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**COMMISSION STAFF WORKING DOCUMENT**

**REFIT EVALUATION**

**of the**

**Directive 2002/49/EC**

**relating to the assessment and management of environmental noise**

# Table of Contents

<b>1. Introduction .....</b>	<b>2</b>
<b>2. Background to the initiative .....</b>	<b>2</b>
<b>3. Evaluation questions .....</b>	<b>7</b>
<b>4. Method .....</b>	<b>8</b>
<b>5. Implementation state of play (Results) .....</b>	<b>12</b>
<b>6. Answers to the evaluation questions .....</b>	<b>14</b>
6.1. Relevance .....	14
6.2. Coherence .....	15
6.3. Effectiveness.....	17
6.4. Efficiency .....	21
6.5. EU added value.....	25
<b>7. Conclusions .....</b>	<b>26</b>
<b>ANNEX 1: PROCEDURAL INFORMATION CONCERNING THE PROCESS TO PREPARE THE EVALUATION .....</b>	<b>28</b>
<b>ANNEX 2: STAKEHOLDER CONSULTATION.....</b>	<b>31</b>
<b>ANNEX 3: METHODS AND ANALYTICAL MODELS USED IN PREPARING THE EVALUATION .....</b>	<b>42</b>
<b>ANNEX 4: LIST OF RELEVANT EU LEGISLATION .....</b>	<b>43</b>

## 1. Introduction

This document describes the methodology and findings of the evaluation of Directive 2002/49/EC relating to the assessment and management of environmental noise (the Environmental Noise Directive, END)<sup>1</sup>.

As the Directive has been in place since 2002 and had never been evaluated before, in 2013 the Commission designated it for evaluation<sup>2</sup> in the context of its Regulatory Fitness and Performance (REFIT) programme, a part of its Better Regulation agenda<sup>3</sup>. The REFIT programme<sup>4</sup> is about identifying actions to make EU law simpler, more efficient and effective, seeking to reduce any unnecessary regulatory costs, thus contributing to a clear, stable and predictable regulatory framework supporting growth and jobs.

In accordance with the general guidance on Better Regulation<sup>5</sup>, this evaluation explores whether the Directive was and continues to be relevant to tackling the issue it addresses, while providing EU added value in comparison to Member State action alone. In addition, this evaluation assesses whether the Directive achieved this in an effective and efficient manner, and whether its provisions were coherent with other EU legislation. The evaluation also considered the impact of the Directive on SMEs, and the potential for simplification and reduction of administrative burdens.

The scope of the evaluation was limited to the Environmental Noise Directive. The evaluation takes into account the interaction of the Directive with EU legislation which tackles noise emissions at their source (e.g. by regulating the noise emissions of motor vehicles), but did not address this legislation in a detailed manner. The evaluation covers the period from the adoption of the Environmental Noise Directive (2002) to the present day.

The findings of the evaluation will – together with the Commission's second report on the implementation of the Directive – inform the further development of the EU noise policy.

## 2. Background to the initiative

Environmental noise pollution relates to noise caused by road, rail and airport traffic, as well as large industrial installations. Prolonged exposure to high levels of noise pollution can lead to serious health effects mediated by the human endocrine system and by the brain, such as cardiovascular diseases, sleep disturbance and annoyance (a feeling of discomfort affecting general well-being). According to the World Health Organisation (WHO), among the environmental pressures in Europe, noise pollution leads to a disease burden that is second in magnitude only to that from air pollution<sup>6, 7</sup>.

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<sup>1</sup> Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise, OJ L 189, 18.7.2002

<sup>2</sup> COM(2013) 685 final

<sup>3</sup> [http://ec.europa.eu/priorities/democratic-change/better-regulation\\_en](http://ec.europa.eu/priorities/democratic-change/better-regulation_en)

<sup>4</sup> [http://ec.europa.eu/smart-regulation/refit/index\\_en.htm](http://ec.europa.eu/smart-regulation/refit/index_en.htm)

<sup>5</sup> [http://ec.europa.eu/info/strategy/better-regulation-why-and-how\\_en](http://ec.europa.eu/info/strategy/better-regulation-why-and-how_en)

<sup>6</sup> <http://www.euro.who.int/en/media-centre/sections/press-releases/2011/03/new-evidence-from-who-on-health-effects-of-traffic-related-noise-in-europe>

An important objective of EU policy is to achieve a high level of health and environmental protection<sup>8</sup>. In accordance with this and based on the evidence on the health effects of exposure to noise pollution, the 7<sup>th</sup> EAP - General Union Environment Action Programme to 2020<sup>9</sup> recognised noise as one of the environment-related pressures and risks to health and well-being from which the Union's citizens needed to be safeguarded and called for ensuring that by 2020 noise pollution in the Union had significantly decreased, moving closer to levels recommended by the WHO.

