

Local and Regional Authorities Tackling Environmental Noise

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1. Part 1 Current situation

Since the adoption of the Environmental Noise Directive (END)¹ in 2002, progress has been made by Member States (MS) in implementing its provisions according to a phased approach, as originally foreseen by the END. Over the same period, the knowledge base of the impact of noise on health and the development of shared platforms for data management and regular data flows on noise has also improved. Following the publication by the European Commission (EC) of the assessment report on the implementation of END², discussion is ongoing whether further European Union (EU) measures or the review of EU action are needed to tackle a quality acoustic environment for Europeans.

Part 1 of this file note provides an overview of the latest progress with regard to the development of a knowledge base on noise and the action undertaken for the abatement of noise pollution (section 1.1), and a summary of main obstacles encountered in implementing the END (section 1.2).

1.1. Current knowledge and action at the EU level

1.1.1 Evidence and perception of the impact of noise on human health

Early in 2011, the World Health Organization (WHO) Regional Office for Europe released an assessment of the burden of disease from environmental noise.³ The study concluded that noise is second only to air pollution as a disease burden, and is the cause of annoyance, sleep disturbance, heart attacks, blood pressure and cardiovascular problems, as well as learning disabilities and tinnitus. The burden is such that *'at least 1 million healthy life years are lost every year from traffic-related noise in the western European countries, including the EU Member States'* (WHO, 2011).

The FP7 [ENNAH \(European Network on Noise and Health\) project](#), due to be completed in late 2011, is expected to provide a consolidated review of existing literature on the impact of environmental noise on health, and to outline gaps and research priorities according to scientific and policy-making needs. Scientific evidence, overall, seems to be still limited or, at the most, sufficient; moreover, there are some areas such as the effect of combined sources, of

¹ Directive 2002/49/EC.

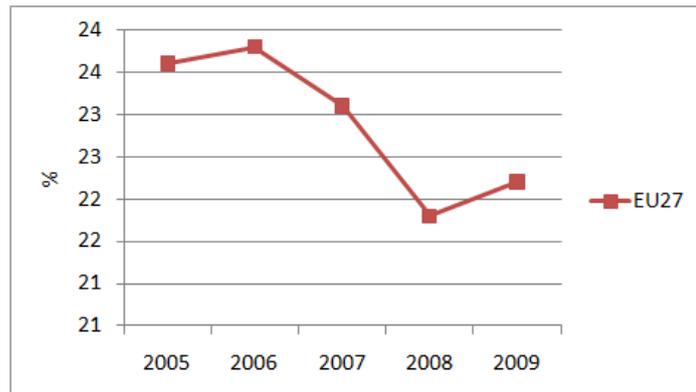
² Report from the Commission to the European Parliament and the Council 'On the implementation of the Environmental Noise Directive in accordance with Article 11 of Directive 2002/49/EC', COM (2011) 321 final.

³ [WHO press release](#), 30/03/2011, New evidence from WHO on health effects on traffic-related noise in Europe.

changing noise characteristics, or of combined environmental pollutants (e.g. noise, air pollutants and chemicals) that require further investigation.

About one out of five people in the EU27 (i.e. 22.2% of the total EU27 population) is affected by noise from neighbours or from outside.⁴ This share has followed a decreasing trend since 2006, slightly increasing again over the Period 2008-9 (Chart 1).

Chart 1 - Proportion of population living in households considering that they suffer from noise



Source: Eurostat, [table tsdph390](#)

Further, noise pollution is not perceived as a priority concern by Europeans, as it was scored the least (9% on average)⁵ among other worrying environmental issues.⁶

1.1.2 Magnitude of the problem

T&E and HEAL (2011) report that *'some 210 million Europeans (i.e. about 40% of the EU population) are regularly exposed to road traffic noise levels exceeding 55 decibels and 35 million (i.e. about 7% of the EU population) are exposed to these levels of rail noise * These data refer back to the year 2000 and are sourced from the CE Delft report 'Traffic noise reduction in Europe: health effects, social costs and technical and policy options to reduce road and rail traffic noise', published in 2007. The same report is acknowledged by the EC in COM (2011) 321 final when referring to the social costs of traffic noise that, at 2006 price level, are estimated to be 38 (\pm 8) billion/year for road traffic and 2.4 (\pm 0.1) billion/year for rail traffic.⁷

⁴ Eurostat data accessed on 13/09/2011, [table tsdph390](#) updated On 12/09/2011.

⁵ Percentages ranged from 3% in Cyprus and Sweden to 14% in Malta and Poland.

⁶ Special Eurobarometer 365 - Provisional Summary (2011).

⁷ Data refer to 22 MS.

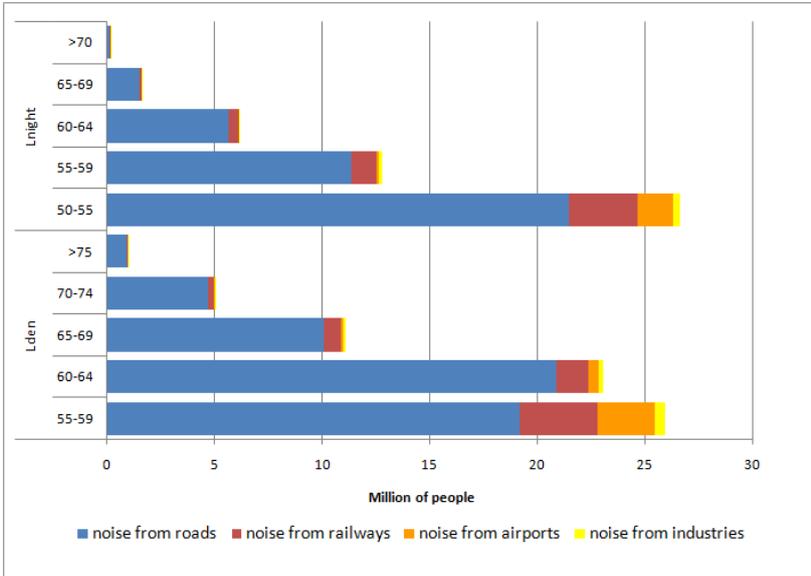
B.1 The measurement of noise

Noise is measured in decibels (dB). dB(A) refers to the use of a scale adapted to human hearing range. Noise is usually considered over a time interval, as is the case for the two main indicators to be reported upon within the framework of the END (Article 5): L_{den} or the 'Day-evening-night equivalent sound level', is the 'average sound pressure levels over all days, evenings and nights in a year'; L_{night} or 'Night equivalent sound level' is the 'average yearly night time level with measures over 8 hours' (T&E and HEAL, 2011). In terms of reference values, WHO guidelines for community noise indicate that good quality sleep at night requires less than 30 dB(A) in bedrooms, while the WHO guidelines for night noise recommend the outdoor value of L_{night} to be below 40 dB(A) to prevent a negative impact on health, with an interim target set at 55 dB(A).

Sources: T&E and HEAL (2011), WHO [Facts and Figures](#) web site

According to the latest data collected within the framework of the END and uploaded into the Noise Observation and Information Service for Europe (NOISE), some 55.7 million of people in agglomerations with over 250,000 inhabitants are exposed to noise annoyance from roads higher than 55 dB L_{den} , and over 40 million of people are exposed to a night noise level from roads above 50 dB (sleep disturbance).⁸ These values rise to 66 million and 47.4 million, respectively, if all sources of noise are considered (roads, railways, airports and industries).

