European Environment Agency

Environmental noise in Europe 2025 — summary for policymakers

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Summary for policymakers

Millions of people across Europe are exposed to harmful noise levels from transport sources, making noise one of the leading environmental health risks in Europe. Noise pollution has serious health consequences, particularly contributing to cardiovascular and metabolic diseases, among a wide range of other conditions. Furthermore, noise pollution also harms terrestrial and marine ecosystems.

The *Environmental noise in Europe — 2025* report presents the latest data and analysis on noise pollution and its effects on human health and the environment across Europe. Now in its third edition, the report draws on information submitted by European Union (EU) Member States and other EEA countries under the 2022 reporting round of the Environmental Noise Directive (END). It focuses specifically on transport-related noise from road, railway and aircraft traffic. The report was prepared in partnership with the EEA's European Topic Centre on Human Health and the Environment.

Key areas covered in the report include:

- the number of people exposed to noise levels that are harmful to health;
- the health impacts and burden of disease associated with environmental noise;
- progress towards the zero-pollution target on noise for 2030;
- impacts of noise on biodiversity and protected natural areas;
- accessibility to green and quiet areas in European cities;
- challenges and potential solutions to reduce noise impacts.

Key messages

- According to the latest Environmental Noise Directive (END) reporting, over 20% of Europeans — more than one in five — are exposed to harmful transport noise levels. When measured against stricter World Health Organization (WHO) recommendations, this figure rises to over 30%, or nearly one in three citizens.

- Road traffic is the most widespread source of transport noise, exposing an estimated 92 million people to levels above the END threshold of 55 dB for the day-evening-night period, compared to 18 million affected by rail traffic and 2.6 million by aircraft noise.

- When compared to other environmental health threats, transport noise ranks among the top three — just behind air pollution and temperature-related factors. Chronic exposure to noise from transport contributes to 66,000 premature deaths annually in Europe, while also leading to around 50,000 new cardiovascular disease cases and 22,000 cases of type 2 diabetes.

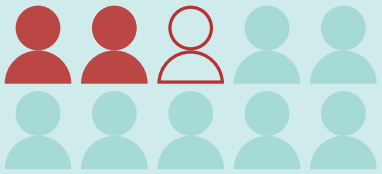
- Almost 16.9 million Europeans experience long-term annoyance due to noise from transport and approximately 4.6 million suffer from severe sleep disturbances. According to new research, noise could also contribute to thousands of cases of depression and dementia.

- It is estimated that over half a million children in Europe experience reading difficulties and about 63,000 experience behavioral issues due to transport noise. High noise levels are also linked to approximately 272,000 cases of overweight children.

- Noise pollution from transport sources results in the loss of 1.3 million healthy life years annually in Europe, equivalent to an annual economic cost of at least EUR 95.6 billion, representing around 0.6% of the region's gross domestic product (GDP) each year.

- Based on current projections, it is unlikely that the EU will meet the target set out in 2021 EU action plan 'Towards zero pollution for air, water and soil' to reduce the number of people chronically disturbed by transport noise by 30% by 2030 (compared to 2017 levels) without additional measures, including regulatory or legislative changes. The number of people highly annoyed by transport noise in the EU declined only by an estimated 3% between 2017 and 2022, falling short of the pace needed to meet the zero-pollution noise reduction objective.

Extent of the problem



at least **20% population**
affected by unhealthy levels of noise
due to road, rail and air traffic

30% according to WHO recommendations

Health impacts

almost
17 million
Europeans
experience
long-term high
annoyance

approximately
4.6 million
suffer from severe
sleep disturbances
due to transport
noise

New cases in 2021

66,000
premature
deaths

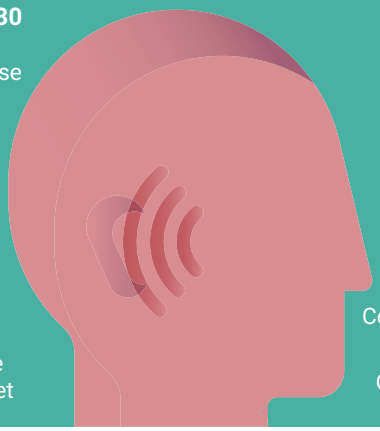
50,000
cardiovascular
disease cases

22,000
type 2 diabetes
cases

Progress and outlook

Zero Pollution target 2030
-30% people chronically
disturbed by transport noise

-3% decline in 2022
falling short of the pace
needed to meet the target

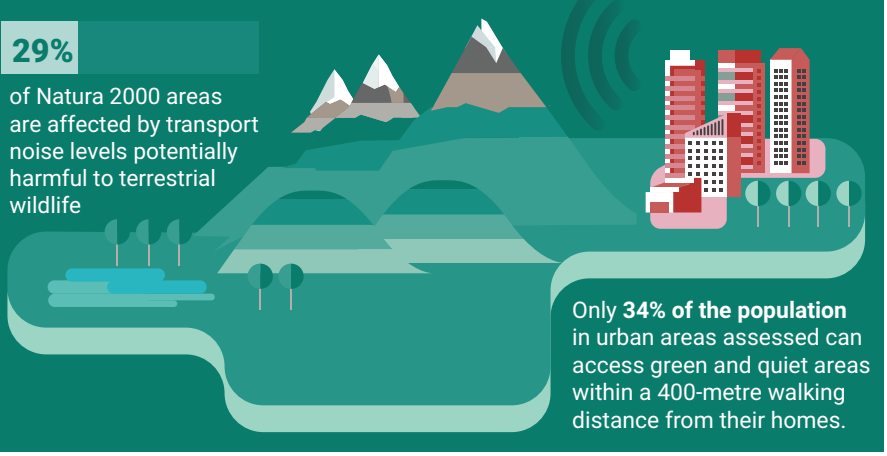


Outlook 2030
reduction in people
highly annoyed

0%
Conservative scenario
-21%
Optimistic scenario

Impacts on natural areas and access to quiet-green spaces

29%
of Natura 2000 areas
are affected by transport
noise levels potentially
harmful to terrestrial
wildlife



Only **34% of the population**
in urban areas assessed can
access green and quiet areas
within a 400-metre walking
distance from their homes.

Main findings

The latest data provided by countries under the END reveal the extent of noise pollution in Europe. The findings of the *Environmental noise in Europe — 2025* report highlight the urgent need for additional efforts to reduce environmental noise and its effects on human health, the environment and the economy.

Noise exposure — a widespread problem affecting over 100 million people in Europe

A significant proportion of Europe's population is exposed to transport noise levels that are harmful to health. The latest estimates show that approximately 112 million people — more than 20% of the population in Europe — are exposed to long-term noise levels from road, rail and aircraft sources that exceed the thresholds set by the END.

However, the latest scientific evidence indicates that health impacts already occur at noise levels below the thresholds at which countries are obliged to report under the END. For instance, the WHO environmental noise guidelines for the European region recommend substantially stricter noise levels, meaning that in reality many more individuals are exposed to transport-related noise that pose a risk to health. When considering these lower recommended levels, it is estimated that approximately 150 million people — more than 30% of the population — are exposed to long-term unhealthy noise levels from transport sources.

The problem of noise pollution is widespread. Unhealthy levels of noise pollution are experienced across all European countries. Road traffic is identified as the dominant source of environmental noise, especially in densely populated urban areas, where the highest numbers of people are affected. Based on END thresholds, road transport accounts for around 92 million people exposed to harmful day-evening-night noise levels and 58 million exposed during nighttime. In comparison, railway noise affects 18 million people during the day-evening-night period and 13 million at night, while aircraft noise impacts around 2.6 million (day-evening-night) and fewer than 1 million during the night. While rail and aircraft noise affect fewer people overall, they remain significant sources of local noise pollution, particularly near major rail transport corridors and airports.

Noise pollution is not only an annoyance, it can cause extensive health impacts

Whereas noise has typically been associated with impacts such as annoyance and sleep disturbance, its effects are much broader. Exposure to noise affects health through interconnected pathways, primarily stress and sleep disturbance. These factors can lead to inflammation and oxidative stress, which in turn contribute to a wide range of negative health outcomes, including cardiovascular and metabolic diseases, mental health disorders and even premature deaths.

In 2021, at least 66,000 premature deaths were linked to long-term exposure to transport noise, as well as 50,000 new cases of cardiovascular diseases and 22,000 new cases of type 2 diabetes. This corresponds to 0.7% of all new cardiovascular disease cases, 1.3% of all type 2 diabetes cases and 1.1% of all premature deaths in that year being attributable to noise from transport sources. Additionally, according to new research, noise from transport could contribute to thousands of cases of depression and dementia.

Noise pollution from transport sources in Europe leads to the loss of approximately 1.3 million healthy life years annually, as measured using disability-adjusted life years (DALYs). DALYs combine the years of life lost due to premature death with years lived in poor health, thus presenting a comprehensive measure of the full burden of disease from noise pollution. This also allows meaningful comparisons between different environmental risks. When compared to other environmental health threats, transport noise ranks among the top three — just behind air pollution and temperature-related (climatic) factors. Furthermore, it has a greater health impact than better-known risks such as second-hand smoke or lead exposure.

Noise pollution also poses risks to children's health

Chronic exposure to transport noise can also negatively affect children, especially as they are in an important learning and developmental phase. The effects of noise on children include delayed learning and cognitive impairment but also impacts such as an increased risk of being overweight. There are approximately 15 million children living in areas affected by harmful noise levels in Europe.

Based on new research, it is estimated that transport noise contributes to over 560,000 cases of reading difficulties, 63,000 behavioural issues and an estimated 272,000 cases of overweight children in Europe.

Transport noise is a threat to Natura 2000 natural areas

Noise pollution can impact both terrestrial and marine wildlife, influencing their behaviour, physiology, communication and sensory perception, while also altering predator-prey dynamics. Noise can also disrupt ecosystem functions, including pollination by insects, affecting overall ecosystem productivity and health.

At least 29% of Europe's natural areas protected under Natura 2000 are affected by transport noise levels that could pose risks to terrestrial wildlife.

Underwater noise pollution from shipping, offshore construction and marine exploration disrupts marine life, causing stress and behavioural changes, particularly in species in Europe’s waters that rely on sound for survival such as whales and dolphins. Areas with the highest underwater noise exposure in Europe include parts of the English Channel, the Strait of Gibraltar, parts of the Adriatic Sea, the Dardanelles Strait and some regions in the Baltic Sea.

While EU legislation addresses noise pollution in the marine environment, it does not currently cover noise impacts on terrestrial ecosystems and species.

Accessibility to quiet and green spaces in European cities could be improved

Access to quiet and green spaces provides health benefits including stress and annoyance reduction, particularly for individuals living in noisy environments. The END and the 2018 WHO environmental noise guidelines emphasise the need to preserve and increase quiet spaces. These areas have a role in promoting well-being and can also support climate adaptation and nature restoration.

A geo-spatial analysis of 233 cities reveals that only 34% of the population can access green and quiet areas within a 400-metre walking distance from their homes, which is a common metric for acceptable accessibility. While northern European urban areas typically provide better access to such spaces, there remains a significant disparity in availability across other regions.

Limited progress made towards noise pollution target

Progress in decreasing the number of people exposed to harmful levels of noise has been slow. The 2021 EU action plan 'Towards zero pollution for air, water and soil' set out an indicative target to reduce by 30% the number of people chronically disturbed by transport noise by 2030 (compared to 2017 levels). It is estimated that between 2017 and 2022, the number of people annoyed by transport noise in the EU declined by only 3%. This reduction falls short of the pace needed to meet the zero pollution noise reduction objective.

Based on current projections to 2030, it is unlikely that the EU will meet the zero pollution target without additional measures. A business-as-usual scenario (that assumes the current rate of implementation of measures) modelled in the report predicts that if no additional measures are taken, the situation by 2030 will remain unchanged. Under an optimistic scenario, where substantial additional measures are implemented, the number of people chronically disturbed by transport noise could decline by about 21%. However, this number is still short of the EU zero pollution ambition. Therefore, more substantial action at EU and national levels would likely be necessary to meet the target.

Increasing calls for action

Different stakeholders have raised significant concerns regarding ongoing noise pollution in Europe. The European Court of Auditors (ECA) has highlighted that, despite longstanding regulations, actions taken by the European Commission (EC) and selected Member States have been insufficiently effective at protecting citizens from noise pollution. The ECA considers that the absence of EU noise reduction targets disincentivises Member States from prioritising actions to reduce noise pollution effectively. Furthermore, the ECA points out that the current noise reporting thresholds cover only a portion of the population exposed to harmful levels. In its report, the ECA recommends that the European Commission assesses the feasibility of introducing EU noise-reduction targets in the END and of aligning the noise exposure reporting thresholds as closely as possible with those recommended by the WHO ([1]).

In 2023, the WHO's *Declaration from the seventh Ministerial Conference on Environment and Health: Budapest Declaration*, focusing on the European region, reinforced the urgent need for action against various pollutants, including noise. The declaration emphasises the importance of collaboratively developing and implementing policies to reduce environmental noise while exploring the health benefits of interventions aimed at improving both air quality and noise pollution.

