



# Towards Quieter Cities



**Noise is part of the buzz of city life – but too much noise in the wrong place at the wrong time has been proved to endanger citizens' health. Increasingly dense populations and busy traffic have the potential to harm our health and disrupt our daily lives.**

Traffic noise disturbs the lives of millions of people in Europe. It is estimated that 44% of Europeans (over 210 million people)<sup>1</sup> are regularly exposed to noise levels considered potentially dangerous to health.

Each year 245,000 people in the EU25<sup>2</sup> suffer cardiovascular diseases provoked by traffic noise. Furthermore, traffic noise could be the cause of at least 50,000 premature deaths in Europe, according to recent analyses.<sup>3</sup> The European Environment Agency's recent Fourth Assessment of Europe's Environment also identifies the health impacts of environmental noise as underestimated and requiring further attention<sup>4</sup>.

While noise impacts are not always immediately obvious, sleep disruption can ultimately affect productivity at work, ability to relax and enjoy leisure time. Moreover, tiredness is dangerous, especially on the roads. Day-time noise also causes annoyance and interferes with communication. Noise has also been directly linked to slowing children's learning progress<sup>5</sup>.

Much of this noise comes from traffic. As traffic is set to increase, managing noise from transport sources is crucial if further impacts are to be avoided.

**This factsheet sets out some top tips for quieter cities, with examples where available, of practical action to reduce urban traffic noise**

## Managing Noise Now

The EU Environmental Noise Directive 2002/49/EC (END)<sup>6</sup> sets out a programme which aims to avoid, prevent or reduce the harmful effects, including annoyance, of exposure to environmental noise (that is, outdoor noise from transport and industry). Noise considerations are

often neglected in planning and transport decisions. In cities, traffic is the main source of this noise. To comply with the Directive, Member States must first assess the extent of noise exposure – by mapping noise levels in cities (for noise measuring details see Box 1) and around major roads, railways and airports. To make this manageable, the biggest, busiest cities and routes are being mapped and assessed first. This means that no later than 30 June 2007 maps must have been made for all cities with more than 250,000 inhabitants and for all major roads, railways and airports<sup>7</sup>.

National Governments must prioritise the prevention of noise that is harmful to health, and prevent noise from intruding into areas that are currently quiet.

### How is noise measured?

The loudness of sound is measured in Decibels: dB(A). (A) denotes that the scale is adapted for the human hearing range. 20dB(A) is for example equivalent to a gentle breeze or a soft whisper. Sounds louder than 120dB(A), equivalent to a military aircraft taking off, can be frightening and possibly cause pain. Levels of environmental noise are often reported as averages over a sustained period (Leq).

Other important characteristics of sound include its frequency (pitch), periodicity (continuous or intermittent) and duration. At the same volume, an intermittent sound such as one passing aircraft, is often more disturbing than a constant background noise, such as a busy road.

Noise is more disturbing at certain times of day. To allow for this the Lden (Loudness day-evening-night) measurement attributes a higher value to noise in the evening (+5dB) and night (+10dB). This means that one plane at night is seen to be as problematic as ten planes during the day.



## Noise Action Plans

Once maps are made, Noise Action Plans (NAPs) will set out how the impacts of noise are to be managed in these areas. In each Member State, central government must designate 'competent authorities' with responsibility for mapping noise, and drawing up NAPs. This may be a central government office, or state or city administration. NAPs are to be submitted to the Commission in July 2008.

## Get Involved

The END requires that the public is consulted about Noise Action Plans – so you can have your say in the management of noise in your own city. If you have not heard anything yet, at the end of this booklet, you will find a link to the details of the responsible authorities in each Member State; they will be able to tell you who is the competent authority for managing traffic noise in your city.

## What can be done?

Some noise management measures are already working in practice, while others may take time to implement. Therefore, it is important that the drafting and implementation of NAPs gets underway now. To ensure this happens, we can all work to raise awareness of city noise and the measures available to manage it – with both the public and politicians.

