

Managing exposure to noise in Europe

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Noise pollution poses a high risk to human health. This briefing presents updated estimates of the numbers of people exposed to environmental noise pollution in Europe. It also provides a new summary of the measures being used in Member States to manage noise. Road traffic remains by far the most important source of environmental noise: at least 100 million people are exposed to levels of traffic noise that exceed the European Union's (EU) indicator of noise annoyance.

Main messages:

- Noise pollution remains a major environmental health problem in Europe.
- Road traffic is the dominant source of environmental noise, with an estimated 100 million people affected by harmful levels. Railways, airports and industry are also important sources of noise.
- A wide range of measures is included in the noise management action plans established by Member States. Not surprisingly, measures targeting road traffic management are most commonly listed in cities. Such measures include replacing road surfaces, improving traffic flow and introducing lower speed limits.
- The EU's Seventh Environment Action Programme (7th EAP) sets the objective that, by 2020, noise pollution in the EU will have significantly decreased, moving closer to the levels recommended by the World Health Organization (WHO).

In 2014, the European Environment Agency (EEA) published its first pan-European assessment on the state of noise pollution in the environment — the Noise in Europe 2014 report. This assessment was based upon data reported to the EEA by its member countries in accordance with the Environmental Noise Directive (END) (2002/49/EC). Since then, additional data for the year 2012 have been reported to the EEA by a number of countries, which now allows a more informed assessment to be made.



European policy on environmental noise

The END is the main legislative instrument for monitoring noise pollution in the EU. It requires Member States to prepare noise maps to determine exposure to environmental noise from major transport and industry sources. These noise maps serve as the basis for adopting action plans designed to prevent and reduce harmful exposure.

The END defines certain noise indicators to be applied in noise mapping and action planning. These indicators represent a physical scale to describe environmental noise, which is linked to its harmful effects. The two most important indicators are:

- 55 dB L_{den} : the day, evening, and night-level indicator designed to assess annoyance.
- 50 dB L_{night} : the night-level indicator designed to assess sleep disturbance.

The EU's 7th EAP, 'Living well, within the limits of our planet', highlights that the majority of Europeans living in major urban areas are exposed to high levels of noise likely to have frequent adverse effects on health.

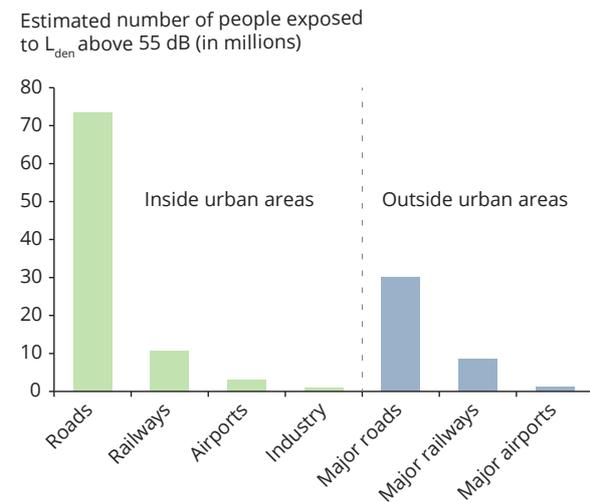
The 7th EAP also sets the objective that, by 2020, noise pollution in the EU will have significantly decreased, moving closer to WHO recommended levels. To achieve this objective will mean implementing an updated EU noise policy, aligned with the latest scientific knowledge, and measures to reduce noise at source, including improvements in city design.

The state of noise in Europe

Road traffic noise, both inside and outside urban areas, is still the dominant source affecting human exposure

above the 55 dB L_{den} action levels defined by the END (Figure 1). Around 100 million people are exposed to road traffic noise above 55 dB L_{den} in the EEA-33 member countries. Of these, 32 million are exposed to very high noise levels above 65 dB L_{den} .

Figure 1 Number of people in the EEA-33 member countries exposed to noise levels above 55 dB L_{den} , 2012



Note: Where data has not been reported by Member States, gap-filling has been performed.

Railways are the noise source with the second highest number of people exposed: 19 million people exposed above 55 dB L_{den} in the EEA-33. Aircraft noise, with more than 4.1 million people exposed above 55 dB L_{den} , is the third main noise source, followed by industrial noise within urban areas, with approx. 1.0 million people exposed.



