

## Implementation of the Environmental Noise Directive, exploitation of results in Europe and its next phase

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The Environmental Noise Directive stimulated the implementation of noise measures and noise action plans in the European Union and European Environment Agency member countries.

The Directive was published in 2002, following the Green Paper on Future Noise policy of 1996, document which aimed at no person to be exposed to noise levels which endanger health and quality of life. After ten years from the date when the Environmental Noise Directive entered into force, some of the main critical objectives are yet to be achieved, such as the comparability between data provided by the different Member States, the analysis of the evolution of noise exposure in the years or the evaluation of the effectiveness of the action plans being developed to reduce the number of people exposed to noise.

European institutions as well as EEA Member Countries are in the process of achieving these objectives, with the final aim to assess and improve the existing situation in order to reduce the number of people exposed to noise levels that could endanger their health and quality of life. To achieve this purpose, improvements on reporting and data collection are relevant to streamline the data-flow.

### **1 Introduction**

The Environmental Noise Directive (hereinafter called END) [1] entered into force in 2002, relating to the assessment and management of environmental noise with the aim to define a common approach intended to avoid, prevent or reduce on a prioritized basis the harmful effects, including annoyance, due to exposure to environmental noise. In order to achieve those objectives, it is foreseen (1) to determine the exposure to environmental noise through noise mapping, (2) to ensure that information on environmental noise and its effects is made available to the public and (3) to adopt action plans by the Member States, based upon noise-mapping results, with a view to preventing and reducing environmental noise where necessary and particularly where exposure levels can induce harmful effects on human health and to preserving environmental noise quality where it is good.

Member States were obliged to transpose the END in the subsequent following 2 years to their national legislations.

Various scientific studies, including the research developed by WHO on this field, demonstrate that environmental noise is damaging people's health, such as causing an increase of the number of deaths of people affected by cardiovascular diseases. Therefore, this was one of the main reasons why it was of high interest to develop an European directive that should be applied in all member states.

One of the main basis of the Directive is the requirement to the member states to deliver every five years, information on the number of people exposed at different noise levels inside agglomerations (with more than 100000 inhabitants) and outside agglomerations due to the main transport networks. This data should be provided separately for each of the noise sources identified in the END: roads, railways, airports and industrial areas. In parallel, it is also requested to provide noise contour maps showing the isophones per each noise source.

It is clear that with these requirements, a portion of the total European population is excluded from the Directive scope, but it tries to find the equilibrium between major noise sources (to ensure environmental security) and the effort requested to the MS to provide the information.

## 2 Implementation of the END

### 2.1 Roles and responsibilities of the involved stakeholders

The END distributes roles, responsibilities and duties between the Member States (and also local governments) and the European institutions. In Table 1, there is a summary of this distribution:

Table 1. Summary of the responsibilities highlighted in the END for the different stakeholders

<b>MS are requested to...</b>	<b>EU institutions are requested to...</b>
... designate the competent authorities and bodies responsible for implementing this Directive...	... establish common assessment methods...
... apply the noise indicators $L_{den}$ and $L_{night}$ for the preparation and revision of strategic noise mapping...	... set up a database of information on strategic noise maps
... ensure that strategic noise maps have been made for...	... publish a summary report of data from strategic noise maps and action plans every five years....
... ensure that competent authorities have drawn up action plans...	... submit to the European Parliament and the Council a report on the implementation of this Directive...
...ensure that the information from strategic noise maps and summaries of the action plans is delivered to the Commission	

Specifically in the case of the European institutions, the European Commission – Directorate General Environment (DG Env) is responsible for determining the compliance with the law of the different Member States, for starting a revision process of the current Directive and for proposing guidelines and common calculation methods at European level.

In parallel, Directorate General Joint Research Centre (DG JRC) developed a comparative analysis of the different calculation methods applied by the Member States (MS) and currently, it is working together with the MS in the development of the CNOSSOS-EU project<sup>1</sup>: a proposal for common calculation methods to be used in all MS to determine the population exposed at several noise bands.

Moreover, the European Environmental Agency is the institution responsible for the development of an harmonized system to report noise data to the European Commission for the MS through a content management system, to assess the data received and to disseminate the results together with the European Topic Centre on Spatial Information and Analysis (ETC-SIA).

