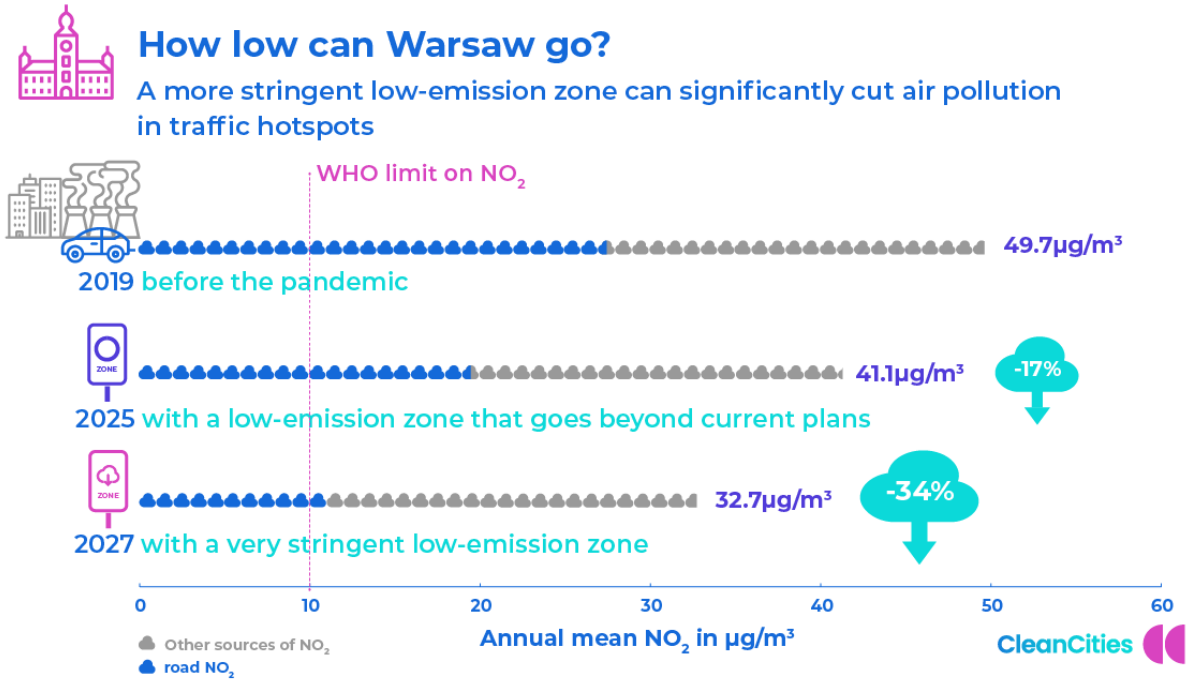
Factsheet

New research shows air quality benefits of a stricter low-emission zone in Warsaw

Warsaw is set to introduce the city's first ever low-emission zone (LEZ) for cars as of 2024. The city will thereby join the ranks of more than 320 European cities that have already introduced these proven policies to address toxic levels of air pollution. New research commissioned by the Clean Cities Campaign confirms the predicted clean air benefits of the planned LEZ in traffic hostpots but also shows that further reductions in pollution can be achieved if the requirements are tightened.



The main findings of the research are:

- The research confirms that the planned Warsaw low-emission zone[1] will significantly reduce emissions from passenger cars. NO_x tailpipe emissions will be reduced by ca. 7% compared to a scenario without a low-emission zone. These results are consistent with earlier research conducted by the TRUE initiative.
- Compared to pre-pandemic levels in 2019, the planned low-emission zone will allow Warsaw to curb total NO_2 pollution levels in the most polluted traffic hotspots by ca. 17%, reaching a total level of ca. 41 µg/m³. This means pollution in this hotspot will remain above the current EU legal limit of 40 µg/m³ and be four times higher than the World Health Organization's air quality guidelines (10 µg/m³).

[1] The plans foresee that diesel cars will have to respect at least the Euro 4 norm, and petrol cars at least the Euro 2 norm. An overview of Euro norms for cars can be found here.

- **If a more stringent low-emission zone is introduced, allowing only Euro 6d(-temp) cars to enter the zone in 2027, significant additional reductions could be achieved. Total NO_2 levels in the most polluted hotpots could be reduced by ca. 34% compared to pre-pandemic levels, achieving an overall pollution level of ca. 33 µg/m³.**
- **The modelling contains several worst-case assumptions, and in particular does not allow for any significant ambition in targeting the remaining non-transport emissions. This means that the future-year predictions are likely to be conservative and that lower concentrations than predicted here are highly achievable with additional and combined efforts to tackle other pollution sources.**

Methodology: modelling the impact of different scenarios in European cities

The analysis for Warsaw is part of a Pan-European study covering five EU cities as well as London. Based on previous work[2], experts at *Air Quality Consultants Ltd.* developed a bespoke methodology that uses recent measured concentrations from fixed monitoring stations, combined with the predicted changes to transport emissions in order to estimate future ambient concentrations. For Warsaw, an additional analysis has been conducted to compare the results with the findings of recent research conducted by the TRUE initiative.[3] The results of both studies have been found to be consistent.

While the methodology has been simplified in comparison to detailed spatial modelling, the outcomes are suitable to demonstrate the effects that low- and zero-emission zones can have on worst-case pollution concentrations (see details in the technical report). The modelling contains several worst-case assumptions, and in particular does not account 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.

Main results

The results confirm that the planned low-emission zone can reduce air pollution in Warsaw and that tightening the requirements will deliver significant additional benefits in the future. The pollution levels that can be attained are presented in following table 1.

[2] Transport & Environment. (2021). Blue Sky Recovery. How to keep lockdown low levels of air pollution in European cities. Link

[3] The additional analysis include modelling of different compliance rates with the LEZ requirements (95% and 100%) and added a closer analysis of emissions from passenger cars only (as opposed to road traffic emissions overall).

Table 1: Air pollution levels in different years in traffic hotpots (in µg/m³), assuming a 100% compliance rate with the policy

	2019	2025 with the planned LEZ	2027 with a tighter LEZ
NO2 from local traffic	27.5	19	10.6
NO2 from all other sources	22.1	22.1	22.1
Total NO2	**49.7**	**41.1**	**32.7**
PM2.5 from local traffic	4.3	3.5	2.9
PM2.5 from all other sources	20.4	14.3	14.1
Total PM2.5	**24.7**	**17.8**	**17**

The expected reductions can be compared to 2019 levels as well as a baseline scenario without a low-emission zone, in which only normal vehicle renewal would take place. The relative reductions are summarised in table 2.

Table 2: Reductions in air pollution in traffic hotspots

	2019	2025 with the planned LEZ	2027 with a tighter LEZ
Total NO2 reduction compared to 2019	**/**	**17%**	**34%**
Traffic NO2 reduction compared to 2019	/	31%	61%
Traffic NO2 reduction compared to baseline (same year without a LEZ)	/	8%	41%
Traffic PM2.5 reduction compared to 2019	/	19%	33%
Traffic PM2.5 reduction compared to baseline (same year without a LEZ)	/	9%	19%

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