Despite the local nature of the negative effects of noise pollution, for the problem to be tackled effectively and efficiently, local (e.g. erecting noise barriers) and national (e.g. setting noise limit values for areas around schools) actions need to be combined with measures to reduce noise at its source<sup>10</sup>, which fall under the competence of the EU as they impact the Single Market (e.g. by regulating maximum sound levels that road vehicles are permitted to emit<sup>11</sup>). As a consequence, in 1996 the Commission outlined<sup>12</sup> the need for a framework based on shared responsibility to help improve the coherence of different actions on noise pollution and monitor their effects.

The Environmental Noise Directive is one of the key legislative instruments of this framework. Two objectives of the Directive were defined as follows:

#### **Box 1: Objective (1)**

**to define a common approach intended to avoid, prevent or reduce** on a prioritised basis **the harmful effects**, including annoyance, **due to exposure to environmental noise**. To that end the following actions shall be implemented progressively:

- (a) the **determination of exposure** to environmental noise, through noise mapping, by methods of assessment common to the Member States;
- (b) ensuring that **information** on environmental noise and its effects is made available **to the public**;
- (c) **adoption of 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.

<sup>7</sup> WHO/JRC, 2011, Burden of disease from environmental noise, Fritschi, L., Brown, A.L., Kim, R., Schwela, D., Kephelopoulou, S. (eds), World Health Organization, Regional Office for Europe, Copenhagen, Denmark

<sup>8</sup> Consolidated version of the Treaty on European Union, OJ C 326, 26.10.2012

<sup>9</sup> OJ L 354, 28.12.2013

<sup>10</sup> L.C. (Eelco) den Boer, A. (Arno) Schrotten, Traffic noise reduction in Europe, CE Delft, March 2007

<sup>11</sup> SEC(2011) 1505 final - COMMISSION STAFF WORKING PAPER - IMPACT ASSESSMENT Accompanying the document Proposal for a Regulation of the European Parliament and of the Council on the sound level of motor vehicles

<sup>12</sup> COM(96)540 final

## Box 2: Objective (2)

**to provide a basis for developing Community measures to reduce noise emitted by the major sources, in particular road and rail vehicles and infrastructure, aircraft, outdoor and industrial equipment and mobile machinery.**

It is important to note that the Directive does not state the avoidance, prevention or reduction of the harmful effects of noise pollution as one of its direct objectives, nor does it set targets for such avoidance, prevention or reduction. Instead it merely provides a framework to facilitate this, by aligning how transport and industry infrastructure operators across the EU manage noise, and creating a level playing field for them. The level of ambition in addressing noise pollution, the prioritisation of areas to intervene in and the choice of noise management instruments are left at the discretion of the competent authorities in the Member States.

Specifically, the Directive requires Member States to develop, every five years, strategic noise maps and action plans for noise management for agglomerations with more than 100,000 inhabitants, roads with more than 3,000,000 vehicle passages per year, railways with more than 30,000 train passages per year and airports with more than 50,000 movements per year. In its first, transitional, round of implementation, the scope of the Directive was narrower, as illustrated in Table 1.

**Table 1: Scope of the Environmental Noise Directive in Round 1 and Round 2**

Type of entity	Round 1 (2006-2011)	Round 2 (2011-2016) and subsequent rounds
<b>Agglomerations</b>	> 250,000 inhabitants	> 100,000 inhabitants
<b>Major airports</b>	> 50,000 movements <sup>13</sup> per year	> 50,000 movements per year (unchanged)
<b>Major roads</b>	> 6 million vehicle passages per year	> 3 million vehicle passages per year
<b>Major railways</b>	> 60,000 train passages per year	> 30,000 train passages per year

The full scope of the Directive came into force in 2013, increasing the number of entities covered considerably (e.g. the number of agglomerations covered increased by 165%, from 176 to 467 agglomerations).

**Table 2: Entities covered by scope of the Environmental Noise Directive in R1 and R2**

Type of entity	Round 1 (2006-2011)	Round 2 (2011-2016) and subsequent rounds
<b>Agglomerations</b>	176	467
<b>Major airports</b>	73	92 (due to increased air traffic)
<b>Major roads (km)</b>	67,488	154,738
<b>Major railways (km)</b>	31,576	72,341

As of 2011, the full scope of the Directive includes 467 agglomerations, 92 airports, 72,341 km of railways and 154,738 km of roads in the EU.

<sup>13</sup> A movement is defined in Article 3(p) of the Directive as a take-off or landing.

At the time of the Directive's adoption, the legislators foresaw that further time would be necessary to develop two parts of the common approach to noise management: the common noise mapping methodology and the common assessment methods for the harmful effects of noise. The common noise mapping methodology was to be defined in Annex II of the Directive. This Annex originally provided for Member States to continue using their national methods, or an interim method, until a common noise mapping methodology (CNOSSOS-EU) was developed. This process took a considerable amount of time and was completed only in 2015 through a revision of Annex II in Commission Directive (EU) 2015/996<sup>14</sup>. As a consequence, Member States used several different interim methods for the two rounds of noise mapping implemented to date. The common noise mapping methodology will need to be implemented by the Member States at the latest on 31 December 2018. The common assessment methods for the harmful effects of noise are to be defined by a revision of Annex III of the Directive. The process for this revision is ongoing and planned to be finalised in late 2017.

