

# CITIES OF SOUND

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As the volume of transport noise surges in Europe's cities, the race is on to curb **noise pollution** and protect public health. With partners in ten EU Member States, the **LENS project** is conducting research on an often-overlooked threat : light vehicles.

For European city dwellers, sound is ever-present, yet nowhere to be seen. Unlike other forms of pollution, it fades into the background of daily life, often regarded only by a vocal minority as an issue worthy of public attention. The truth of the matter, however, is far more alarming.

Ironic though it may sound, noise pollution has become a silent killer in Europe. After air pollution, it is Europe's second-largest environmental health risk. According to the European Environment Agency (EEA), 20% or more of the urban population in the EU is exposed to sound levels considered detrimental to their health. In some cities, this number creeps closer to 50%. The World Health Organization (WHO) estimates that no fewer than 1 million 'healthy years' are lost in Western Europe each year as a result of environmental noise.

By inducing chronic annoyance and stress, noise pollution leads to many life-impairing – if not life-threatening – health conditions. These range from extreme sleep disturbance, which impacts an estimated 5 million Europeans, to hearing loss, hypertension, poor mental health, and cognitive impairment and decline, all of which were highlighted by the World Health Organization (WHO) in its 2018 Environmental Noise Guidelines for the European Region.

The primary culprit is road traffic noise (RTN). Outcompeting even railways and airports, RTN has a larger negative impact on the overall population than any source of transport noise.



Recent [estimates from the EEA](#) show that more than 90 million Europeans are exposed to harmful levels of RTN, causing around 11,000 premature deaths and 40,000 new cases of coronary artery disease. And with urban growth driving up demand for mobility, the toll of RTN is only expected to increase.

## Putting an END to noise pollution

The negative impacts of noise pollution have not gone entirely unnoticed. As early as 2002, the European Union passed the [Environmental Noise Directive \(END; 2002/49/EC\)](#), which introduced much-needed limit values for noise: 55 decibels over the day-evening-night period ([Lden](#)) and 50 decibels between 11 PM and 7 AM ([Lnight](#)).

To keep sound levels within healthy boundaries, the END requires Member States to [map and manage noise pollution](#) at acoustic hotspots, including:

- all cities with 100,000 inhabitants or more;
- roads that receive more than 3 million vehicles or more per year;
- railways travelled by 30,000 train trips or more per year;
- and airports with more than 50,000 take-offs or landings per year.

Based on the results of noise maps, Member States must adopt regularly updated action plans in areas where noise levels exceed Lden and Lnight limits. Additionally, they are obliged to identify and preserve so-called 'quiet areas' – ie areas '[undisturbed by noise from traffic, industry or recreational activities](#).' Outside of urban areas, [only 18%](#) of Europe could be classified as quiet in 2016.

Though promising at first glance, the END has proven difficult to implement, as national authorities are not required to monitor the outcomes of their action plans. A tendency toward underperforming was reflected in the European Commission's [2023 implementation report](#) on the END, which stressed the need to ramp up



efforts ahead of 2030, the year by which the EU aims to achieve a [30% reduction](#) in the number of citizens chronically disturbed by transport noise.

Without proper enforcement measures to back up Member States' action plans, the Commission's warning risks falling on deaf ears. According to [Eulalia Peris, an environmental noise expert at the EEA](#), the lack of follow-up from Member States means that city governments are often left to fight noise pollution on their own.

## Sound-proof cities

Some European cities have already risen to the challenge. For example, [Paris](#), which ranks among the [noisiest cities in Europe](#), has introduced so-called '[medusa](#)' devices for noise level monitoring on high-traffic streets. Thanks to multidirectional cameras and a set of eight microphones, these devices can pinpoint the noisiest vehicles and photograph their license plates for follow-up by local police. As of 2023, car drivers and motorcyclists caught exceeding the city's strict noise laws are subject to a [fine of €135](#), a clear sign that Paris has been listening to complaints from residents.

***Quiet spaces: One of Europe's most precious commodities***

*Marie Bellando Mitjans, Unsplash*



The Paris City Hall was also one of the main partners in the [LIFE C-LOW-N ASPHALT](#) project, which developed three innovative, low-noise asphalt mixes to bring down RTN by three decibels at the street level, with the added benefit of reducing road temperatures. By limiting noise from tyre-road interaction, these asphalt mixes have produced significant acoustic advantages, with **63%** of residents reporting a noticeable change in RTN volume.

