

Air quality in Eindhoven, Netherlands significantly improves with 'Lungs of the City'

November 8 2021



The test installation at Eindhoven's town hall square with the town hall on the right in the photo. Credit: Lungs of the City

The air quality in many parts of Europe and the Netherlands does not

meet the advisory values of the World Health Organization (WHO). However, the smart integration of air purification technology at polluting hotspots in public spaces can substantially reduce fine dust concentrations in cities. This is the conclusion of the Eindhoven University of Technology, ENS Clean Air, Air Liquide, and the municipality of Eindhoven from the pilot project "Lungs of the City," in which the effect of air purification systems in underground parking garages was measured in the center of Eindhoven.

Eindhoven has been pursuing an active policy to improve air quality for many years. It was therefore a logical choice in 2017 for the city center to serve as a living lab for research into the so-called "Lungs of the City" approach. In this concept, infrastructural facilities and buildings such as a parking garage, a tunnel, a public transport station, or street furniture act as an air-purifying "Lung of the City," with the central aim of reducing particulate matter concentrations in places where high concentrations of particulate matter and high levels of exposure converge—the so-called hotspots.

Air-purifying element

In the pilot project, a temporary test installation was placed in the town hall square in Eindhoven. An air purification unit removed particulate matter from the ventilation air of the parking garage under the square and then emitted the purified air in the vicinity of the square. Air quality measurements were then taken around the square, which checked for the concentration of particulate matter and also accounted for weather conditions.



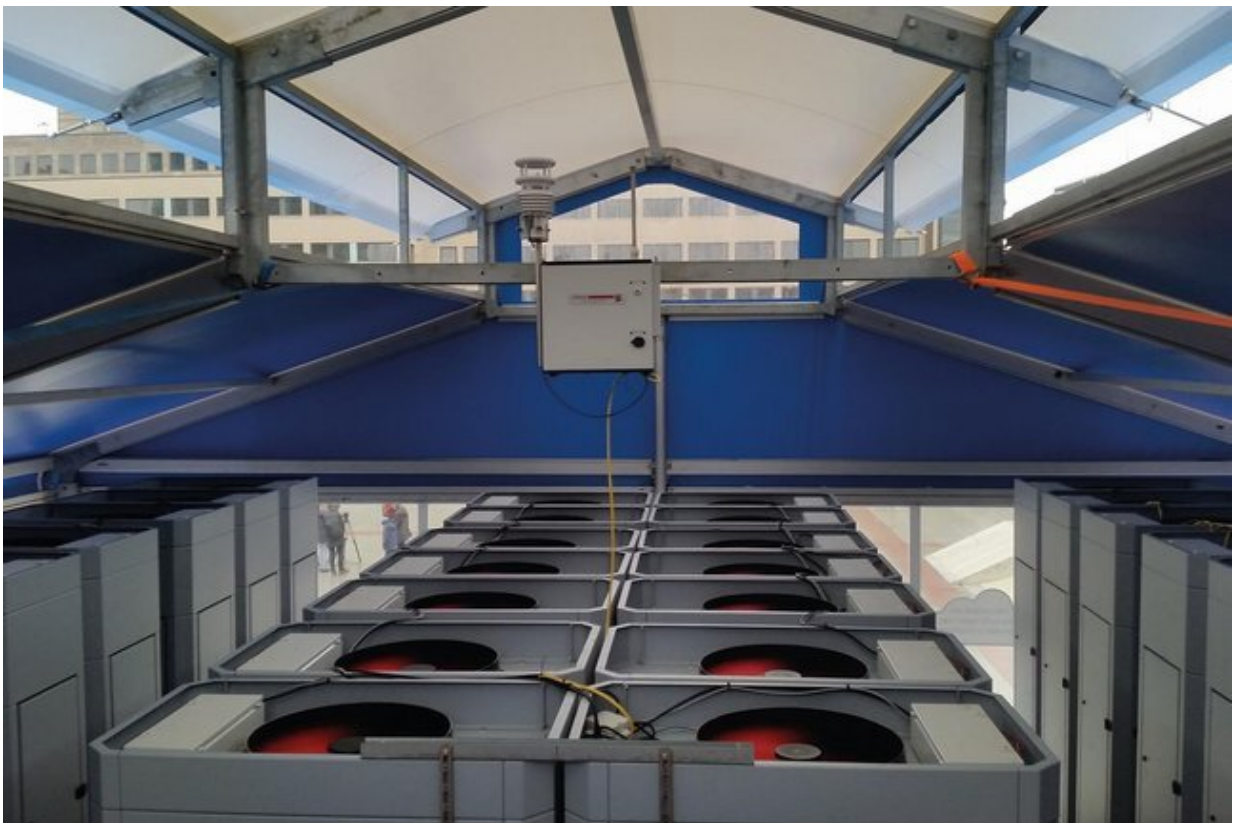
Schematic depiction of the concept of 'Lungs of the City.' Credit: Lungs of the City

The results, which have just been released, demonstrate conclusively the positive effect of the installation on air quality, according to project manager Roel Gijbbers of ENS Clean Air, who said, "The local reduction of particulate matter concentrations turned out to be very high. We saw that the purified air from the parking garage even contains less particulate matter than the air above the ground normally does. This makes the garage a net air-purifying element in the city."

Furthermore, the [measurements](#) showed, among other things, that the local particulate concentrations differ greatly from one measurement location to another as a result of building density, weather conditions,

and local traffic intensity.

High-resolution computer models that can virtually determine the effects of air purification interventions were also developed. In the report that has just been delivered, the parties combine all the insights gained from the concept and offer application recommendations and a cost-effectiveness study.



A look inside the test installation where the air purification systems are installed.
Credit: Lungs of the City

Lower health risk

According to the project partners, the project demonstrates that the "Lungs of the City" approach is a technically and financially feasible strategy that has been shown to reduce particulate matter exposure. "Using established calculation methods, we have shown that the health risk can be significantly lower as a result of the measures," says Gijbbers.

"Lungs of the City" can be integrated into the urban [infrastructure](#) in many ways, according to the parties involved. Gijbbers notes, "Worldwide, many similar projects and impact studies are currently being conducted on active [air purification technology](#) in traffic-intensive areas, such as next to a highway, at the exit of a highway tunnel, in narrow city streets (street canyons), but also in train and subway stations and bus terminals."

Self-cleaning city

The concept could therefore be an effective addition to national and regional [air quality](#) policies, Gijbbers believes. "To prevent harmful [emissions](#), tackling the local sources of emissions is most effective. However, most particulate matter comes from outside the city and reducing local emissions has no impact on that. Smartly integrated active air purification treats both local emissions and background concentrations."

With the approach and new knowledge from the "Lungs of the City" project, the parties believe they are adding an important new tool to the toolkit towards achieving [sustainability](#) and improving the urban environment. Gijbbers observes, "The city of the future can be self-cleaning, and in Eindhoven, the first steps have been taken towards this."

More information: More information on the study may be found at www.tue.nl/en/news/news-overview-st-in-public-spaces/

Provided by Eindhoven University of Technology

Citation: Air quality in Eindhoven, Netherlands significantly improves with 'Lungs of the City' (2021, November 8) retrieved 17 July 2024 from <https://phys.org/news/2021-11-air-quality-eindhoven-netherlands-significantly.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.