In this regard, the ETC-SIA is responsible for the quality check of the noise data being reported by the Member States and the compilation of all the data into the European noise database. This information is published afterwards by both institutions through the NOISE website (Noise Observation and Information System for Europe): <http://noise.eionet.europa.eu> [6], to accomplish with the dissemination request of noise information specified in the END (Article 10.3).

<sup>1</sup> <http://ec.europa.eu/environment/noise/cnossos.htm>

## 2.2 Dataflow

In the case of the END, Member States and the European institutions have been working in parallel to solve the problems arising from one reporting obligation to the subsequent one. There have been several improvements from both sides, and there is still room for improvement.

Several working groups dependent from EEA, also helped in the overall process through the development of documents such as the Good Practice Guide for Strategic Noise Mapping and the Production of Associated Data on Noise Exposure (WG-AEN, 2006) [3], a position Paper on Presenting Noise Mapping Information to the Public (WG-AEN, 2008) [4], a Good Practice Guide on noise exposure and potential health effects (EPoN, 2010) [5] and a Good Practice Guide on Quiet Areas (EPoN), which is being developed at the current moment.

Concerning specifically the work done concerning the noise data reporting (including how to do it and where to do it), the following two issues could be highlighted:

- In order to facilitate the comprehension of the information being requested by the END and to organize the information to be provided by the MS, a datamodel named as Environmental Noise Directive Reporting Mechanism (ENDRM) was created in 2007. Associated to this datamodel, a series of Microsoft Excel templates have been created.
- In order to have a more straight forward way to report the data from the MS to the EC, the ENDRM has been implemented into the content management system developed and managed by the EEA to report environmental data, called Reportnet [7]. This platform allows having all the information concerning noise stored in the same place and at the same time, to develop some tools to facilitate the delivery and to check the correctness of the data by the reporters. In this regard, specific guidelines explaining how to report each type of the expected data are being finalized and an automatic quality check of the data have been developed per each dataflow, which highlights mistakes of the data being reported, warns if the specifications are not followed, etc.

By using all these tools, the time frame to report to the European Commission on the quality of the data being reported and its coverage will be shortened, as well as the publication of the data into Noise Observation and Information Service for Europe (N.O.I.S.E.) [6].

## 3 Exploitation of results at EU level

### 3.1 State of the art

The END obliges Member States to report information on people exposed to different noise levels and due to different noise sources per  $L_{den}$  and  $L_{night}$  indicators. It obliges as well to develop action plans to reduce the number of people exposed to those noise levels, in order to improve the situation in the future.

However, END contains several missing and unclear provisions concerning definitions, methodologies to be used to obtain the requested data, input data to be included in the calculations and different accuracies, etc. and also formats to be used to report the information.

This situation created problems concerning data harmonization in the first stages of the implementation of the END, and a lack of comparability between member states when analyzing noise data at EU level. However, and although the difficulties of comparability of the data, an effort has been done to integrate all the data reported in a common relational database containing noise data for all Europe.

Nevertheless, the EC, the EEA and the ECT-SIA, and the different member states have started to work on measures to overcome those difficulties in order to obtain data of higher quality, with more accuracy, that could be easily integrated in an European database and most important, comparable among the different member states.

Having said that, it is remarkable that for the first time there exists a picture at European level of the noise situation, which highlights the potential number of people exposed to different noise levels affecting their health. This picture covers currently, the major transport networks at EU level (major roads, major railways and major airports) as well as all the agglomeration with more than 250.000 inhabitants.

Much more data is expected by the end of 2012, when information on people exposed to noise will be calculated per all European agglomerations with more than 100.000 inhabitants and including all main transport networks. It is also expected to compile information such as noise contour maps or the delimitations of quiet areas in spatial format, which will enable its analysis with other types of spatial information, such as land cover, information on biodiversity (Natura 2000, endangered species distribution,...), air pollution, urban and transport policies, etc. The final aim of performing all these analyses as well as relating noise exposure and health is the assessment of the overall range of impacts due to noise in order to overcome the current situation and improve it in the future, by reducing the number of people and habitats exposed to noise levels that could endanger their quality of life on the one hand and impair the implementation of (some) ecosystem services on the other hand.

