and buses

Pollutants analyzed:

- Nitrogen oxides (NO_x)
- Hydrocarbons (HC)
- Carbon monoxide (CO)
- Smoke opacity from ultraviolet light as a proxy for particulate matter (PM)
- Ammonia (NH_3)

Partners: This study was conducted in coordination with the City of Johannesburg and the University of Johannesburg Process, Energy, and Environmental Technology Station (UJ PEETS) with support from Breathe Cities. Vehicle exhaust emission testing was undertaken by Opus RSE in partnership with C&M Consulting Engineers and UJ PEETS.

KEY FINDINGS AND POLICY OPTIONS TO REDUCE EMISSIONS

This study demonstrated that meaningful emission reductions are achievable in Johannesburg through near- and long-term interventions both at the city and national government levels. Specifically, the study identified the following key results and policy options to reduce emissions.

1. Vehicle-related emissions in Johannesburg are not equally distributed across the city

- Overall average PM vehicle exhaust emissions were highest in central and southern Johannesburg (Figure 1).
- Minibus taxis, the most common form of public transport for residents in the central and southern regions of the city, accounted for 10% of measured vehicle activity in the areas yet contributed between 24% and 35% of total exhaust PM and NO_x emissions in these regions.
- Diesel minibus taxis showed higher average PM and NO_x emissions than their petrol counterparts in recent years, despite growing in popularity over the same period.

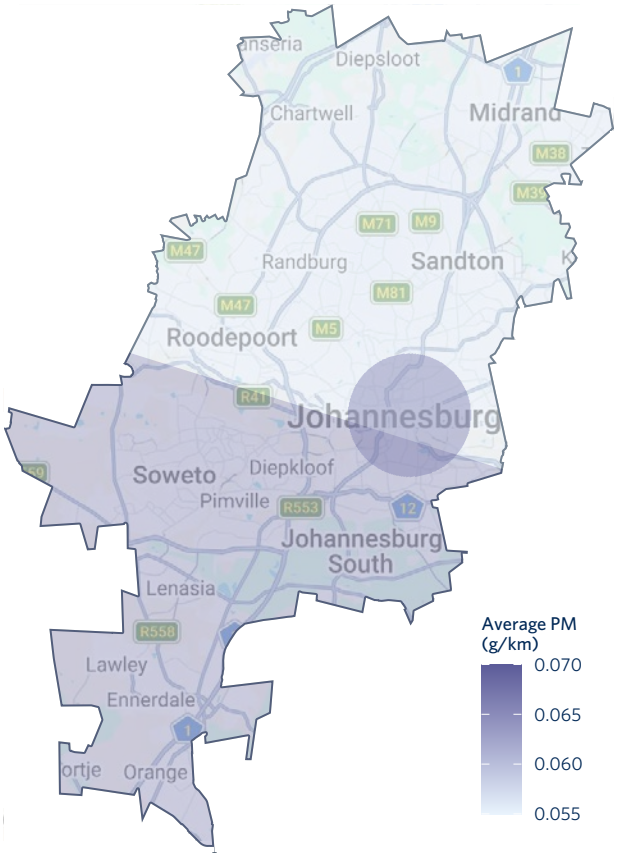

Figure 1. Average distance-specific PM exhaust emissions from vehicles measured in the central, southern, and northern regions of Johannesburg

TRUE INITIATIVE POLICY RECOMMENDATIONS:

- **Prioritizing vehicle-emission focused CAZs** in central and southern Johannesburg could address unequal vehicle emissions exposure.
- **Transitioning to electric minibus taxis** could reduce emissions and lifetime operating costs for owners. Provincial or national financing schemes to address higher upfront costs of electric alternatives could include promotion of drive-to-own schemes.
- **Expanding bus networks via CAZs** and deploying electric buses to complement minibus taxis on high-demand corridors could improve transport connectivity and improve efficiency for both passengers and minibus drivers.

2. The oldest and highest emitting light commercial vehicles (LCVs) contributed disproportionately to vehicle emissions

- The oldest petrol-powered LCVs and minibus taxis first registered before 2006 exhibited average CO and HC emission levels consistent with possible malfunctions or high usage. These vehicles made up 3%–8% of the fleet yet contributed 13%–22% of overall HC emissions and 20%–25% of CO emissions (Figure 2).
- The oldest diesel LCVs and minibus taxis registered before 2015 made up just 4%–13% of their respective fleets but contributed over twice their share to overall PM emissions.