([1]) The noise thresholds of the END are set at 55 dB for the day-evening-night period (L_{den}) and 50 dB for the night period (L_{night}), while the WHO thresholds are source specific and are set at levels below the END.

In its most recent implementation report from 2023, the European Commission has committed to strengthening ongoing short-term actions on source legislation and improving the implementation of the END. The report also states that the European Commission will assess possible improvements to the directive, including the feasibility and benefit of establishing noise reduction targets at the EU level.

The scientific community has found adverse health effects at traffic noise levels even below the WHO recommendations, starting from as low as 45 decibel (dB) day-evening-night noise level for various cardiovascular diagnoses and diabetes. Given the significant role of noise as a risk factor for cardiovascular disease and other adverse health effects, the scientific community has highlighted the necessity of raising awareness about noise among health professionals as a critical environmental risk, alongside air pollution and chemical exposure. It has been suggested that incorporating noise pollution into medical education and prevention guidelines is essential for developing more comprehensive and effective disease prevention strategies.

Solutions to reduce noise exist

While noise pollution poses significant challenges, there are effective solutions already available to mitigate its impact. Key solutions outlined in the report include:

Upstream measures that reduce noise at source, including regulatory and legislative actions

In general, these measures are found to benefit a larger segment of the population because they address all noise levels compared to localised interventions, which are only effective at hotspots. Measures at source that are backed up by regulation/legislation help to ensure consistent and effective application. Examples of such solutions could include:

- regulating noise emissions from road vehicles, such as reducing vehicle speed limits in urban areas, increasing the use of low noise tyres, and reducing noise from high emitters;
- regular rail grinding and maintenance to smooth tracks;
- optimising aircraft landing/take-off patterns to avoid populated areas and promoting the use of quieter aircraft.

Source measures are especially important to tackle road traffic noise, which is a prevalent source, but also for railway activity, which is expected to grow in the coming years.

Long-term strategies incorporating urban and transport planning

Long-term strategies incorporating urban and transport planning can provide a clear, iterative and achievable pathway for the delivery of tangible reductions in noise exposure, allowing for the prioritisation of preventive rather than reactive measures. This includes measures such as buffer zones between transport corridors and residential areas and sensitive locations (e.g. schools and hospitals); designing building orientation to minimise exposure; noise-sensitive indoor layouts; promoting sustainable mobility options (e.g. public transport, walking and cycling); and the creation of green and quiet spaces — all of which can also support better air quality, climate resilience and ecosystem restoration.

Other actions on climate, environment and health can contribute to noise reduction

On the one hand, reducing noise pollution can contribute to the objectives in other policy areas. On the other hand, noise reduction can also be achieved as an important co-benefit of actions taken in other policy domains. These include air quality and climate policies, nature restoration and preventive health initiatives related to cardiovascular and respiratory diseases and mental health.

For instance, efforts to decarbonise cities and reduce pollution — through active mobility and investments in walking, cycling and public transport — can also deliver significant reductions in urban noise, especially in densely populated areas. The EU's biodiversity strategy and the Nature Restoration Regulation also present opportunities to reduce noise exposure. Creating and restoring green and blue spaces — such as urban forests, wetlands, parks and green corridors — not only improves ecological resilience but also increases the potential availability of quiet areas for recreation and restoration.

Additionally, various EU initiatives focused on preventive health, particularly concerning mental health and cardiovascular diseases, can be leveraged. Given that noise pollution is a significant risk factor for these conditions, integrating noise reduction into health strategies can yield beneficial outcomes for public well-being and resilience.

Reducing noise pollution can bring important benefits to the European economy and society

Noise pollution should also be considered in economic terms, as it causes a large burden of disease in Europe. In terms of economic (social) costs, years of health and life lost prematurely due to illness or death significantly reduce the human resource potential of an economy and they are a source of lost productivity. The report shows that noise pollution from transport sources results in annual economic costs of at least EUR 95.6 billion in Europe. This represents 0.6% of the total gross domestic product (GDP) each year. The latest European Commission implementation report outlines that implementing the noise measures proposed in some local and national action plans would be highly cost-efficient. A study commissioned by the European Commission found that for every euro spent on specific noise measures, there is a return of EUR 10 in social benefits. This indicates that when authorities in Member States adopt these specific noise measures, they not only address health concerns but also create long-term benefits for society. Noise mitigation can therefore provide economic opportunities and help establish EU manufacturers and industries as leaders in green innovation.

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