Chart 2 - Number of people in agglomerations exposed to noise from roads, railways, airports and industries - EU27

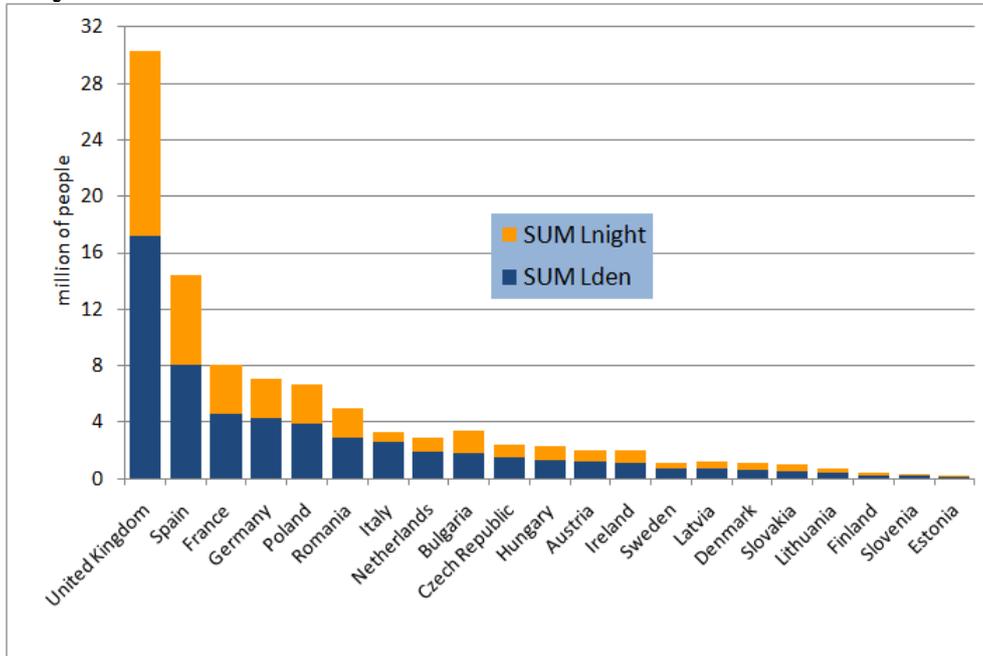


Source: NOISE, data extracted on 12/09/2011

⁸ Data accessed on 12/09/2011. Data updated on 01/10/2010 and including valid data and information available up to 30/06/2010.

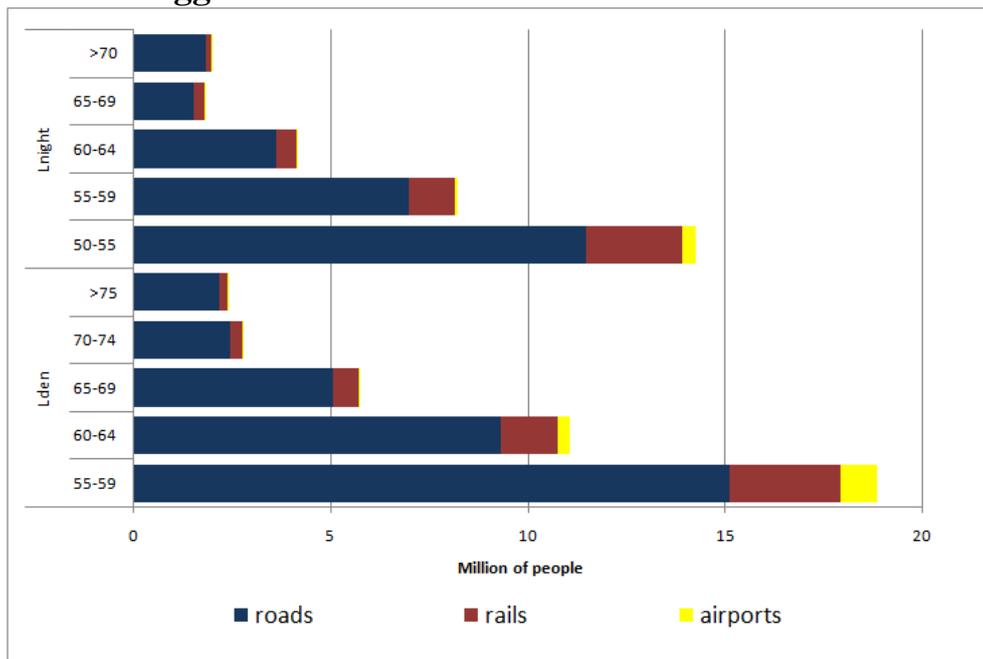
Chart 2 shows the level of exposure of people living in agglomerations across the EU to the different sources of noise. Chart 3 displays the detail of national levels of exposure to noise from roads. Reporting refers to 118 agglomerations for a total of some 106 million of inhabitants over 21 MS.

Chart 3 - Number of people in agglomerations exposed to noise from roads, by country



Source: NOISE, data extracted on 12/09/2011

Chart 4 - Number of people exposed to noise from major roads, rails and airports outside agglomerations – EU 27



Source: NOISE, data extracted on 12/09/2011

Currently, 163 agglomerations with more than 250,000 inhabitants across 25 MS have been notified under the END and are thus subject to reporting obligations (Cyprus and Luxembourg do not have agglomerations with 250,000 inhabitants or more); the list of these agglomerations is enclosed as Annex I as it provides information on the LRAs directly concerned in meeting the provisions of the END. Exposure information from major infrastructure (roads, rails and airports) outside agglomerations is showed in Chart 4. Major infrastructure under the END includes 77,615 km of Major Roads, 12,378 km of Major Railways and 75 Major Airports.⁹ Road traffic is the most important source of noise inside and outside agglomerations.

1.1.3 Level of implementation of the END

Transposition into national legislation (Article 14)

All MS have transposed the END into national legislation. In some MS, transposition was necessary also at the sub-national level by competent authorities. For example, in Austria, the transposition of the END at the federal level was followed by legislative acts at the State/Province level for the implementation of measures.

Allocation of competences for the implementation of END (article 4)

All MS have allocated competences for noise mapping, action planning and data collection. Competences belong to all levels, as the case of the Czech Republic clearly demonstrates (B.2). Since relevant infrastructure is often managed by different public agencies or even by private stakeholders, coordination problems were experienced. In France, for example, the management of national roads passed from national to local authorities between 2005 and 2007, but the devolution process was not smooth and data on roads have not been collected since 2005, by either the local or by the national authorities. Hence, relevant data for the END had to be estimated and is still to be validated locally.

⁹ Data refer to EU27; latest complete data for Major Roads and Major Railways refer to 2005.

B.2 In the Czech Republic, the Ministry for Healthcare bears the main responsibility for the implementation of the END. It is supported by the Ministry of Transport (responsible for some types of noise action plans) and affiliated agencies to the two Ministries that deal with noise mapping and scientific matters (Institute of Public Health Ostrava and Regional Public Health Institute of Pardubice) as well as action planning (Road and Motorway Directorate of the Czech Republic). Mapping is also undertaken by private contractors. The local government is '*responsible for action plans in agglomerations and some types of roads*'.