You can help to reduce noise by supporting the development of your city's Noise Action Plan. You could take inspiration from some tried and tested measures from around Europe. Here are our recommendations for noise reduction measures:

# Quiet please... Top 10 Tips

### 1. Speed Reduction

Reducing speed of travel reduces noise from engines, acceleration and tyres on roads. Lower speeds in residential areas result in quieter urban streets – particularly where cars and trucks are the main source of noise. If scooters/motorcycles are common, the potential for noise reduction from these sources will not be so great.

#### Example: Graz, Austria

A LIFE-funded project GOAL ('Gesund ohne Auto und Lärm' or 'Healthy without car and noise'), showed that reducing vehicle speed in a residential area to 30 km/h from 50 km/h resulted in an actual reduction of 2.5 decibels and a perceived reduction among residents of 50%. The popularity of the measure led to its implementation across the whole city.<sup>8</sup>

Reducing car speed – even if it just means better enforcement of legal speed limits – can also make a contribution to reducing both CO<sub>2</sub> and air pollution levels.

met with strong objections from businesses and the public – proving that removing traffic can be good for business and the overall quality of life in a city district.

#### Example: Norderstedt, Hamburg, Germany

Norderstedt, in the Hamburg area, drew up one of the first NAPs in Europe, prepared with contributions from the public. The NAP has succeeded in reducing noise through several traffic management measures and encouraging a switch from cars to cycling and public transport. Public transport services have been improved, including giving buses priority over other traffic. The area has also been made more accessible for cyclists and pedestrians. The aim is that by 2013, the proportion of car traffic should fall from 58% to 51%, cycling should increase its share of city traffic to 22%, and walking to 16%. A positive by-product of Norderstedt's Noise Action Plan measures is an expected reduction of 25.000 t of CO<sub>2</sub> emissions.

### 2. Traffic Management

The most effective way to reduce traffic noise in cities is to remove the source – the traffic itself. Cities have used many measures to attempt to do this – for example park-and-ride schemes, pedestrian areas and the introduction of parking policies and charges. These measures have had varying degrees of success and may move impacts to other areas, so have to be carefully planned.

#### Example: Brighton, New Road, United Kingdom

In 2007 a city centre road lined with theatres, restaurants, bars, next to the Royal Pavilion was paved and seating was added where parking spaces once were. The street is now a vibrant thoroughfare, and moves by the Council to re-open it to traffic (very restricted traffic is now allowed)

### 3. Quieter road surfaces

In many European cities, roads were not designed with motor traffic in mind. Older stone pavements, while adding character to streets, amplify noise. Areas with this style of paving are often narrow streets not suited to modern traffic. Brushed concrete surfaces are also very noisy. Quieter surfaces are available, both for block pavements and continuous surfaces, and programmes of resurfacing reduce noise impacts if sound absorbing surfaces are used. Low noise surfaces can reduce noise by 6dB<sup>9</sup> or more compared to standard asphalt, with the greatest benefit

## RELATIVE LOUDNESS OF SOUNDS dB(A)



10 Breathing • 20 Broadcasting  
80 Vacuum cleaner • 85 Heavy

on higher speed roads. Benefits can be up to 10dB<sup>10</sup> where quiet surfaces replace the noisiest block pavements. Also, poorly maintained roads (or roads that have undergone much digging up by utilities, resulting in patchy surfaces) are noisy. Measures to maintain and manage the quality of the road surface all contribute to noise reduction.

#### Example: Barcelona, Spain

As part of a programme to reduce noise in the city, between 2001 and 2004, 60% of the basic road network was resurfaced – with the aim of covering 100% by 2007.

### 4. Quieter Buses

After heavy goods vehicles, buses are responsible for the highest noise emissions in traffic. Increasing bus use should reduce individual car journeys, so encouraging the use of buses and the implementation of quieter buses can reduce noise even further.

#### Example: Barcelona, Spain

70 buses running on compressed natural gas (CNG) were introduced (between 2001 and 2002) on high-noise routes in Barcelona. They were found to work best on flat routes, avoiding acceleration uphill. These proved popular with the public, and the fleet was expanded to 160 buses by 2005 making for almost 25% of the passenger-carrying fleet.