Following the development and adoption of noise maps and action plans (in five-yearly cycles), Member States are required to report these to the Commission, in accordance with deadlines set in the Directive. Reporting is almost exclusively done via the European Environment Agency's online system Reportnet<sup>15</sup>, although this is not compulsory.

The problems the Directive was intended to solve, its objectives and its different components are summarised in the intervention logic diagram in Figure 1.

## **Baseline**

Previous to the introduction of the Directive, data available on noise exposure in Europe was generally poor – in contrast to that collected to measure other environmental problems – and often difficult to compare due to the different measurement and assessment methods across and even within the individual Member States. Rough estimates on the noise exposure of EU citizens were made in the 1990s<sup>16</sup>, but, considering the severe limitations of the data that they were based on and the state of the art on measuring noise pollution and its effects at the time, they cannot be used as a reliable baseline. Moreover, as impact assessments were not a common practice when the Directive was being proposed in the early 2000s, neither a systematic EU-wide baseline nor an estimate of the benefits the Directive was expected to bring about were developed at the time, making the current evaluation all the more challenging.

Therefore the only option remaining to establish the baseline for the purposes of the evaluation was to use the data from the first round of noise mapping under the Directive, done for 2006, and to compare it to the data from the second round of noise mapping, done for 2011. This means that the effects of the Directive on the noise exposure of EU citizens can only be considered for a period of 5 years between 2006 and 2011. Keeping in mind that the benefits of most measures to address noise can only be seen in the longer term (e.g. over a 20-year period),

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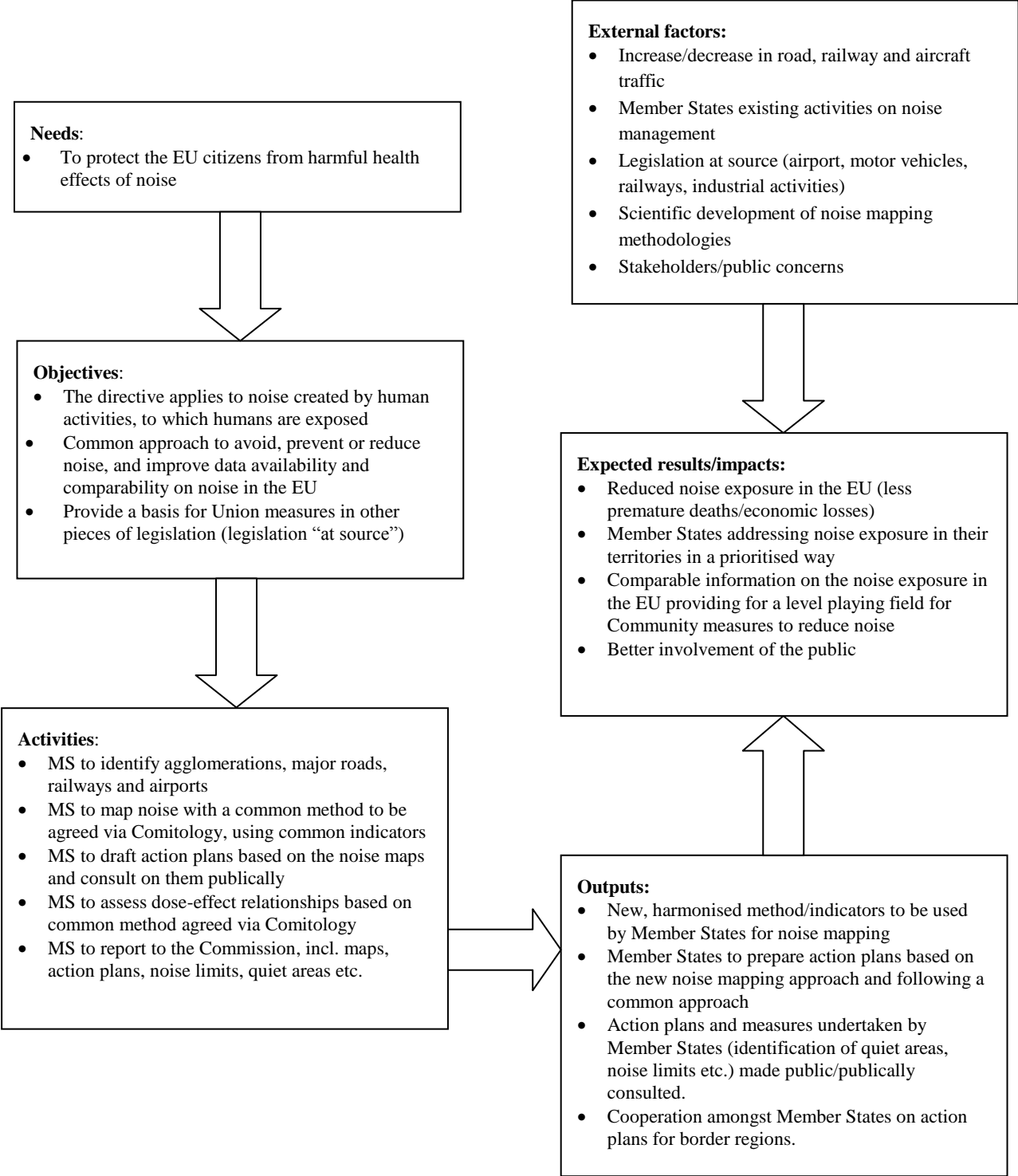
<sup>14</sup> Commission Directive (EU) 2015/996 of 19 May 2015 establishing common noise assessment methods according to Directive 2002/49/EC of the European Parliament and of the Council, OJ L 168, 1.7.2015