TRUE INITIATIVE POLICY RECOMMENDATIONS:

- **Updating the inspection and maintenance (I&M) program outlined in the Air Pollution Control By-law 2021** to include emissions testing for CO and HC emissions from petrol vehicles in addition to the existing smoke test for diesel vehicles could reduce in-use emissions.
- **Prioritizing inspection of the highest emitting commercial vehicle sub-groups,** like large light- and heavy-duty commercial fleets, could offer a more equitable approach whereby small business and private vehicle owners are not overburdened.
- **Leveraging the I&M program to operationalize CAZ vehicle entry criteria**, permitting only vehicles that passed emission inspection to enter the CAZ.

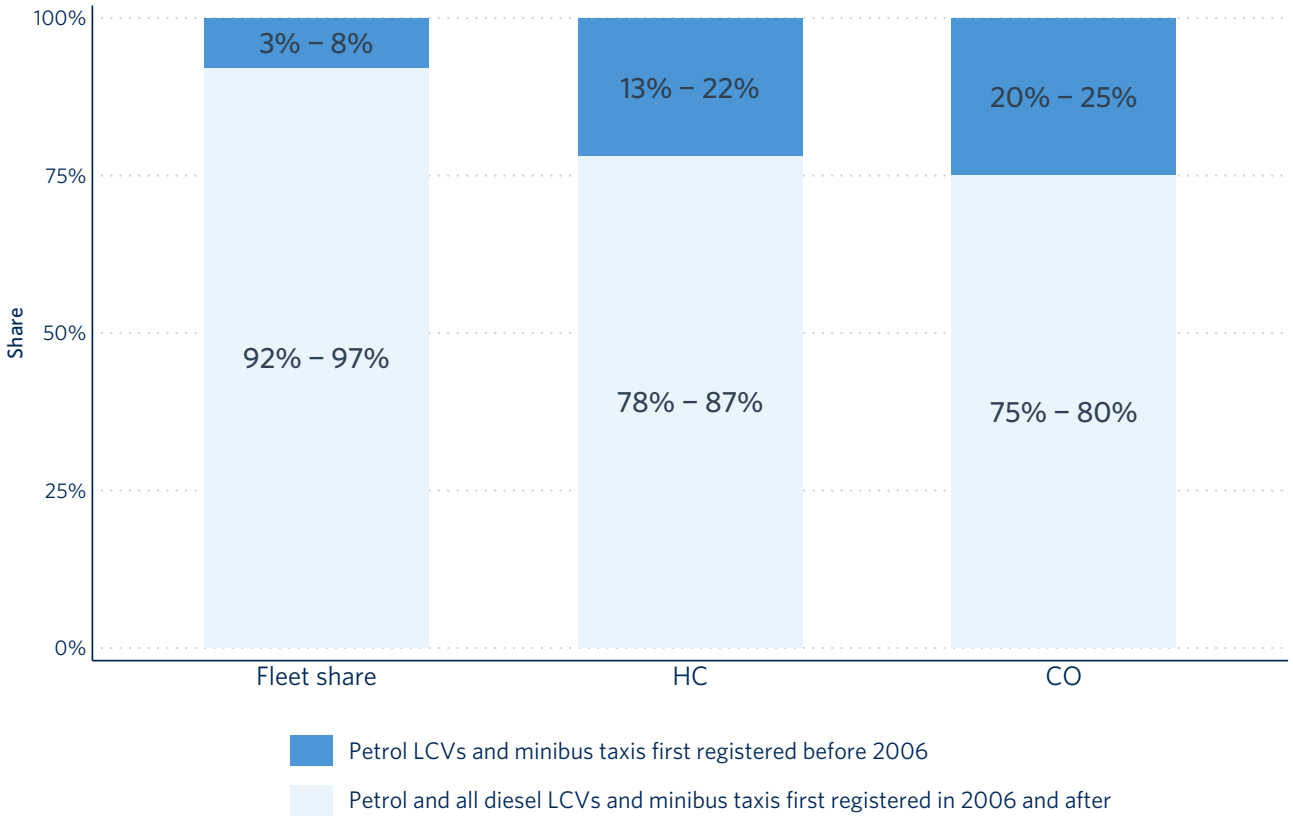

Figure 2. Fleet measurement share and CO and HC emission shares from petrol-powered LCVs and minibus taxis registered before 2006