But Paris is not the only city working to keep its streets quiet. Further south, another POLIS member has made a name for itself with its 'superblocks': [Barcelona](#). First introduced in 2016, these pedestrian-first zones re-route nearly all vehicle traffic to their perimeters, creating islands of low environmental noise within bustling Barcelona. Plans to create a '[super-superblock](#)' covering a large portion of the city centre could allow for the more than 20 road intersections to be converted into 'pedestrian plazas,' bringing down local greenhouse gas emissions and curbing noise levels drastically.

## Checking for blind spots: LENS takes on LVs

Beyond their work at the local level, Paris and Barcelona have joined fellow POLIS member [Leuven](#) as test cities for the [LENS](#) project, an EU-funded initiative that targets one of the most overlooked, yet impactful sources of RTN: light vehicles (LVs).

Though their effect on urban noise levels is often underestimated – and, as a result, insufficiently addressed in EU legislation – LVs such as motorbikes produce noise levels comparable to those of medium-duty trucks and even rail freight. This is especially true when their engines have been illegally tampered with (eg by removing silencers). Just like other sources of RTN, they contribute to sleep disturbance, cardiovascular and metabolic disease, cognitive impairment, poor mental health, and premature mortality across the EU.

*Inside one of Barcelona's superblocks*

*Marek Lumi, Unsplash*

In collaboration with POLIS and a group of 15 partners from ten EU Member States, LENS is committed to developing the techniques needed to test LV performance under real driving conditions and identify tampered vehicles.

The project's work departs from two unsettling observations: first, that LVs produce levels of air and noise pollution beyond the limits set out in the Euro 5 emissions standards, whether because of typical wear and tear or intentional modifications by drivers; and second, that illegally tampered LVs often pass routine police checks undetected.

### **LV testing at Tienestraat (Leuven)**

*Quaid Cey*



The goal of LENS is therefore not only to develop the means to catch noisy LVs once they are already roaming European streets, but also to recommend better test procedures for type approval (TA), which would bring real-world LV performance into the lab.

## **Leuven takes the lead**

As test cities for the LENS project, Leuven, Paris, and Barcelona will pilot the testing equipment needed to monitor noise and air pollution from LVs on the street. The first to take the plunge was Leuven.

Before testing started in the first weeks of May, the City of Leuven brought in the help of the local police force and POLIS member KU Leuven to select adequate sites for monitoring. They considered factors such as LV traffic volume and the presence of non-traffic-related background noise. Based on these criteria, several sites around the city were approved for testing, including one location in the heart of historic Leuven.

At the LENS City Platform and Stakeholder Group Workshop on 15 May 2024, stakeholders from Hungary, Albania, Germany, and the Netherlands visited the testing site in the Leuven city centre after listening to technical presentations from project partners, including LENS project coordinator Leonidas Ntziachristos (Aristotle University Thessaloniki). Amidst the hustle and bustle of cyclists, students, and tourists, workshop attendees had the chance to see for themselves how the LENS project and the Leuven police are working together to test innovative, easy-to-implement noise abatement solutions for LVs.

Following a successful launch, which included the measurement of emissions from more than 160 LVs, LENS' next stop is Paris. With the support of IFPEN, testing will begin this September at two different locations: one rural and one urban. Shortly after, tests will follow in Barcelona before the LENS project presents its findings in mid-2025.

## Conclusion

Growing awareness of noise pollution's impact on public health is driving a surge in research on RTN and the development of new techniques to combat transport noise. Essential to these efforts is leadership from projects like LENS, which leverages the technical expertise of research institutes to help cities address one of the unspoken culprits of environmental noise: LVs. Through its niche focus and its emphasis on practical, scalable solutions, the LENS project is helping to enhance understanding of LVs' real-world performance and, as a result, reshape the way these vehicles are regulated and monitored at the regional, national, and local levels. The project's work serves as a reminder that while the symphony of urban sound may be far from over, cities have the power to decide what plays next.

***Road traffic, the leading source of urban noise pollution***

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