<sup>15</sup> <http://cdr.eionet.europa.eu/>

<sup>16</sup> COM(96)540 final

the effects can therefore not be fully evaluated at the moment. In line with the intervention logic, the evaluation therefore explores whether the expected outputs have occurred.

**Figure 1: END intervention logic diagram**



Source: Evaluation roadmap

### 3. Evaluation questions

The evaluation logic was framed under five different evaluation categories: relevance, coherence, effectiveness, efficiency and EU added value. For each of these categories a series of evaluation questions, set out in the evaluation roadmap, were given.

#### Relevance

- Are the objectives of the Directive still relevant/do they still match current needs, and if yes, why? How does the Directive contribute to ensuring "that by 2020 noise pollution in the Union has significantly decreased, moving closer to WHO recommended levels", as stated in the 7th Environment Action Programme?
- How has the Directive adapted to technical and scientific progress?

#### Coherence

- How has the Directive contributed to providing a basis for developing measures at EU level to reduce environmental noise (interaction with other EU law related to noise), and in particular for legislation to regulate noise at source (road vehicles/road traffic, rail vehicles/railway traffic, airports and aircrafts e.g. the new Regulation on operating restrictions at airports, outdoor equipment, industrial equipment, and mobile machineries)?
- Are there any gaps where further EU noise legislation is required to improve reaching the objectives of the Directive, which can best be addressed by modifying/amending the Directive (e.g. common target or limit values)?

#### Effectiveness

- What progress have Member States made over time towards achieving the objectives set out in the Directive? Is this progress in line with initial expectations?
- What main factors have contributed to or stood in the way of achieving these objectives?
- How has the Directive contributed to achieving a common approach within the EU towards environmental noise?
- What other significant changes did the Directive achieve (positive or negative)? Which are unexpected or unintended changes resulting from the Directive?
- Can any obsolete provisions in the Directive be identified and if yes, why are such provisions obsolete?
- How have the different provisions of the Directive (noise measuring, including via common indicators and a common assessment method, noise mapping, preparation of action plans, information and consultation of the public, reporting to and by the Commission) been accepted by the stakeholders?

In this context, a number of prospective issues were asked to explore possibilities for **simplification**:



- How could the reporting mechanism be improved? (taking into account the work and results of the recently started REFIT of the reporting requirements - and subsequently also ensuring compliance with the INSPIRE Directive)
- What administrative burdens can be identified and what is causing them (including for SMEs and micro-enterprises)?
- Is the scope of the Directive (as laid down in its Article 2) still appropriate, or – if it needs to be modified – how could that be done?
- How could the Directive be simplified, making it clearer and easier to understand while maintaining the integrity and purpose of the Directive?

### **Efficiency (addressing cost-benefit relations)**

- How has the Directive contributed to avoid, prevent or reduce the harmful effects of environmental noise?
- What are the costs and benefits (monetary and non-monetary) associated with compliance with the Directive in the different Member States (and extrapolated to the EU)?
- What are the cost differences between Member States (if any), what is causing them and has that had impacts on the benefits? Are there costs that are out of proportion with the benefits achieved? What good practices in terms of cost-effective implementation of the Directive in Member States can be identified?
- Are there provisions in the Directive which have caused excessive costs compared to the benefits (including the interval for noise mapping and action planning, the size of agglomerations, major roads, major railways and major airports for which noise maps and action plans need to be prepared and implemented)?
- How could the reporting mechanism be made more efficient?

### **EU added value**

- What has been the EU added value of the Environmental Noise Directive?
- What has been the EU added value of the Noise Directive compared to what could be achieved by Member States at national and/or regional levels?
- To what extent do the issues addressed by the Directive continue to require action at EU level?
- What would be the most likely consequences of repealing the Directive?