Source: Milieu Ltd (2010)

Limit values, targets and indicators (Article 5)

The END does not set binding noise limit values or targets but requests MS to report on national provisions. National provisions turned out to be very diverse. Twenty MS have legally enforced noise limit values and five MS have indicative or recommended targets that guide noise policy or trigger relevant action. Denmark has both. Cyprus and Malta have none. However, according to the information reported in the noise maps, legal enforcement is not systematically translated into the implementation of measures for noise reduction or protection of exposed population.¹⁰

All MS use the selected common noise indicators to assess, respectively, annoyance (L_{den}) and sleep disturbance (L_{night}), allowing for comparison across Europe. Some MS¹¹ decided to use also additional indicators.

National guidance on noise mapping and action planning National guidance is available in several MS; where such guidance is lacking, problems in implementation were reported, as is the case of Lithuania, where a common methodology for action planning was not available.

With regard to priorities, these were set at the national level in some MS, while in other MS regional and local priorities were also considered. In Bulgaria, for example, priorities in the action plans currently under development are set at the local level; the same provision applies to Greece, where priorities are set on the basis of exceeded noise limit values. In general, priorities were either set on the basis of the results of the mapping (as in the case of the Netherlands) and level of population exposure, or according to health assessments, as, for example in Finland and Romania.

¹⁰ Milieu Ltd (2010).

¹¹ Estonia, Finland, Ireland, the Netherlands, Sweden, Slovenia and the UK.

Most common measures included in the action plans refer to: traffic planning, land-use planning, technical interventions at the source of noise, insulation, reduction of sound transmission, selection of quieter sources, regulation, incentives, economic measures, and monitoring.

Designation of quiet areas

In all but three MS quiet areas were designated, although little progress was noted, overall, in the inclusion of quiet areas in noise maps and action plans. This was, in particular, due to problems related to their definition and role, hence leading to a lack of clarity on the action to be taken. In some MS, however, 'quiet areas' are defined within the national legislation (e.g. Hungary, by Government Decree).

Consultation (Article 8) and public availability of plans and maps (Article 9)

Action plans and noise maps are publicly available in all but three MS. Public participation in the preparation of the action plans was, overall, considered a critical step and fostered through different means. For example, Denmark collected reactions to published action plans through public hearings; and Luxembourg conducted online consultation combined with awareness campaigns. Ad hoc initiatives targeting individual sources of noise were also undertaken, such as the 'Sas akoume' ('we're listening to you') 24/24 phone line of the *Eleftherios Venizelos* airport in Athens, Greece, where citizens can call to report or talk about about noise-related issues.

1.1.4 Development of common platforms for data reporting and sharing

Significant progress has been achieved in the development of standards for reporting. The END Reporting Mechanism (RM) proposed by the Commission in 2007 was linked to Reportnet, i.e. the '*Eionet's infrastructure for supporting and improving data and information flows*' (EEA, 2008) and a Noise Observation and Information Service for Europe (NOISE) was developed, allowing the visualisation of noise exposure data. Reportnet includes a series of tools and processes (i) supporting the data/information delivery process, in particular of those environmental information flows required by reporting obligations, and (ii) improving the harmonisation and standardisation of the data flows. Both the Reportnet process and NOISE are managed by the EEA, the latter with the support of the European Topic Centre on Land Use and Spatial Information. Information on the use of these tools is available to MS.¹² Overall,

¹² For example, the ENDRM Handbook and the Reportnet Delivery Guide for Environmental Noise Data,

the above developments contribute to the establishment of a Shared Environmental Information System (SEIS)¹³ integrating 'existing *data gathering and information flows related to environmental policies and legislation*'¹⁴ and to its guiding principles¹⁵. Reporting on noise will also be affected by the implementation of Directive 2007/2/EC establishing an Infrastructure for Spatial Information in the European Community (INSPIRE).

1.2. Problems encountered in implementing the provisions of END

The main study reviewing the implementation of the END¹⁶ highlights the concerns expressed by MS as regards the difficulties faced while implementing the Directive. These difficulties are summarised in the following paragraphs. In general, it is felt that in the absence of common limit values or targets for noise pollution, and of the legal requirement to implement the action plans, the deliverables produced through the END are likely to be of limited scope.

Further, the implementation of the Directive is affected by the weakness of some of its provisions, often related to unclear definitions, and by the imprecise relation of some of the provisions to other noise-related EU legislation.

1.2.1 Sharing of competences across different authorities

At all levels of action, from data gathering to planning and implementation, difficulties were encountered in coordinating the different stakeholders involved. Among the reasons were: (i) different bodies are often responsible for planning and implementation; (ii) roads and railways crossing administrative boundaries may be managed by different authorities.

1.2.2 Establishing new data flows

Data gathering was constrained by the need to consider multiple data sources, by the overlapping responsibilities for shared infrastructure, and by the lack of

version 1.3 (EEA, 2010).

¹³ COM (2008)46 final.

¹⁴European Commission, DG Environment [website](#).

¹⁵ SEIS guiding principles establish that information should: be managed as close as possible to its source; be collected once, shared and used for many purposes; be readily available; enable easy fulfilment of legal reporting obligations; be readily accessible to end-users, serving evolving policy developments in a timely manner, allowing for comparison at the appropriate geographical level and facilitating participation of citizens to the development and implementation of environmental policies; be available in the relevant national language(s); and be shared and processed through common, free open source software tools.

¹⁶ Milieu Ltd (2010) for DG Environment, Review of the Implementation of Directive 2002/49/EC on Environmental Noise.

accessibility of data, including geospatial data. The data gathering process was slowed down to such an extent that it became difficult for competent authorities to keep pace with dynamic situations, so that, for example, airports and roads not meeting the designation criteria in 2005 became eligible for inclusion in maps in 2008 due to increased volumes of traffic.

1.2.3 Differing quality and format of data

Data gaps created problems in terms of the need of relying on estimation methods, both to fill the gaps and to calculate the number of people exposed to noise. Other problems included the lack of data consistency (poor quality of data) and of data comparability, because of the differing formats of data coming from different sources.

1.2.4 Unclear or inappropriate definitions and standards

Several definitions were considered 'approximate' and needing further clarification, including, for example: 'agglomeration'; 'quiet areas' and their role, especially in open country; 'industrial site' (in keeping with the definition given in Directive 2008/50/EC on air quality); and 'action plan', including guidance on its development and content. Further, the definition of 'major roads' on the basis of traffic volumes was considered restrictive by some MS and so was the 4 m noise assessment heights with respect to the existing style of buildings in some MS.

1.2.5 Insufficient technical capacities

Some MS reported on the lack of appropriate expertise for mapping, as well as of experience in using the necessary software and estimation methods. In particular, a need was felt for common mapping methodologies, cost-effective noise measurement models, and a common methodology to measure exposed populations. Attention was drawn to the lack of clarity on how: (i) the 'predictive function' of noise maps should be achieved; (ii) the dose-effect relations used to estimate the effect of noise on populations should be interpreted; (iii) the multiple exposure to noise should be calculated and displayed in maps; (iv) the action plans should be evaluated; (v) the cost-benefit analysis of action plans should be undertaken; and (vi) the criteria triggering the implementation of measures in the action plan should be determined. Technical constraints in mapping were also reported, in particular: *'Technical expertise was particularly limited amongst local authorities responsible for drawing up action plans'* (Milieu Ltd, 2010).

1.2.6 Mapping inconsistencies

Quality of mapping across MS was found not to be consistent; further, strategic noise maps are rarely comparable between MS, and sometimes also within MS, constraining EU level assessments and common responses.

1.2.7 Limited public consultation

Public consultation was barely undertaken in an effective manner. This was mainly due to the limited time span between the finalisation of the strategic noise maps and the completion of action plans, but some MS also considered noise a too technical matter to brought to the attention of the general public unless accompanied by awareness and information campaigns.

