

# 'Lungs of the City': A City Center-Scale Intervention Study to Curb Urban Air Pollution

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Environmental innovation company 'ENS Technology' is a front runner in the development of innovative solutions to eliminate fine and ultrafine dust from ambient air in new and existing infrastructure (e.g. buildings, public spaces, car parks, tunnels, metro stations).

In the 'Lungs of the City' project, we studied the effect of PM emission reduction from car park exhaust by implementation of our proprietary 'positive ionization' air purification technology. In close collaboration with Eindhoven University of Technology (TU/e), the effect on ambient air quality was studied using Computational Fluid Dynamics (CFD) simulations, at the scale of a city center (approximately 5 km<sup>2</sup>; in the city of Eindhoven, the Netherlands). It was shown that the levels of airborne particulate matter (PM) diminished significantly in the direct vicinity of the car parks in which air purification systems were projected. Moreover, this PM-reduction effect extended to a wider area in the surroundings of these car parks. A peer-reviewed manuscript on this study has been published in Journal of Wind Engineering and Industrial Aerodynamics [1].

Recently, we performed an elaborate intervention project to validate this CFD study: In this project, 30 'Aufero' air cleaning systems were deployed to eliminate PM from the total volume of exhaust air of an underground car park in the city center of Eindhoven. Measurements of ambient PM were performed using an extensive network consisting of 14 (Grimm EDM164) environmental monitoring systems, which were placed in a grid surrounding the car park. To our knowledge, this is the first time an 'in situ' intervention experiment has been performed on such a large scale. A peer-reviewed scientific publication on this project is anticipated to be published towards the end of 2018.

Further reading:

'Lungs of the City' project website [2], Elsevier Connect [3]

## References

- [1] Bert Blocken, Rob Vervoort, Twan van Hooff (2016) Reduction of outdoor particulate matter concentrations by local removal in semi-enclosed parking garages: A preliminary case study for Eindhoven city center, Journal of Wind Engineering and Industrial Aerodynamics, Vol. 159, pp 80-98, doi:10.1016/j.jweia.2016.10.008
- [2] 'Lungs of the City' project website: <http://enstechnology.nl/en/projects/lungs-of-the-city-eindhoven/>
- [3] Lucy Goodchild van Hilten (2017) How electrifying the air in parking garages could clean our cities. Elsevier Connect, January 25, 2017, <https://www.elsevier.com/connect/how-electrifying-the-air-in-parking-garages-could-clean-our-cities>