## **4. Method**

The basis for the evaluation was set up in the evaluation roadmap<sup>17</sup>. The evaluation was overseen by a Steering Group of relevant Commission Services and supported by an external service contract. The Commission established a dedicated web page<sup>18</sup> to share information and provide feedback to stakeholders about the evaluation throughout the process.

<sup>17</sup> [http://ec.europa.eu/smart-regulation/roadmaps/docs/2016\\_env\\_065\\_noise\\_evaluation\\_en.pdf](http://ec.europa.eu/smart-regulation/roadmaps/docs/2016_env_065_noise_evaluation_en.pdf)

<sup>18</sup> [http://ec.europa.eu/environment/noise/evaluation\\_en.htm](http://ec.europa.eu/environment/noise/evaluation_en.htm)

The methods and data sources used in conducting the evaluation included desk/literature research, including data reported by Member States, a cost-benefit analysis, interviews with competent authorities and stakeholders in all Member States, an online survey, expert views collected at a workshop and an online public consultation.

The **desk/literature research** took full account of the first implementation review of the Directive from 2010-2011<sup>19</sup> and the 27 country reports developed to support it. This allowed for the current evaluation to build on existing knowledge on the implementation of the Directive across the EU. Equally important sources in the desk research were national legislative texts and national guidelines on strategic noise mapping and action planning, as well as scientific literature. Finally, the evaluation drew upon the European Environment Agency's Noise in Europe 2014 report<sup>20</sup>, as well as the Member States' submissions of data to the Environmental Noise Directive Reporting Mechanism database<sup>21</sup> maintained by the European Environment Agency.

A detailed **cost-benefit analysis** (CBA) was performed to support the evaluation of the efficiency of the Directive. First, a review of 'state of the art' methodologies in relation to monetising the costs of noise-reduction measures (e.g. construction of noise barriers) and the health benefits of noise reduction was undertaken (e.g. reduction of risk for cardiovascular diseases), in order to inform the approach to the quantitative case studies. Following this, data was collected and analysed on 19 test cases covering agglomerations, airports, roads and railways. Quantitative work carried out for the test cases provided a bottom-up assessment of the level of noise reduction expected as the result of the most common noise-reduction measures and associated health benefits. The CBA then performed an extrapolation to the EU level based on this data.

To clarify and further deepen the information gained through desk/literature research, an **interview programme** was carried out with 104 stakeholders designed to be geographically balanced and a representative sample of relevant stakeholder groups (e.g. competent authorities, other bodies at national, regional and local level involved in implementation, industry associations at EU level, as well as NGOs and community organisations). The interviews were facilitated using an interview guide, tailored to the different groups of stakeholders.

In order to ensure that stakeholders not part of the interview programme were also able to provide their views, three different questionnaires targeted to different stakeholder groups were made available via an **online survey**. In total, 73 valid responses were received from public authorities, 7 from consultancies involved in strategic noise mapping, and 10 from NGOs/community groups. Whereas the responses to the online survey from public authorities were sufficient to allow for a quantitative analysis, the responses from acoustics consultancies and from NGOs/community groups were analysed only qualitatively due to the low number of reactions.

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<sup>19</sup> COM(2011)0321 final

<sup>20</sup> European Environment Agency: Noise in Europe 2014. Publications Office of the European Union, Luxembourg, 2014.

<sup>21</sup> <http://cdr.eionet.europa.eu/>

After the preliminary evaluation findings were developed based on the information from the methods above, a **validation workshop** was held on 23<sup>rd</sup> September 2015 in Brussels to collect stakeholder feedback on the emerging evaluation findings. The workshop was attended by 53 stakeholders. Three working papers were distributed in advance and discussed at the workshop, covering all the aspects of the evaluation. Following the workshop, the working papers were published on the website dedicated to the evaluation for written comments. In follow-up, 20 responses were received. The outcome of the workshop and the views contributed through written responses were considered for the final report of the supporting service contract.

Finally, an **online public consultation**<sup>22</sup> was made available in 23 EU languages from 21 December 2015 to 28 March 2016<sup>23</sup>. As the other parts of the evaluation methodology had already covered a thorough investigation of other stakeholders' views, the online public consultation targeted primarily citizens and associations of citizens. However, all other interested stakeholders were invited to reply as well. The 13 questions addressed the relevance, effectiveness, efficiency and EU added value of the Directive. A total of 1429 replies were received, 79% of them from citizens and citizen associations.

The final report of the supporting service contract was approved on 5 September 2016. In addition to the evaluation report, the implementation of the Directive was also reviewed. For this, 28 country reports were developed as a basis to inform the EU-level aggregate analysis of the situation in respect of END implementation.