1.2.8 Tight timing

The timetable set in the END leaves insufficient time between key stages. In particular, two years were not considered sufficient between the designation of sites and the production of strategic noise maps; and one year was not considered sufficient between strategic noise mapping and action planning.

1.2.9 Lack of coherence with other EU legislation

Further to the lack of consistency in the use of definitions (e.g. the definition of 'agglomeration' in Directive 2008/50/EC on Air Quality is not consistent with the definition provided in the END), there is a call for a more coherent relationship between the END and other pieces of EU legislation that refer to source-specific noise limit values or technical standards, such as legislation related to road traffic noise (motor vehicles, motor cycles and tyres), aircraft noise, and railway noise.

1.2.10 Lack of financial resources

The financial and economic crisis was reported as constraining the resources available to implement the END. This was, for example, made explicit by local authorities from Romania.

2. Part 2 Best practices

The implementation of the END by LRAs involved the use of several different approaches and the application of a variety of tools and measures, some of which have been awarded best practice status, either by pan-European initiatives (e.g. European Green Capital Awards, LIFE+ programme, etc.) or by experts and/or the academic community, on the basis of extensive assessments of their effectiveness. In this respect, a geographically representative selection of best practices (BP) is presented below. Best practices are proposed per local/regional authority and are accompanied by some background information.

2.1 Amsterdam Municipality (The Netherlands)



The city of Amsterdam features about 15,500 dwellings suffering from noise exceeding 68 dB; these are distributed over 80 locations in the city, along roads covering a total of 25 km in length. To address the impact of environmental noise, the city council has decided on an action plan targeting the reduction of exposure to noise to a level below 68 dB (Lden) by 2018. The proposed approach has been evaluated by experts participating in the *Quiet City Transport* project¹⁷, who used modelling or actual measurements to assess the effectiveness of specific elements of the plan.

BP 1- Prioritisation of locations using a noise rating system

The city of Amsterdam uses strategic noise maps as an input for the formulation of its noise action plan. Specifically, it prioritises actions by applying the Q-City environmental noise rating system, which is based on the following noise impact indicators: (i) overall noise climate in residential areas: percentage of people being highly annoyed (% HA); (ii) night-time noise climate in residential areas: percentage of highly sleep disturbed people (% HSD); (iii) hot spots in residential areas: (weighted) number of individuals above limit value L (nL); (iv) Non-Quiet area: percentage area with Lden > 50 dB(A) (AREA50). The noise action plan has considered the values of these indicators calculated for different situations or sources (e.g. for the whole of the city and for individual neighbourhoods; for effects of a single source, such as road traffic, railway, airports, etc.; or for the combined effects of multiple sources), in order to decide on priority locations for the implementation of noise abatement measures.

Source: Miedema et al. (2007)

The city's noise strategy focuses on three aspects: (i) noise prevention, through measures taken at new developments to avoid situations of high noise exposure; (ii) noise mitigation, involving measures to reduce noise in existing sources; and (iii) noise offsetting, through the creation of quiet areas and building facades, improved insulation in buildings and roads, etc.

¹⁷ The [Q-City project](#), funded by the EU 6th Framework Programme.

BP 2 - Noise reduction measures at street level

Central to the approach considered in the city of Amsterdam Noise Action Plan, are the following types of noise reduction measures at street level, targeting vehicle movement: (i) speed reduction (it is estimated that by reducing speed from 50 to 35 km/h, a 3 dB(A) reduction is achieved); (ii) dynamic traffic management, such as the 'green wave' (adjustment of traffic lights to achieve continuous traffic flow over several intersections in one main direction), estimated to induce a 3 to 4 dB(A) reduction; (iii) silent public transport, including the use of quiet streetcars/trams (Combinos) and the reduction of curve squeal at selected locations (e.g. by grinding the rails); and (iv) low-noise vehicles, estimated to induce a potential reduction of 5 dB(A), combined with an additional 1 to 2 dB(A) reduction for low-noise tyres. The option of traffic volume reduction is also examined, though not preferred because of low estimated impact on noise levels and apparent difficulties in achieving, overall, substantial results. The city council plans to combine the aforementioned measures with major reconstructions of roads, involving the use of an innovative low-noise asphalt ('thin top layers'), with an estimated initial reduction of 4 to 5 dB(A), due to decrease over the time to about 3 dB(A). The use of low- noise asphalt implies an additional cost of about 60 EUR/m² due to faster deterioration in comparison to conventional asphalt.

The above road traffic measures have been evaluated with the use of the Q-City system of noise impact indicators (rating system), highlighting, among other issues, the following:

- the largest impact on noise reduction is achieved through the reduction of speed from 50 km/h to 35 km/h on all roads inside the circular road with a traffic intensity >10000 vehicles/24h, and the use of silent asphalt on main roads (reduction of 3 dB(A)).
- Poor effects are achieved by: (i) banning heavy duty vehicles in the old city centre during the night; and (ii) using silent buses as opposed to standard buses (estimated emission reduction of 3 dB(A)).
- Implementation of measures (as evaluated by the Q-City report) which contribute to both noise reduction and improved air quality would reduce by 11% the number of buildings presently exposed to Lden above 63 dB(A); implementation of more measures can improve this effect, up to a 27% reduction.

Sources: Roovers et al. (2005); Polinder et al. (2008)

2.2 Dublin Agglomeration (Ireland)



The Dublin Agglomeration includes four local authorities, i.e. the Dublin City Council, the Fingal County Council, the South Dublin County Council and the Dún Laoghaire-Rathdown County Council. It has a population of 1,186,704 people and extends over an area of approximately 924 km². Main sound sources in the area include: one major airport of over 215,000 movements and 23 million passengers per year; 130 km of rail track, including the light rail (named Luas) and 80 km which have been designated as Major Rails; and approximately

4,000 km of road, with 9.9% being designated as Major Roads (i.e. carrying annually more than 6 million vehicle passages).

Distinct noise maps have been produced for all roads and railway lines, as well as for Dublin airport which covers the Fingal County Council area only and has no strategic impact on the other areas. Dublin noise mapping, modelling and monitoring indicated (Dublin City Council 2007), among other issues, that:

- traffic is the dominant noise source; railway noise is not significant compared to overall noise levels, while aircraft noise hardly affects local population (measured below the Lnight 50-54dB band);
- in terms of noise impact, the 'Major road' category is more important than the 'All roads' category;
- most of the people (slightly over 71%) are exposed to average 24-hour (Lden) sound levels from traffic below 65 dB, with 6% of them being exposed to below 55dB levels;
- exposure to Lden sound levels equal or greater than 75dB affects only 2% of the population (approximately 24,000 people).

BP 3 - Integrated noise reduction measures

The 2008-2013 Dublin Agglomeration Noise Action plan primarily focused on traffic noise, introducing a wide range of measures, including: (i) promotion of low-noise and low-emission vehicles (included as a criterion in invitations to tender for local authority fleet or waste collection services); (ii) reduction of traffic density (promotion of public transport, traffic and parking management, encouragement of walking and cycling, etc.); (iii) application of access restrictions to heavy goods vehicles (e.g. night delivery restrictions and limits); (iv) speed reduction (traffic calming schemes); (v) improvement or changes in road surfaces (low-noise road surfaces for new developments or during the routine maintenance cycle); (vi) passive measures, such as noise screening (e.g. use of building structures for screening), sound proofing of new residential developments; (vii) planning measures, such as: a - integration with city and county development maps; b - requiring sound impact assessments from developers, also with regard to new rail infrastructure or major intensification of existing rail tracks; c - decentralisation of amenities to local areas; d - promotion of appropriate land use patterns (restricting housing development where possible) near the airport (flight paths).

The effectiveness of the measures is continuously assessed through a monitoring system, including eleven monitoring locations where the total ambient sound is measured. The results of the 2010 measurements indicate that: (i) all locations met the desirable values of 55dB night\70dB day, with one exception; and (ii) the desirable criteria for daytime and night time levels were met by seven and six sites respectively, as well as by the overall Network Average. Moreover, the implementation of the Dublin Agglomeration Noise Action Plan is expected to have estimated total annual financial savings ranging between 144,800 EUR and 724,000 EUR.

Sources: Dublin Agglomeration (2008b); Dublin City Council (2010)

BP 4 - Prioritisation of actions using a simple decision support tool

The 2008-2013 Dublin Agglomeration Action Plan (jointly prepared by the four local authorities concerned) used a simple but practical action prioritisation tool, based on a decision/selection matrix which facilitates the identification, analysis and rating of the relative significance of sound exposure in various locations and daytimes, as well as of different sound sources. The matrix provides a score to each studied area, ranging from 8 to 23, on the basis of the noise band levels, the type of location and the type of noise source. The higher the total number in the decision matrix process, the higher the priority for action, with a threshold of 17 suggesting that priority action is required either to address excessive sound levels or to preserve low sound levels where they exist. The use of this decision support tool indicated the need for priority action to be considered for approximately 52,524 residential properties, including 46,735 properties in quiet areas and 5,789 properties suffering from exposure to high sound levels, equalling a potential annoyance from high sound levels for approximately 14,274 people.

Source: Dublin Agglomeration (2008a)

BP 5 - Public consultation on the Noise Action Plan

The approach used for the drafting of the 2008-2013 Dublin Agglomeration Noise Action Plan was highly participatory. Extensive consultation with stakeholders was achieved through:

- directly contacting 24 Public Bodies, Government and Semi-State bodies;
- sending out e-mails to 150 NGOs with general interest in the environment, such as community councils and residents associations; and to an additional 25 NGOs with specific interest in environmental issues;
- placing a large advertisement in the two largest national daily newspapers, inviting submissions on the Draft Action Plan;
- promoting the draft Action Plan on national television making use of a 7 minute slot that was made available specifically for that purpose;
- placing reference copies of the noise maps and Action Plan in all Dublin City Council Libraries;
- making all relevant documents available on the websites of the local authorities involved.

Source: Dublin Agglomeration (2008a)

2.3 Berlin State (Germany)



Berlin metropolitan area includes the following main noise sources: the main road network (in total about 1,360 km); the tram and metro (parts running above ground) system (188 km and 26 km, respectively); the railway network (1,066 km); Tegel Airport; and selected industries and power plants. As indicated in the strategic noise maps, car traffic is the most important noise source in the city, followed by rail and air traffic; industrial noise is, comparatively, of very little importance. The Berlin State prepared a noise action plan targeting noise from both road traffic and above-ground railway, placing particular emphasis on the integration of noise reduction measures into urban planning policies. A recent research project on best practices of noise reduction solutions in integrated locations documented the effectiveness of noise reduction measures conceived and implemented at the town planning level.¹⁸

¹⁸ Berlin Federal Institute for Research on Building, Urban Affairs and Spatial Development ([BBSR](#)), 2009/2011.

BP 6 - Coordination of the noise action plan with urban planning

The Berlin Noise Action Plan has been drawn up as an integral part of the local urban planning process, with land use and traffic planning being key to this interactive integration in terms of sharing similar goals and exploring potential synergies. Relevant urban planning initiatives included the development of master plans with concrete town and traffic planning measures that complemented the noise plans prepared for pilot areas and roads. In this context, particular attention was given to the coordination of the various planning departments and other stakeholders involved in the process, including:

- the responsible Senate Administration for Public Health, Social Services and Consumer Protection and the Senate Administration for Urban Development;
- the borough administrations concerned;
- the Berlin Public Transport Administration (Berliner Verkehrsbetriebe (BVG));
- Traffic Control Berlin (Verkehrslenkung Berlin VLB);
- representatives of the political parties in the House of Representatives;
- freight traffic representatives;
- the Chamber of Industry and Commerce;
- the Chamber of Trade;
- representatives of the real estate sector;
- representatives from several health insurance companies;
- various environmental agencies;
- other stakeholders, e.g. ADAC (Automobile Club), ADFC (Bicycle Club).

A Noise Reduction Planning Forum was created for coordination purposes, with members from the aforementioned stakeholders. The Forum discussed a number of issues regarding noise planning and made suggestions that were subsequently considered in the final Action Plan. Moreover, public consultations involving citizens and the respective borough councils were held in selected survey areas through public meetings.

Source: Berlin Senatsverwaltung für Gesundheit, Umwelt und Verbraucherschutz (2008)

2.4 Barcelona City (Spain)



Noise pollution in the city of Barcelona is undoubtedly significant and mainly attributed to the relatively high traffic levels (approximately 6 million journeys per day), population density (approximately 15,000 inhabitants/km², not including the large number of tourists), and other urban features like the mix of land uses and activities, night-time leisure activities, frequent public road works, goods loading and unloading, etc. The Barcelona City Council has been particularly concerned to address growing noise levels. Among the concrete noise reduction initiatives promoted are: public awareness of noise pollution; the preparation of strategic noise maps and of a noise action plan; and the implementation of pilot initiatives in selected city areas.

Noise measurements carried out in 2007, indicated, among other issues, that:

- almost half of the city (48.27% of the studied area) falls within the high acoustic sensitivity zones classification;
- The vast majority (97.4%) of the city's street sections comply with the acoustic capacity assigned for the day-evening time period, though significantly less street sections (88.5%) comply during the night period.
- The city has a significant number of quiet areas with noise levels below 50 dB during the day and 45 dB at night, including parks and gardens, noise quality protection zones, specific low-noise blocks and 2.3% of the city's street sections.

BP 7 - Citizen awareness on noise pollution

The Barcelona City Council's effort to raise public awareness of noise pollution focused on a multi-faceted approach including the following main targeted initiatives:

- the preparation and dissemination of environmental noise educational guides focusing on noise pollution in general, e.g. *'Menys soroll, millor'* (The less noise, the better), and on motorcyclists in particular, i.e. *'Mou-te bé'* (Getting around on your motorbike);
- the introduction of sound level meters in schools;
- an awareness raising campaign jointly developed with the provincial association of vehicle repair workshops of Barcelona, promoting the message that the sale of nonofficial exhaust pipes is wrong, as they exceed the legal noise levels;
- media campaigns on noise pollution addressing the general public;
- the dissemination to citizens of booklets on noise pollution, e.g. *'Sons i sorolls'* (Sounds and noise).

Sources: Barcelona Municipality (2010); European Green Capital Award (2011)

BP 8 - Strategic noise mapping for diverse sources

Preparing Barcelona's strategic noise map involved undertaking of more than 2,400 noise measurements in selected city locations. The measured noise levels were linked to the specific noise sources from which they originated, such as traffic, large crowds, open-air bars/restaurants and other leisure activities, linear or point concentration of commercial activities, tramways, industrial activities, etc. Assessing noise levels and the corresponding sources facilitated the use in the mapping process of a more comprehensive noise typology, which considers the different land-uses in each location or area studied. Accordingly, it was possible to assign in each case the most appropriate emission limit values.