### 5. Reduction in night-time traffic

The most disturbing noises are peak noises at night which are those that wake up people. These often come from heavy goods vehicles in towns. While freight operators argue that night-time deliveries reduce day-time congestion and pollution, there is scant evidence for this. However, we do know that heavy vehicles at night are noisy. Some cities therefore opt for a ban of heavy goods vehicles at night.

**Example: The Netherlands** Much work has been carried out in the Netherlands on the noise impact of goods deliveries. Researchers have developed guidelines called the PIEK scheme<sup>11</sup>. It limits the maximum noise levels for night-time deliveries, aimed mainly at loading and unloading in built-up areas in the evening and night. Levels must not exceed:

- 60 LA<sub>max</sub><sup>12</sup> between 23:00 and 07:00 and
- 65 LA<sub>max</sub> between 19:00 and 23:00.

The restrictions have led to innovative developments in quiet vehicle technology, including the Fluistertruck (whisper truck), designed to meet the off-peak requirements.

### 6. Freight Distribution Centres

Constant deliveries of freight, particularly in bustling city centres can cause pollution and noise, and can threaten

safety. Also, deliveries at night can disturb residents (see Point 5). Some European cities are already recognising that managing freight distribution reduces noise and other impacts.

#### Example: Genoa, Italy

With a historic, largely pedestrianised, city centre, mitigation of the impact of freight transport deliveries was required in Genoa. Deliveries were centralised, with a hub served by 8 low noise electric vehicles, reducing noise and air quality impacts in the city centre. In England, London has a freight consolidation centre and Bristol also manages deliveries.

### 7. Smooth traffic flow

Planning for traffic to flow smoothly and quietly rather than for optimum traffic speed can reduce stop-start noise. For example, synchronisation of traffic lights on uphill roads avoids the sound of gear changes and acceleration. Also, roundabouts, compared to other intersection layouts can reduce noise up to 4dB LA<sub>eq</sub>.<sup>13</sup>

#### Example: Barcelona, Spain

Coordinating traffic lights on hills have been introduced, to avoid stop-start driving, with priority on gradients where this is a particular problem

### 8. Quiet Traffic-Calming

Traffic-calming is designed to reduce speeds on roads, which in theory should reduce vehicle noise. However, impact of vehicles on some traffic-calming installations, and driving style means features such as road humps can increase noise from heavy trucks by up to 8dB LA<sub>eq</sub><sup>14</sup>. Chicanes ('obstacles' placed to narrow roads and make them winding rather than straight) can also cause noise annoyance, as drivers accelerate and brake to drive through them as quickly as possible. Mini roundabouts have been found to be more successful, with reductions of up to 4dB LA<sub>eq</sub>, as they reduce speed and acceleration. Similarly, interactive rather than static speed restriction signs have been more successful in reducing speed and therefore noise. The effectiveness of these measures on noise reduction has been studied as part of the EU-funded SILENCE project.<sup>15</sup>

### 9. Quieter Tyres

Rolling noise – from the contact between tyres and road surfaces – is a major source of noise. An increasing body of European research shows that reducing tyre noise is more cost-effective than other measures such as noise barriers or noise insulation of buildings. Experts agree that an urgent reduction (of the order of 5dB under test condi-



tions – technically reducing the noise by more than half) is required. Manufacturers easily meet the current limits. In fact the average noise emission today is already 3.5dB quieter than the current limits, so it should not be too difficult for tyre manufacturers to make further reductions. It would greatly help to reduce noise in our cities if the EU would quickly review the Tyre Noise Directive 2001/43/EC, requiring manufacturers to produce quieter tyres. In addition, we have called for the introduction of a noise label for tyres to raise awareness, to promote the quieter tyres that are already available, and to encourage local authority vehicles and drivers to use them. Quieter tyres can go a long way to reducing road noise.<sup>16</sup>

#### Example: Nordic Swan ecolabel

'Nordic Swan' ecolabels are awarded to products fulfilling several environmental criteria, so that consumers can consider the environmental impact when deciding what to buy. Tyres sold in Nordic countries must fulfil standards for noise and energy efficiency in order to be awarded the label.

## 10. Quieter Vehicles

Vehicles themselves emit noise – from engines, exhausts, acceleration and braking. At lower speeds below approx. 30 km/h – often experienced on congested city streets – engine noise predominates. Tighter standards on vehicle noise emissions from cars are urgently needed. Despite European vehicle noise standards since the 1970s, road noise levels have increased. Technological progress has been drowned out by a trend towards noisier vehicles and

traffic growth. Improved vehicle certification test methods would also help; current testing does not evaluate noise performance in urban stop-start driving at lower speeds. Work towards tighter standards and a more realistic test are underway, but progress is painfully slow.

Beyond this, the use of quieter vehicles in cities and especially in public fleets can contribute to noise reduction. Electric and hybrid vehicles, as well as being cleaner, also tend to be considerably quieter.

#### Example: Barcelona, Spain

Barcelona introduced a fleet of 90 quiet service vehicles including electric carts for street-cleaning in the Old City as part of a programme to address noise in the city.

## We Can All Make a Difference

While the machinery and infrastructure of transport is noisy, so is the manner in which it is operated. Educating drivers – whether they be at the wheel of a truck, bus, taxi, scooter or car - can help to reduce the noise caused by vehicles. As can our transport choices: if we walk, cycle or use public transport, we reduce our noise (and air quality) impact. Most of the measures outlined above depend on people demanding quieter cities. And they are more likely to work if those people recognise that their actions can make a difference – for example, by sticking to speed limits, maintaining their vehicles, driving smoothly, not slamming doors or sounding horns when unnecessary.

## REFERENCES AND FURTHER INFORMATION

Website with details of competent authorities in charge of implementing the Environmental Noise Directive:  
[http://circa.europa.eu/Public/irc/env/d\\_2002\\_49/library?!=/reporting\\_2005&vm=detailed&sb=Title](http://circa.europa.eu/Public/irc/env/d_2002_49/library?!=/reporting_2005&vm=detailed&sb=Title)

- 1 CE Delft (2007). Traffic noise reduction in Europe. Delft : CE Delft.
- 2 EU25 refers to EU27 without Cyprus and Malta.
- 3 CE Delft (2007). Traffic noise reduction in Europe. Delft : CE Delft.
- 4 EEA (2007). Europe's environment – The fourth assessment. Copenhagen: EEA.,
- 5 RANCH project: [http://www.wolfson.qmul.ac.uk/RANCH\\_Project/](http://www.wolfson.qmul.ac.uk/RANCH_Project/)
- 6 For the text of the directive in different European languages, see: <http://ec.europa.eu/environment/noise/directive.htm>
- 7 'Major roads' in the Environmental noise directive are roads, which have more than six million vehicle passages per year. 'Major railways' are railways which have more than 60 000 train passages per year (END, Art. 7.1). The term 'major airports' refers to civil airports, designated by the Member State, with more than 50 000 take offs and/or landings per year. (END, Article 3 (p)).
- 8 GOAL project website: <http://www.goal-graz.at/en/index.htm>
- 9 Kropp W., Kihlman T., Forsen J., Ivarsson L. (2007). Reduction potential of road traffic noise . Chalmers: Chalmers University of Technology. <http://www.iva.se/templates/page.aspx?id=4354>
- 10 SILENCE Seminar: Reducing road transport noise in urban areas, Brussels 2007. [http://www.silence-ip.org/site/fileadmin/SP\\_J/Road\\_seminar\\_June\\_2007/5A\\_Ulf\\_Sandberg.pdf](http://www.silence-ip.org/site/fileadmin/SP_J/Road_seminar_June_2007/5A_Ulf_Sandberg.pdf)
- 11 <http://www.piek.org>
- 12 LAmax is the 'peak' noise level, i.e. the highest recorded in a time period
- 13 SILENCE Seminar: Reducing road transport noise in urban areas, Brussels 2007. [http://www.silence-ip.org/site/fileadmin/SP\\_J/Road\\_seminar\\_June\\_2007/8\\_Lars\\_Ellebjerg.pdf](http://www.silence-ip.org/site/fileadmin/SP_J/Road_seminar_June_2007/8_Lars_Ellebjerg.pdf)
- 14 ibid.
- 15 ibid.
- 16 For more information see: <http://www.transportenvironment.org/module-htmlpages-display-pid-20.html>

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