As demonstrated above, the evaluation methodology included an analysis of scientific literature, relevant documentation and reporting data from the Member States, a cost-benefit analysis, as well as a comprehensive consultation with competent authorities from all Member States and stakeholders across the EU including citizens. This process encompassed a wide range of data, information, and views of stakeholders and Member States, giving confidence in the robustness of the findings. However, some methodological challenges remained. They are described below, together with an outline of how they were addressed.

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<sup>22</sup> As the online public consultation was not a mandatory element of evaluations under REFIT at the time when the study contract was prepared, the consultation was not part of the contract and was conducted independently by Commission Services. Consequently its results are not reported in the final report of the study, but are instead available in Annex 2 of this document.

<sup>23</sup> The standard 12-week period for responding was extended by 2 weeks in order to account for end-of-year holidays.

**Table 3: Methodological limitations**

<b>Key limitations</b>	<b>How they were addressed</b>
<p>The text of the Directive does not specify a level of ambition for reducing noise pollution. Moreover, at the time when the Directive was adopted, no estimate of the benefits the Directive was expected to bring about was defined. Therefore it is not possible to conclude precisely what ambition the Directive should fulfil.</p>	<p>Where possible, in addition to looking at the two objectives of the Directive, the evaluation also assessed the Directive's performance against what the evaluators assumed to have been the expected impact, i.e. the reduction of noise pollution (see in particular the CBA analysis).</p>
<p>Since at the time the Directive was adopted, no ex-ante impact assessment was performed and clear baselines were not established, it was not possible to draw up a clear counterfactual for the evaluation.</p>	<p>Data on the noise exposure of EU citizens collected in the first round of noise mapping under the Directive (2006) was used as the counterfactual.</p>
<p>The END has been designed to allow implementation to be quite different in different countries, but this posed challenges in assessing the efficiency and effectiveness of the Directive's implementation overall. A direct comparison between countries could be misleading.</p>	<p>To some extent, the risk of direct comparison was overcome by clustering groups of countries that have adopted a similar approach to END implementation.</p>
<p>As the implementation of the Directive is delayed by Member States, data, including on noise exposure, was limited. This limited the choice of case studies for the cost-benefit analysis.</p>	<p>The criteria for the selection of case studies were amended to include data availability considerations.</p>
<p>The provision of financial information on noise action plans is optional under the Directive, which meant that the majority of action plans did not include it and therefore the data that could be used for the cost-benefit analysis was limited.</p>	
<p>It is difficult to determine the extent to which the costs and benefits incurred could be attributed specifically to the END, as opposed to other drivers, such as the pre-existence of national regulatory requirements or other factors such as air quality or road safety.</p>	<p>Attribution issues were factored into the quantitative case study and CBA work. A sensitivity analysis was undertaken to assess how costs-benefit ratios would change under different modelling scenarios of 25%, 50% and 75% attribution effects.</p>
<p>The END has led to a number of benefits which could not be quantified, and as a consequence it was difficult to value them against the costs of implementing the Directive.</p>	<p>The assessment of effectiveness and impacts provided examples of the non-quantifiable strategic benefits of the END.</p>

## 5. Implementation state of play (Results)

In order to support the evaluation of the Directive, a detailed review of the state of implementation of the Directive in Member States was performed, focussing on: the legal transposition, the implementation arrangements and the completeness of reporting to the Commission to date.

With regard to **transposition**, the Commission registered cases of non-communication for 14 Member States by the official deadline for transposition in 2004, but all cases were successfully closed by October 2007. Formal legal transposition can therefore be considered satisfactory.

With regard to the arrangements for the **practical implementation** of the Directive in the Member States, it is important to note that the Directive has been designed in a way that fully recognises subsidiarity. It requires the Member States to designate the competent authorities and leaves it to them to decide the appropriate level (national/regional/local). As a consequence, implementation arrangements vary widely between Member States, from highly centralised (where e.g. one action plan is prepared at Member State level) to highly decentralised (where e.g. thousands of small municipalities each prepare their own action plans), including a combination of approaches.

With regard to the **completeness** of implementation of the provisions of the Directive, the implementation is significantly delayed, with more than 20% of the required noise maps and around 50% of the action plans for the current five-year reporting cycle, which were due to be prepared by 2012/13, still not supplied by Member States. An overview of data completeness is provided in the Table below.

**Table 4: Completeness of reporting for current round of noise mapping and action planning**

Entity	In agglomerations				Outside agglomerations		
	Road noise	Railway noise	Aircraft noise	Industry noise	Major roads	Major railways	Major airports
Noise maps completed	78%	75%	52%	69%	79% <sup>24</sup>	73% <sup>25</sup>	75%
Action plans completed	49%				47% (average)	41% (average)	43%

Source: Final Report of supporting service contract.

Noise maps: END\_DF4\_DF8\_Results 2012 sheet for R2 provided by the European Topic Centre on Air Pollution and Climate Change Mitigation. Analysis last updated in June 2015.

