Roadside Emissions in Dublin: Measurements and Projections (REDMAP)

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Identifying pressures

In Ireland, transport accounts for about 20% of emissions, and 95.8% of these emissions are caused by on-road vehicles. Several pieces of legislation and policies have been developed to tackle this issue. However, emission reductions resulting from policies, legislation and standardisation have been lower than originally anticipated. The key challenge is the discrepancy between vehicle type approval tests and real-world emissions from vehicles powered by fossil fuels. A comprehensive understanding of real-world emissions, particularly from in-use vehicles, is lacking, as discrepancies between laboratory testing and actual on-road performance make it difficult to accurately assess the full extent of the pollution problem and devise effective mitigation strategies. Moreover, knowledge is limited about trends in the emission factors of vehicles that conform to different emission standards (Euro 4/Euro 5/Euro 6), use varying fuel types (petrol/diesel) and have high mileage. From a mitigation standpoint, the fact that there are no low-emission zones (LEZs) in Ireland indicates that few restrictions are aimed at improving ambient air quality in sensitive areas.

Informing policy

The findings of this report have significant policy relevance, as they could directly guide the design and implementation of LEZs and zero-emission zones (ZEZs) in Dublin and other Irish cities. The comprehensive dataset collected could support the introduction of restrictions on older, more polluting vehicles, as well as the development of mandatory inspection and maintenance programmes. Furthermore, the insights gained on the impact of pedestrianisation measures could inform urban planning strategies to mitigate air pollution within the city centre. This evidence-based knowledge could make a substantial contribution to improving air quality and public health in Dublin. By providing a more accurate representation of real-world vehicle emissions, this report offers policymakers the necessary data and analysis to make informed decisions and implement effective interventions. The introduction of LEZs and ZEZs could lead to a significant reduction in air pollution levels within the city. Overall, the evidence-based solutions presented in this research have the potential to make a substantial and positive impact on air quality in Dublin and in other cities in Ireland.

Developing solutions

By utilising real-world measurement techniques, such as remote sensing, it was possible to quantify emissions from an exceptionally large sample of over 130,000 vehicles, including cars, light goods vehicles, heavy goods vehicles and buses. This extensive dataset provided invaluable insights, further enhanced by the incorporation of portable emission measurement system (PEMS) data. The emission factors derived from both PEMS and remote-sensing data were then integrated into a dispersion model, offering a more accurate representation of air pollution levels in the city. Notably, the study also focused on a significant number of the latest Euro 6 vehicle models, providing crucial insights into the real-world performance of these newer, more stringent emission standards. Based on the analysis, a comprehensive set of evidence-based solutions were proposed, including the phasing out of older, more polluting vehicles (such as Euro 3 and Euro 4 models), restricting vehicle access in the city centre and implementing LEZs to effectively mitigate air pollution in the Dublin metropolitan area.