Source: European Green Capital Award (2011)

BP 9 - Noise reduction measures during: night delivery of goods

About 100,000 goods deliveries take place daily in Barcelona city, with the majority using on-street spaces specially reserved for (un)loading from 08:00 to 20:00 hours. Several businesses, such as supermarket operators, are particularly interested in facilitating supply of fresh food stuffs just before the stores open. These operators, as part of the Barcelona Mobility Pact, initiated in 2003 a process of night-delivery trials. The initiative was supported by the municipality, which granted an experimental six month exemption to the traffic regulations, as well as by the traffic police, which collaborated with the operators and the municipality's Noise Unit to measure noise levels in residences close to the goods loading sites. The pilots outlined a wide range of measures which reduce noise emissions during goods delivery, including: use of electric lifts; use of insulating carpets; pavement adaptations for access using fork lift; training of staff to unload with minimal verbal communication; use of plastic roll-containers, soundproofing and wedges controlling rollcontainer movement; and use of adapted refrigeration equipment. Noise measurements indicated only a slight increase in noise levels during night time (0.3 dB(A)).

Sources: Hayes S. (2008); European Green Capital Award (2011)

2.5 Vitoria Gasteiz Municipality (Spain)



According to 2005 noise measurements, more than one third (34.5%) of the population in Vitoria Gasteiz is exposed to noise levels higher than 65 dB(A); the situation is similar at night, when almost 40% of the population is exposed to noise values higher than 55 dB(A). The municipal council has made significant investments towards addressing noise pollution, including an innovative approach for re-locating industrial units outside residential areas.

BP 10 - Relocation of heavy industries away from residential areas

Noise pollution caused by the metallurgical and chemical industries located in urban residential areas has been high on Vitoria-Gasteiz City Council's environmental agenda. The Council is implementing a scheme for the relocation of such units to industrial areas, outside the city and away from residential zones. One of the first companies participating in this initiative was the steel company 'Sidenor' at the residential district of Zaramaga; relocation to Jundiz industrial zone was made possible after a land swap agreement between the City Council and the company (however, prior to this, initial noise mitigation actions had been taken in the target residential area, including the replacement and insulation by the company of 1,500 windows in about 500 homes). Similarly, the 'Forja y Prensados' steel company in the Arambizkarra neighbourhood agreed with the City Council on a land transfer exchange, following a ban on night production. The relocation process involved close collaboration between several municipal departments, notably the Urban Planning Department and the Municipal Police. This collaboration was facilitated by a series of educational initiatives targeted to the municipal staff.

Sources: Vitoria-Gasteiz Municipality (2010); European Green Capital Award (2011)

2.6 Municipality of Stockholm (Sweden)



Noise pollution levels in Stockholm are significantly low, with only 34% of the people living in the Municipality of Stockholm (out of a total population of about 800,000) exposed to daily noise levels above 55dB(A). Extensive work on noise measurements (e.g. creating a noise monitoring network with an accuracy of 2m x 2m) as well as on noise prevention and reduction measures has been carried out by the municipal administration over the last four decades. The city is considered a leader in noise proactive actions, regulations, planning and reduction of noise at the source.

BP 11 - Planning of traffic infrastructure on the basis of traffic noise assessment

The City of Stockholm, making best use of its long experience in noise abatement initiatives, has developed a new approach in the assessment of traffic noise impact on dwellings, allowing the results of the assessment to feed directly into the planning process of traffic infrastructure. The method, called 'Sound Quality Score', is based on the concept that noise can be prevented if noise creating factors are taken into consideration while planning and building residential areas. The idea was first implemented by the City of Stockholm in the 'Traffic noise and planning' project, where the municipality collaborated with stakeholders from the building and road transportation sectors to develop guidelines of good acoustic standards for buildings. Examples of noise reduction measures implemented under the Sound Quality Score include the use of high insulation of exterior walls, the turning of building facades and habitable rooms away from traffic, and the construction of specially designed balconies to deflect noise.

Sources: City of Stockholm (2009); European Green Capital Award (2010)

2.7 Municipality of Bucharest (Romania)



Traffic noise is one of the main sources of noise in the City of Bucharest. The street network includes 5,340 streets with a total length of some 1,821 km, covering a total area of 19,5 km². The municipality prioritised the preparation of updated noise maps of the city under the END finding solutions to overcome several data-related problems.

BP 12 - Correcting old noise maps with new data

In updating the noise maps of the city, the municipality faced the problem of addressing the many deficiencies in the availability of noise data, as well as in the accuracy of information on traffic volumes and noise emissions. Considering the significant time and other resources required for a complete re-calculation of the noise maps, the Bucharest City Council decided to correct the existing maps by making new measurements for a short period of time in selected locations of the city, and then using a simulation model to calculate noise level values in all of the city areas. In total, traffic measurements were made in 200 locations; in more than 80 locations the equivalent noise level was also measured. Calculated values were compared with actual measurements; differences indicated that the simulation model provided a good approximation of the actual noise pollution levels. Using reverse engineering techniques, the measurements facilitated the correction of old information regarding the noise emission levels of vehicles and the computation of the noise map for the whole city, using a grid of a 10m step.

Sources: Comeaga (2007); Tache (2007)

2.8 North Rhine-Westphalia State (Germany)

North Rhine-Westphalia (NRW) has a particularly high population and transportation route density, hence features the highest amount of noise calculation areas and objects in Germany. Implementation of the END in the region is a serious concern, given the large number of agglomerations in the area (12 cities with a population higher than 250,000 inhabitants, and about 60 cities with more than 100,000 inhabitants), the numerous municipalities required to take relevant action (350 out of 396 in total), and the number of exposed people (Czerwinski et al. 2006b, Stöcker-Meier et al. 2007). In this context, the State Agency for Nature, Environment and Consumer Protection of NRW has made available on-line noise maps, including detailed and updated information of the areas outside the agglomerations, to facilitate and support the mapping task of small municipalities.

BP 13 - Use of Spatial Data Infrastructure (SDI) on web service architecture in environmental noise mapping

The preparation of environmental noise maps in North Rhine-Westphalia (NRW) using SDI and web services for data access, indicated a potential reduction of costs by about '77% for 3D geodata generation and provision compared to proprietary architectures and 15% for 3D geodata integration and refining' (Plümer et al. 2006; Czerwinski et al. 2006). The use of the web service CityGML, as an output interface, facilitates the visualisation and processing of 3D geodata in several noise modelling software applications. Moreover, the main drawbacks of the approach are linked with the high demand for computational power, an issue which is expected to become of minor importance as relevant technology advances. The approach is considered a pilot for the INSPIRE Directive 2007/2/EC, as the provided geodata are in line with a number of the themes listed in Annex I-III, while the available web services are connected to the regional spatial data infrastructure of NRW, enabling their use in a wide range of other applications.

Source: Czerwinski A. et al. (2007)

3. Part 3 Recommendations

Raw data collection and processing

Data collection problems have been underestimated. EU intervention has promoted common data management, sharing and exchange; however, it has not sufficiently addressed issues related to the availability and quality of relevant raw data, especially at the local level. EU standard processes will definitely help in delivering comparable data but problems may still be faced, for the next round of mapping, with regard to the cost and the capacity for 'accessing' data locally, in both monetary and human resource terms. Eurocities reports that '*In many cases data collection was based on a one off action*'¹⁹; hence, it may be expected that regular data flows were not established and that difficulties faced in the first mapping process are likely to appear again in the second. Although situations are very diverse in terms of data sources, availability, responsibilities and coordination levels, the sharing of knowledge or evidence of practice in this area would significantly support local authorities.