3. **There was little improvement in NO_x and PM emissions among diesel vehicles across registration years.**
   - Even the newest diesel passenger cars, LCVs and trucks showed average NO_x and PM emissions between 3 and 14 times higher than Euro 6/VI limits (Figure 3).
   - Collectively, average NO_x and PM emissions among all petrol passenger cars measured in Johannesburg were consistent with real-world emissions from European petrol cars that are 10 years older.

TRUE INITIATIVE POLICY RECOMMENDATIONS:

- **Adopting to Euro 6d/VI-D emission standards** is critical for South Africa to achieve a meaningful reduction in NO_x and PM emissions from diesel vehicles in the city and safeguard against emission deterioration exhibited by LCVs and minibus taxis.
- **Aligning national-level emissions requirements** with those of the European Union and the United Kingdom (roughly half of South Africa's automotive exports) would protect the long-term export competitiveness of locally manufactured vehicles.

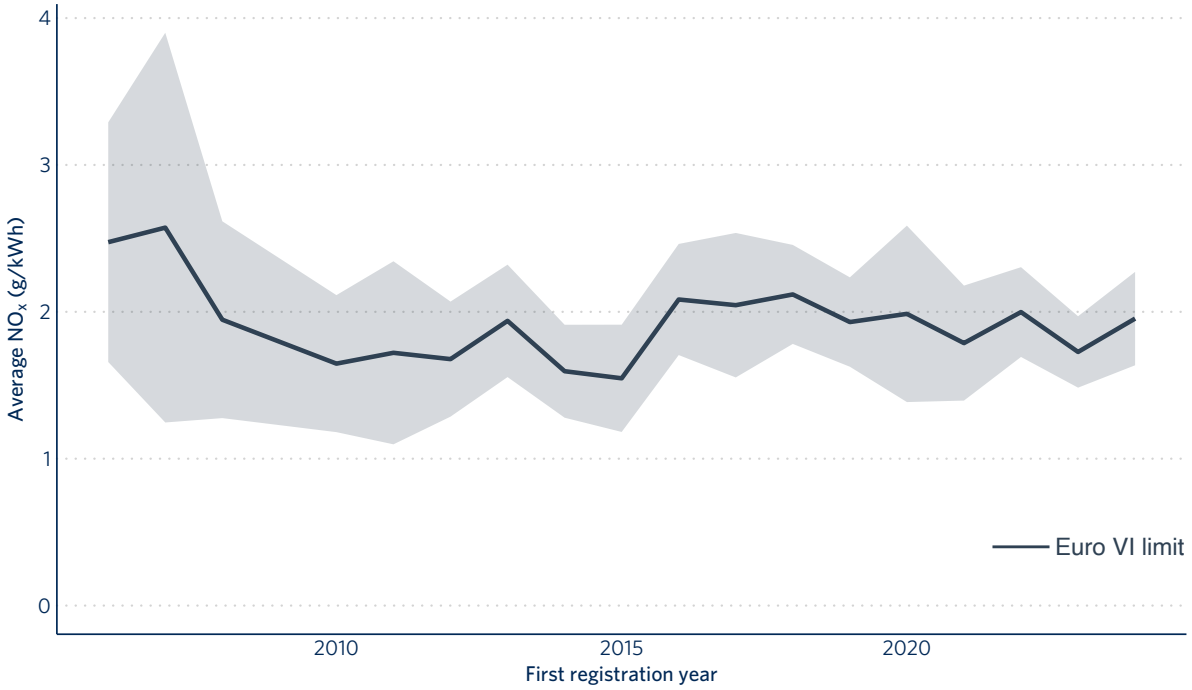

Figure 3. Average energy-specific NO_x diesel truck emissions over time compared to Euro VI limit

THE REAL URBAN EMISSIONS INITIATIVE

SUPPORTED BY:

Breathe Cities

FIA FOUNDATION

icct THE INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION