

Foreword

Despite technological advances to reduce energy and materials use and growing political will to pursue green development, population growth in cities is putting ever-greater pressure on the pursuit of sustainability in urban areas. As cities grapple with ongoing environmental challenges, they also face interactions between environmental pollution and public health risks. A notable example is local air pollution, which has been associated with greater susceptibility to respiratory infections. Growing populations increase the exposure to particulate matter in urban areas, and rising incomes increase the total amount of emissions produced as more people are able to own vehicles.

While the overall amount of particulate matter from road traffic has decreased in past decades thanks to increasingly stringent standards regulating exhaust emissions, emerging evidence shows that particulate matter is also emitted from the wearing down of tyres, brakes, and road surfaces, and from the resuspension of road dust. Particulate matter from these “non-exhaust” sources is less well-understood than particulate matter from exhaust emissions, and the policy options to address them are consequently less well-explored. Importantly, non-exhaust particulate matter emissions will not be addressed by increasing the stringency of existing emissions standards. As a result, almost all particulate matter from road traffic is expected to come from non-exhaust emission sources in future years. Given the significant negative impacts of particulate matter on public health, it is incumbent on policymakers to consider how to manage these emissions.

This report synthesizes the state of knowledge on the nature, causes and consequences of non-exhaust particulate emissions from tyre, brake, and road wear as well as road dust resuspension. It also simulates how particulate matter emissions from non-exhaust sources will evolve in future years and identifies existing technological and policy measures to mitigate these emissions. Finally, the report proposes a policy framework for internalising the social costs associated with these emissions.

The evidence presented herein is intended to bring attention to this important but overlooked environmental policy issue and provide preliminary insights regarding how to address them. First, it emphasizes that even electric vehicles produce non-exhaust emissions. While this observation may not alter the appeal of electric vehicles relative to conventional vehicles in terms of overall environmental performance, it nevertheless invites a reappraisal of the net social benefits that can be expected from the use of electric vehicles. Addressing non-exhaust emissions can notably have implications for the design of electric vehicles moving forward. Finally, the findings of the report lend additional rationale for minimising private vehicle travel in favour of less polluting modes of transportation in urban areas, such as efficient mass public transit and walking and cycling. Assessing the public health burden of non-exhaust emissions and addressing them accordingly is also likely to involve a number of co-benefits, including reduced congestion, improved quality of life as well as enhanced societal resilience to potential public health risks.

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