The importance of 'quiet' areas

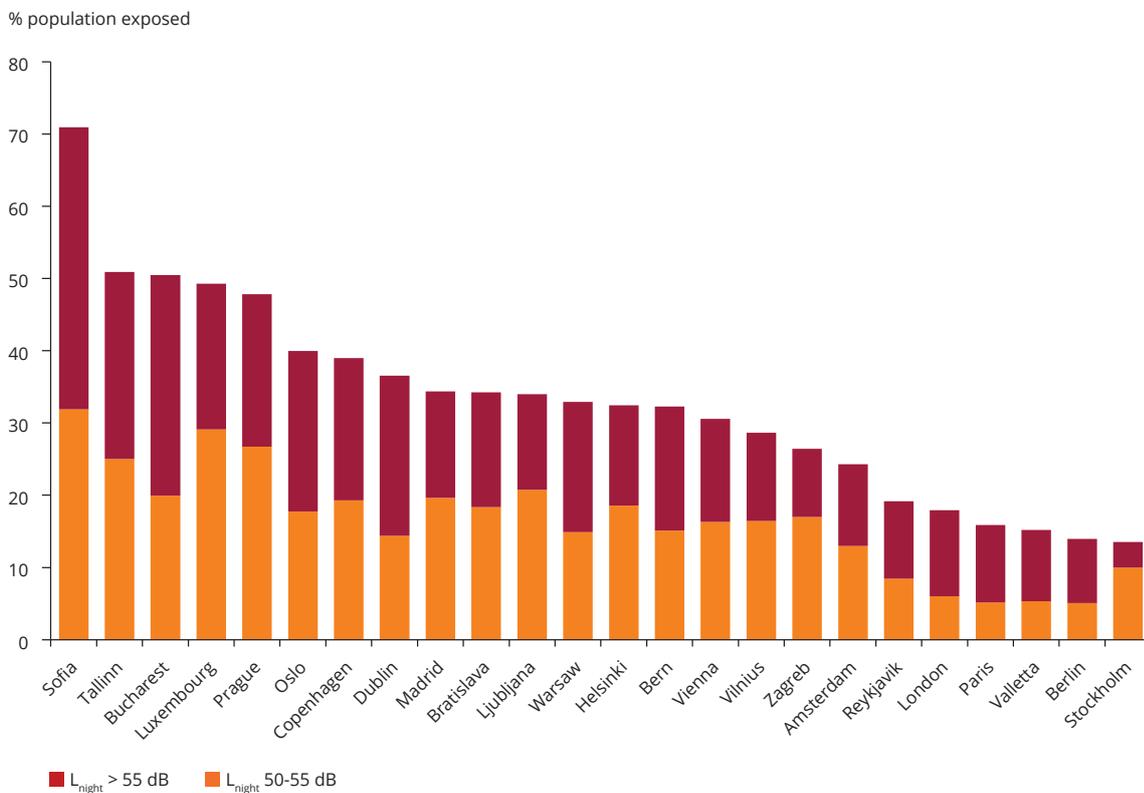
Further measures are also required, not only to reduce noise pollution, but also to protect so-called quiet areas in cities and in open country. This was one of the main conclusions of the EEA's 2016 report *Quiet areas in Europe*, which explored the extent to which Europe's rural environment is undisturbed by noise pollution. The report concluded that, although some measures have been taken to protect quiet areas in open country, there remains much that could be done to reduce noise pollution and help to protect human health and biodiversity. The report noted that, outside cities, approximately 18 % of Europe can be considered quiet, but 33 % remains adversely affected by noise pollution. The distribution of quiet areas is strongly related to population density and the location of transport infrastructure.

The harmful effects of noise arise mainly from the stress reactions it causes in the human body, which can also manifest themselves during sleep. These can potentially lead to premature death, cardiovascular disease, cognitive impairment, sleep disturbance, hypertension and, at the least, annoyance.

The WHO has categorised noise from road traffic alone as the second most harmful environmental stressor in Europe, behind only air pollution. The WHO Night Noise Guidelines for Europe recommend that exposure should not exceed 40 dB $L_{\text{night-outside}}$. Achieving this low

level of noise can present a challenge, particularly in urban areas where background noise levels tend to remain relatively high even at night. For this reason, the WHO also recommends a short-term interim target for night-time noise of 55 dB $L_{\text{night-outside}}$. The END does not require night-time noise mapping to be conducted to as low a level as 40 dB, so assessments can currently only be made against the higher interim target. The exposure assessment of road traffic noise against the WHO's interim target is illustrated for selected European capital cities in Figure 2.