Action plans: Data in the EIONET reporting system. Analysis last updated in November 2015.

The review of the implementation of the Directive in the 28 Member States showed that the overriding reasons for these significant implementation delays included the lack of priority given to the issue at the national/local level when deciding on the allocation of limited human

<sup>24</sup> 22 out of 28 countries

<sup>25</sup> 19 out of 26 countries – 2 countries did not have any major railways in 2010

and financial resources. More specifically for noise mapping, challenges have included a lack of centralised and consistent input data, lack of effective coordination among the different competent authorities responsible for implementing the Directive and lack of comparability of the resulting noise maps across jurisdictions. With regard to action-planning, delays were caused by knock-on effects from the delays in noise-mapping (as action plans need to be based on noise maps) and the short period given between the deadline for the preparation of noise maps and that for action plans (12 months). Overall, evidence shows that Member States with a highly decentralised approach to implementation have in particular struggled to enforce the timely implementation of the Directive's measures on their authorities.

The long delays in the drawing up of noise maps and the adoption of action plans for noise management indicate that the Member States in question have not taken steps to ensure that their citizens are informed about noise pollution in their territories (or parts thereof) and its effects, nor have they adopted measures to address noise pollution. These delays in implementation generate complaints from citizens, as well as petitions and questions from the European Parliament. Consequently, the Commission has launched 8 structured dialogues with Member States to verify non-compliance and 7 infringements<sup>26</sup>.

Despite the delayed implementation of the Directive in some Member States, a direct output of the Directive's implementation is that, at EU level, we now have a much clearer understanding of the extent of the noise problem in the EU. In 2014, the European Environment Agency used the data collected from noise maps submitted under the Directive to estimate the number of people exposed to levels of noise pollution above which negative health effects can occur<sup>27</sup>. Estimations, based on calculated figures complementing data reported under the Directive, show that more than 125 million people in Europe<sup>28</sup> are exposed to excessive levels<sup>29</sup> of road traffic noise, nearly 8 million people to excessive rail traffic noise, almost 3 million people exposed to excessive levels of aircraft noise, and 300,000 people exposed to excessive industrial noise in urban areas.

Unfortunately this data cannot be compared to a baseline from before the Directive's introduction because reliable data on noise exposure was not available at the time. The need to improve understanding on the number of people exposed to and affected by environmental noise was indeed one of the key motivators for the introduction of the Directive. The fact that this data is now available is the direct result of the Directive's implementation. In terms of trends since the Directive's introduction, the average exposure to noise in selected urban agglomerations remained broadly constant between the two reporting rounds in 2006 and 2011, according to comparable data reported by countries for these two years.<sup>30</sup> The comparison was based upon a subset of 44 selected agglomerations in 10 Member States reported for these two years, and for which data are considered comparable.

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<sup>26</sup> By end November 2016.

<sup>27</sup> More than 55 dB Lden.

<sup>28</sup> EEA member countries (28 EU Member States together with Iceland, Liechtenstein, Norway, Switzerland and Turkey)

<sup>29</sup> 55 dB Lden is the EU threshold for excess exposure, indicating a weighted average during the day, evening and night over one calendar year. (Source: European Environment Agency: Noise in Europe 2014. Publications Office of the European Union, Luxembourg, 2014)

<sup>30</sup> European Environment Agency: Noise in Europe 2014. Publications Office of the European Union, Luxembourg, 2014

No negative unexpected effects from the Directive's implementation have been observed. However, an unforeseen positive impact of the Directive was the use of noise mapping data by stakeholders outside those directly involved in implementing the Directive. For example, noise mapping data is being used for research purposes, particularly in large scale epidemiological studies which are advancing the scientific understanding of the health effects of noise. Similarly, noise mapping data is being used in some Member States for land-use-planning purposes, assisting in decision-making on future land use, particularly for new transport infrastructure and new noise sensitive developments.

## **6. Answers to the evaluation questions**

This section summarises the main findings in relation to the analysis of the questions set out in Section 4. In order to avoid excessive length, the section is structured around the key evaluation issues of relevance, coherence, effectiveness, efficiency and EU added value. The detailed replies to all the sub-questions are provided in the final report of the service contract supporting the evaluation.

### **6.1. Relevance**

The Directive's relevance was assessed with respect to the wider policy context and its two objectives: (1) to define a common approach intended to avoid, prevent or reduce the harmful effects of exposure to environmental noise and (2) to provide a basis for developing Community measures to reduce noise emitted by the major sources. **The Directive itself and both its objectives were found to remain strongly relevant.**

The findings of the European Environment Agency's 'Noise in Europe 2014' report (presented in Section 5) show that **noise pollution continues to constitute a major environmental health problem in Europe, which impacts the European economies.** With more than 136 million people in Europe exposed to levels of noise pollution above the threshold where negative health effects can occur, noise pollution puts a burden on the limited resources of health care systems across the Union. The health effects caused by exposure to noise **also generate** the loss of productivity of workers whose sleep is disturbed or health affected. Moreover, recent research indicates that the number of sources of noise pollution is on the rise (i.e. increases in road traffic<sup>31</sup> and aircraft movements<sup>32</sup>). This data shows that **action on noise continues to be relevant** and may be increasingly necessary in the future.