- ▶ The implementation of the END would benefit from the development of an on-line database of local/regional examples, showcasing specific knowledge or evidence of practice related to collection and processing approaches for noise-related data and information. The emphasis of these examples should be on the evidence of practical solutions rather than on the 'best practice' concept, as this sometimes concentrates on 'ideas' values more than producing detailed practices, especially in terms of replication potential.

Noise mapping

The wealth of approaches used so far in noise mapping is characterised by lack of consistency in the level of detail, as well as by several cases of low quality information. In order to address relevant problems and increase the effectiveness of the process, besides the dissemination of existing tools such as good practice guides on noise mapping, it would be advisable to support the map development process within the END coherently with the INSPIRE Directive.

- ▶ There is a need to deliver effectively to all competent authorities the necessary tools and guidance (including training) to tackle comparable mapping across the EU, at least for the basic information required to be produced under the END.

¹⁹ Eurocities Working Group Noise (2009).

- ▶ As an intermediate step towards the implementation of the INSPIRE Directive²⁰, a web-based central repository for all strategic noise maps should be created, including metadata explaining the approach used each time for the preparation of the maps.

Types of analysis

Competent authorities often use more information in their noise maps or action plans than is strictly required by the END. There are, for example, cases of sophisticated approaches to prioritise intervention, or of inter-related measures that impact not only on noise reduction/prevention but also on air quality improvement. In this context, the two main indicators provided for in the END (i.e. L_{den} and L_{night}) may not be sufficient to reflect complex situations, or to highlight problems and the need for effective action. Similarly, the maps may not be sufficiently dynamic to guide options for the future.

- ▶▶ The provisions of the END should focus on both 'state-' and 'forward looking-' analysis. Accordingly, the maps produced under the END should support both 'mitigation' of the 'state' and 'prevention' of undesired situations.
- ▶▶ Supportive tools and guidance on the visualisation, in combined maps, of cumulative noise from different sources, should be provided to the competent local and regional administrations.

Action planning

Noise action planning cannot be framed, in an ideal situation, in isolation from other planning initiatives. Further, it often needs the collaboration of several stakeholders. Hence, noise action plans are unlikely to be self-standing documents and, instead, tend to be closely interacting with, or even be part of, other plans (e.g. town plans, urban mobility plans, etc.) whose nature is determined by the competent local and/or regional authorities.

- ▶ The Directive should encourage the drafting of Noise Action Plans as an integral part of the local urban planning process, enabling LRAs to integrate soundscapes and noise reduction provisions into land use and traffic plans.
- ▶ Annex V of the END does not seem to acknowledge the complexity of the planning process; the fact that the information provided by the MS on action plans '*was very diverse and the data were scattered*' (COM (2011)

²⁰ The full implementation of the INSPIRE Directive is due by 2019.

321 final) should encourage a review of the 'minimum requirements for action plans', with a view to providing common guidelines to MS.

Making the END coherent

Firstly, coherence needs to be tackled at the level of needs of ordinary people. The perception of the noise problem by citizens does not match the problem as outlined in the Directive and, accordingly, the scope of the END reflected in the noise maps is limited, as competent authorities cannot use such maps for solving concrete challenges. Secondly, the END needs to be coherent with other existing pieces of EU legislation to tackle simplification.

- ▶ It is imperative to get the END closer to needs by making: (i) citizens more aware of the negative impact of noise on health and (ii) the provisions of the Directive more relevant to daily lifestyle. The participation of the general public in the planning phase requires awareness campaigns and the consideration of those sources that concern ordinary people the most, such as neighbour noise or recreational and leisure noise.

The opportunity and challenge to set common limits

The recent review of implementation of the END revealed both an opportunity to set thresholds for noise levels, against which all MS would then have to fine-tune interventions, and a challenge to make sure that existing national provisions are not significantly disrupted. The fact that not only so many countries have established limits, often in a very careful manner, but also that local authorities have set targets, is a sign that an 'obligation' triggering action has the potential to be positively received. Furthermore, exposure to noise can substantially be affected by the revision of relevant EU legislation or the undertaking of EU initiatives promoting standards for buildings and road/railways surface.

- ▶ The introduction of noise level limits or targets at the EU level should be considered.
- ▶ It would make sense to link targets for noise levels to more pieces of EU legislation rather than to one single Directive.

Making the END clear

The implementation of the END has been affected by the inconsistency or approximation of definitions. Lack of clarity on technicalities has contributed to the data collection and analysis problems faced by relevant local authorities. Even worse, deliverables have turned out to be diverse and difficult to compare.

- ▶ An improvement of the END in this sense is mandatory, along the need to clearly outline the relationship of the Directive with other relevant legislation referring, for example, to noise limits on vehicles, tyres or equipment. Coherence is needed in the first place at the EU level, if such coherence is expected at the national and local level.

Knowledge base

Since the END deals with several technical issues (e.g. calculations or mapping) clear guidelines and/or tools developed at the EU level are needed to support implementation. Past and on-going research projects dealing with strategic noise planning, along with the experience gained by LRAs from the drafting and implementation of Noise Action Plans, have created a number of tools facilitating local implementation of soundscape and noise reduction measures, such as prioritisation methodologies identifying noise hotspots for mitigation action and quiet areas for protection, tools for the assessment of traffic noise impact on dwellings, etc. In this context:

- ▶ The standardisation, at EU level, of tools and methodologies facilitating the drafting and/or actual implementation of Noise Action Plans should be a priority concern. Ideally, this process should involve a wide range of stakeholders, from research institutes and universities to LRAs, under the coordination of a single agency within the EC.

There are still important gaps in research: filling them could substantially improve the effectiveness of planning, for example in terms of impact of cumulative noise or combination of different environmental pollutants. Accordingly:

- ▶ A more solid knowledge base for the implementation of the END needs to be developed. Relevant research should be further encouraged through the seventh EU Framework Programme, in terms of supporting both relevant past/on-going research (e.g. the Q-City Transport project, the BESTUFS project, etc.) and new initiatives.

Sharing of best practices

The implementation of the END could greatly benefit from the sharing of best practices.

- ▶ The sharing of best practices through a common platform or a network would be particularly relevant for some areas of competence of local and regional authorities, such as involving the public, coordination of stakeholders at the local level, methodologies for the prioritisation of interventions, monitoring of the effectiveness of measures, and mapping.
- ▶ Best practices can also be shared through European territorial cooperation programmes. In particular, the Interreg IVC programme provides an opportunity for spreading technical knowledge to regions that are less advanced in specific noise-related areas, and for promoting policy interventions for improved soundscapes.
- ▶ Awards, prizes or similar initiatives may help to highlight creative or cost-effective measures implemented across the EU, along the example of 'The European Soundscape Award' (B.3).

B.3 The European Soundscape Award

The award is meant to raise awareness about the health impact of noise by rewarding products, campaigns, innovations or schemes aimed at reducing excessive noise in a creative or in a cost-effective manner. Community co-operation, noise education and replication potential are also considered among the award criteria. The next award ceremony will be on 8 November 2011 for all applications submitted by 2 September 2011.