Figure 2 Selected capital cities in Europe: percentage of population exposed to road traffic noise above 50 dB L_{night} , 2012



Note: The 55 dB limit shown is the WHO interim target.

Reducing and managing noise in Europe

The END requires Member States to prepare and publish noise management action plans. However, the specific types of measures included in these action plans are decided at Member State level.

A new assessment presents an overview of the types of measures included in the noise action plans (Figure 3).

For city agglomerations, measures targeting road traffic management are most commonly listed. Examples of such measures include replacing road surfaces, improving traffic flow and introducing lower speed limits. These are followed by measures related to land use and urban planning.

There are also action plans that aim to promote the use of more environmentally friendly modes of transport, avoid increases in traffic flow and raise awareness of noise as an environmental problem.

The main policy objective of the EU's 7th EAP is to significantly reduce noise pollution by 2020 and move closer to WHO recommended noise levels. The

indications are that this objective will be difficult to achieve without further measures and more focus on implementation at both Member State and EU level, including with respect to the completeness, comparability and timeliness of data reporting.

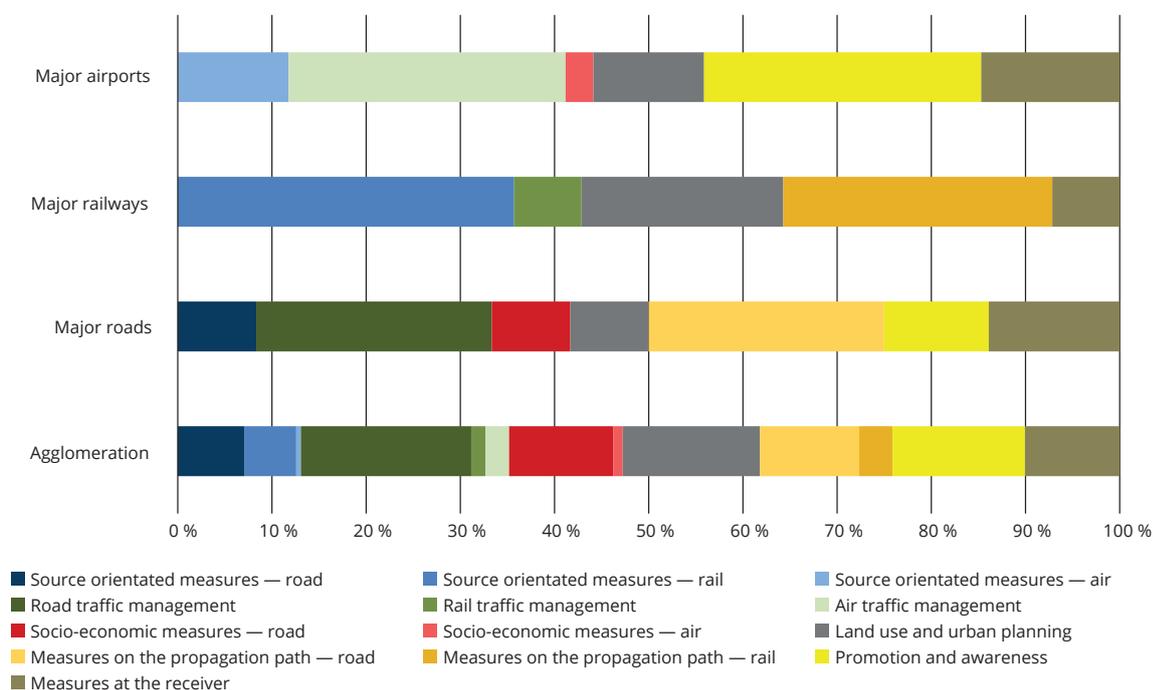
Given the factors that determine environmental noise levels, one single measure alone is often not enough to deal effectively with the problem of high noise levels. Instead, it will be important for Member States to develop action plans looking at synergies and benefits that could be obtained by integrating noise management with other areas of work, such as air quality, transport, mobility, urban planning and the way in which cities are designed.

Further information

EEA noise country fact sheets: www.eea.europa.eu/themes/human/noise/sub-sections/noise-fact-sheets

Explore the Noise Observation and Information Service for Europe map viewers: www.noise.eionet.europa.eu

Figure 3 Analysis of END noise action plan measures



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