### 3.2 Degree of compliance of the END

10 years already passed since the END entry into force and the percentage of Member States being compliant with it and delivering the requested information, or at least some of the requested information, is nearly 100% in all the dataflows that should have been reported. Nevertheless, if we analyze the percentages but considering the reporting items, the situation is different depending on the dataflow and on the specific reporting entities. In Table 2, the percentages of compliance with information reported by Member States until the 30<sup>th</sup> of June 2011 concerning information on Strategic noise maps (dataflow 4), due in 2007, and information on Action Plans (dataflow 7), due in 2009 is displayed.

Table 2. Current state of compliance: % of fulfilment by reporting entities for DF4 and DF7

Strategic noise maps (DF4)			Action plans (DF7)		
Reporting item		% of fulfillment (noise exposure data)	Reporting item		% of fulfillment (errors to be clarified)
Agglomerations	Roads	80	Agglomerations	Roads	2,44
	Railways	76		Railways	
	Airports	71		Airports	
	Industry	75		Industry	
Major roads		96	Major roads		10,34
Major railways		96	Major railways		4,54
Major airports		96	Major airports		1,28

### 3.3 Dissemination

The European Environment Agency (EEA) has entrusted European Topic Center for Spatial Information and Analysis (ETC-SIA) with the management of the official data reported by Member States on compliance with the European Directive for assessment and management of environmental noise. Besides being responsible of the harvesting of the information with a quality checking process, and the harmonization of European noise data, ETC-SIA has also been in charge of the development of N.O.I.S.E. (standing for Noise Observation and Information System for Europe). These responsibilities have allowed ETC-SIA to be involved in the full life-cycle of the European noise data, from the collection and harmonization phase till the development of the dissemination system for citizens.

NOISE constitutes a service from the Shared Environmental Information System for Europe (SEIS)<sup>2</sup>, a collaborative initiative promoted by the European Commission, the European Environment Agency and the member states of the EEA to set up an integrated information system for environmental data. Given that SEIS has been conceived as a distributed, standardized and inter-operable system, it builds upon the premises of the INSPIRE directive<sup>3</sup>.

<sup>2</sup> <http://ec.europa.eu/environment/seis/>

<sup>3</sup> <http://inspire.jrc.ec.europa.eu/>

NOISE contains all the existing information on noise delivered by the Member States, discriminated by noise source and at different scales of detail: at European level, at country level or per single reporting item. It shows information on number of people exposed to different noise bands per different noise sources and it also shows noise isophones, being both of them displayed in a map viewer, and enables the user to download additional information being reported by the Member States.

The dissemination of the existing data is an important source of information for the citizens and it also allows that different scientific communities to analyse this data and extrapolate results at EU level in noise studies, strategic planning, urban planning, human health, transport networks, etc.

Other services based on this data has also been produced, such as the NoiseWatch Service, being published in the Eye on Earth Platform [8], a global public information service, with the objective of gathering information from the citizens.

## 4 Next phase

Data provision by Member States and compiled afterwards by the EU institutions have been used to identify the existing problems and to design proposals to improve the dataflow process. An important step to be achieved in order to overcome the current inconsistencies with the data provided until now is the consolidation of the CNOSSOS-EU project, started by the Commission in 2009 to deal with all aspects related to methodologies, standards and data formats in an integral way. It is expected to be of full application for the third round of the implementation of the END, in 2015-2017.

It is also important to take into consideration that noise has been identified as a priority issue for enhancing societal resilience (improving health and wellbeing through a better environment) and for meeting the urban challenge of the proposal for the Seventh EU Environmental Action Programme – EU environment policy priorities for 2020<sup>4</sup>.

Therefore, the availability of noise information at EU level will become a priority, and as more data would be available, it would be possible to follow-up existing assessments, analyse trends on noise exposure and the effectiveness of action plans being applied at the different administration levels.

Establishing proven scientific linkages of noise data and noise exposure with other environmental stressors is going to provide in the future, an overall picture of the impacts that can occur -or that are already occurring- at citizens' level and at habitats level. By disseminating the facts and the current situation due to noise to the society, noise can be upgraded in the political agenda, which in fact, it started to happen as soon as noise data have been made available, compiled and published for the first time at EU level.

Considering all these inputs, and following also the END requests, the Directorate General for the Environment is going to review the Directive in the next future, to solve the missing and unclear provisions already identified, work on the definitions and with the specifications of the data to be provided and of the methods to be applied.

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<sup>4</sup> [http://ec.europa.eu/environment/consultations/7eap\\_en.htm](http://ec.europa.eu/environment/consultations/7eap_en.htm)

## References

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