Source: EEA [website](#)

4. Annex I - List of agglomerations subject to reporting obligations under the END

Country	Agglomeration	Inhabitants	Area (km2)	Country	Agglomeration	Inhabitants	Area (km2)
Austria	Vienna	1.610.578	456	Malta	Valletta	274.500	39
Belgium	Antwerp	422.676	205	Netherlands	Amsterdam	1.543.781	880,76
Belgium	Brussels	999.899	160	Netherlands	Eindhoven	428.207	276,4
Belgium	Ghent	255.120,00	156,00	Netherlands	Haarlem	258.513	174,47
Bulgaria	Plovdiv	376.000	102	Netherlands	Rotterdam	1.271.832	642,59
Bulgaria	Sofia	1.358.000	210	Netherlands	The Hague	1.083.134	437,84
Bulgaria	Varna	350.000	168	Netherlands	Utrecht	460.592	242,87
Cyprus				Norway	Oslo	822.800	
Czech Republic	Brno	374.929	230	Poland	Białystok	294.193	102
Czech Republic	Olomouc	317.385	214	Poland	Bydgoszcz	355.085	179
Czech Republic	Prague	1.160.641	496	Poland	Gdansk	459.072	262
Denmark	Copenhagen	1.071.714	400	Poland	Gdynia	253.193	135
Estonia	Tallinn	401.140	159,2	Poland	Katowice	314.500	165
Finland	Helsinki	560.905	186	Poland	Krakow	1.410.000	327
France	Avignon	253.580	507,91	Poland	Lodz	764.100	294
France	Bordeaux	259.198	389,61	Poland	Lublin	353.500	147
France	Bordeaux	753.931	1057,03	Poland	Poznan	564.035	216
France	Clermont-Ferrand	258.541	180,77	Poland	Szczecin	388.466	301
France	Douai - Lens	518.727	489,12	Poland	Warsaw	1.700.536	512
France	Grenoble	419.334	324,78	Poland	Wroclaw	589.685	293
France	Lille	1.000.900	450,26	Portugal	Lisbon	564.637	85
France	Lyon	1.348.832	954,19	Portugal	Porto	263.131	42
France	Marseille	1.349.772	1289,59	Romania	Brasov	284.596	256,9
France	Metz	322.526	362,5	Romania	Bucharest	1.926.334	228
France	Montpellier	287.981	154,39	Romania	Cluj-Napoca	317.953	179,5
France	Nancy	331.363	314,24	Romania	Constanta	310.471	124,9
France	Nantes	544.932	475,62	Romania	Craiova	302.601	81,4
France	Nice	888.784	721,08	Romania	Galati	298.861	241,5
France	Orleans	263.292	289,52	Romania	Iasi	320.888	93,9
France	Paris	9.644.507	2723,03	Romania	Ploiesti	259.000	58,28
France	Rennes	272.263	184,83	Romania	Timisoara	317.660	129,3
France	Rouen	389.862	267,64	Slovakia	Bratislava	528.129	858,66
France	Saint-Etienne	291.960	231,22	Slovenia	Ljubljana	266.251	275
France	Strasbourg	427.245	222,43	Spain	Alicante	320.021	40
France	Toulon	519.640	713,15	Spain	Baix Llobregat I	462.697	49,89
France	Toulouse	761.090	808,14	Spain	Barcelona I	1.646.529	104,27
France	Tours	297.631	420,6	Spain	Barcelona II	338.307	28,77
France	Valenciennes	357.395	506,51	Spain	Bilbao	354.918	40,65
Germany	Aachen	258.208	160,83	Spain	Córdoba	324.327	33,8
Germany	Augsburg	270.000	147	Spain	Gijón	274.037	182
Germany	Berlin	3.390.000	889	Spain	Las Palmas de Gran Canaria	385.169	101
Germany	Bielefeld	326.925	257,85	Spain	Madrid	3.205.334	606
Germany	Bochum	385.626	145,44	Spain	Málaga	560.631	98
Germany	Bonn	312.818	141,22	Spain	Murcia	436.000	881,1
Germany	Bremen	545.991	325	Spain	Palma de Mallorca	404.335	213
Germany	Cologne	983.347	405,15	Spain	Pamplona	280.199	127,41
Germany	Dortmund	588.168	280,39	Spain	Santa Cruz de Tenerife	370.473	252
Germany	Dresden	456.000	150	Spain	Sevilla	537.893	140,09
Germany	Duisburg	501.564	232,81	Spain	Valencia	807.396	134,65
Germany	Düsseldorf	574.514	217,01	Spain	Valladolid	320.287	197,91
Germany	Essen	585.430	210,38	Spain	Vigo	293.000	109
Germany	Frankfurt	664.000	256	Spain	Zaragoza	660.895	-2
Germany	Gelsenkirchen	268.102	104,86	Sweden	Gothenburg	489.757	451
Germany	Hamburg	2.040.000	1045	Sweden	Malmö	276.244	155
Germany	Hannover	555.862	238	Sweden	Stockholm	782.885	216
Germany	Karlsruhe	300.134	173	United Kingdom	Belfast	580.276	198
Germany	Kiel	292.933	188,6	United Kingdom	Birkenhead	336.452	76
Germany	Leipzig	350.000	132	United Kingdom	Blackpool	264.601	61
Germany	Mannheim	325.433	145	United Kingdom	Bournemouth	383.713	108
Germany	Mönchengladbach	261.444	170,45	United Kingdom	Brighton/Worthing/Littlehampton	442.252	95
Germany	Munich	1.302.489	310	United Kingdom	Bristol	551.066	140
Germany	Munsterberg	493.397	187	United Kingdom	Cardiff	327.706	76
Germany	Stuttgart	600.700	211	United Kingdom	Coventry/Bodworth	304.400	73
Germany	Wiesbaden	273.000	203	United Kingdom	Edinburgh	452.340	
Germany	Wuppertal	359.237	168,39	United Kingdom	Glasgow	1.243.150	
Greece	Athens	745.514	38	United Kingdom	Kington upon Hull	261.088	66
Greece	Thessaloniki	363.987	18	United Kingdom	Leicester	441.213	102
Hungary	Budapest	2.065.230	1128	United Kingdom	Liverpool	879.996	211
Ireland	Dublin	1.150.000	1163	United Kingdom	London	8.278.251	1623
Italy	Bari	318.564		United Kingdom	Manchester	2.284.093	600
Italy	Bologna	501.292		United Kingdom	Nottingham	666.358	159
Italy	Catania	637.587		United Kingdom	Portsmouth	461.181	94
Italy	Florence	387.669	102,27	United Kingdom	Preston	301.416	80
Italy	Genoa	610.307		United Kingdom	Reading/Wokingham	362.403	97
Italy	Milan	1.256.211	181,64	United Kingdom	Sheffield	640.720	162
Italy	Naples	1.004.500		United Kingdom	Southampton	319.675	89
Italy	Palermo	780.529		United Kingdom	Southend	269.415	67
Italy	Rome	2.546.804	1285,3	United Kingdom	Swansea/Neath/Port Talbot	270.506	80
Italy	Turin	1.321.800	227,57	United Kingdom	Teesside	369.804	93
Latvia	Riga	806.993	579	United Kingdom	The Poitievies	365.323	114
Lithuania	Kaunas	378.943	156,944	United Kingdom	Tyneside	816.216	186
Lithuania	Vilnius	553.904	400,399	United Kingdom	West Midlands	2.240.230	557
Luxembourg				United Kingdom	West Yorkshire	1.499.465	370
	sub-total 1	63.695.229	29.555		sub-total 2	58.674.989	18.012

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