In relation to the first objective, **stakeholder feedback showed that there is a continuing need for a "common approach" to the assessment of environmental noise**, since the lack of comparability of noise exposure data between various jurisdictions or across time can be an impediment to choosing the appropriate noise management measures and monitoring their success. There is also acceptance among stakeholders of the need to carry out strategic noise mapping to provide evidence of population exposure at both Member State and EU level.

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<sup>31</sup> COM(2011) 856 final

<sup>32</sup> According to the European Aviation Environmental Report from 2016 by EEA, EASA and Eurocontrol, the number of flights has increased by 80% between 1990 and 2014, and is forecast to grow by a further 45% between 2014 and 2035.

Moreover, in order for the second objective, informing EU noise-at-source legislation, to be implemented, adequately harmonised population exposure data at EU level is indispensable.

The **second objective** of the END, providing a basis for developing EU noise-at-source legislation, is also viewed by most stakeholders as **remaining highly relevant to identified needs**. It is acknowledged that whilst environmental noise at receptor should be tackled through local level measures, such measures could be ineffective without additional controls over noise emitted by the major sources of noise, particularly given the growth in the number of such sources (e.g. increases in road traffic<sup>33</sup> and aircraft movements<sup>34</sup>). The collection of adequately harmonised and standardised data at EU level was regarded by the majority of stakeholders (85% - 90%) as being an important pre-requisite for strengthening the evidence base for a balanced revision of the existing EU noise-at-source legislation.

In the online public consultation, **citizen respondents also strongly supported the appropriateness of noise mapping, action planning and public consultation** for tackling the issue of noise pollution. However, it is important to note that, when asked whether the approach of the END to leave Member States free to choose if to intervene on noise pollution and how, 81% replied that this was not appropriate.

Many stakeholders interviewed also commented that although the objective of a common approach remains relevant, it is an intermediate objective. At the validation workshop, it was confirmed that, given the adverse health effects of high levels of noise at receptor, the relevance of the END could be further strengthened by defining a longer-term objective of the Directive relating to public health. Although this is implicit through references in the recitals to ensuring a high level of protection of the environment and public health, and remains highly relevant to European citizens and society as a whole, it is not outlined in the core text of the Directive. **Stakeholders understand the END as ultimately aiming to protect citizens from the effects of exposure to noise, although this is not an explicitly stated aim of the Directive.**

## 6.2. Coherence

The investigation on coherence focussed on two aspects: (1) the Directive's internal coherence, the extent to which its text is clear and consistent, and (2) external coherence – with other relevant EU legislation.

**The Directive was found to be generally internally coherent.** Feedback through the interview programme suggested that the majority of terms and definitions in the legal text of the END do not pose particular problems for END stakeholders. In a survey of public authorities, 60% indicated that at least one of the definitions in the Directive lacked clarity. However, a more detailed analysis revealed that the majority of these focussed on the following three definitions: agglomeration, quiet areas in open country, quiet areas in an agglomeration. **There were also some areas which END stakeholders perceived to be ambiguous in the Directive and that could benefit from being clarified to reduce the scope for differences in**

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<sup>33</sup> COM(2011) 856 final

<sup>34</sup> According to the European Aviation Environmental Report from 2016 by EEA, EASA and Eurocontrol, the number of flights has increased by 80% between 1990 and 2014, and is forecast to grow by a further 45% between 2014 and 2035.



**interpretation between Member States** (e.g. draw up vs. adopt a Noise Action Plan, submit a summary of an action plan or the complete action plan through the END Reporting Mechanism).

With regard to coherence with national noise control legislation, since 13 Member States had noise legislation prior to the END, there were found to be challenges during the initial implementation phases for Member States to ensure that the transposition process did not create any conflict between transposing the Directive and pre-existing national legislation. **Although there were practical challenges in some countries, there was no evidence that national legislation was in conflict with the END.**

**With regard to ‘external coherence’ the END was found to be coherent with EU noise-at-source legislation<sup>35</sup> and other relevant EU legislation** (environmental legislation and legislation on industrial machinery). Most stakeholders did not perceive there to be any overlap or duplication between the END and other EU legislation. However, a small number of stakeholders raised concerns about possible areas of overlap with respect to the Industrial Emissions Directive<sup>36</sup> (industrial noise) and the Habitats Directive<sup>37</sup> (protected areas and quiet areas under the END).

With regard to the **Industrial Emissions Directive**, some stakeholders, especially in the UK, argued that industrial noise did not belong in the END at all, since the Directive was primarily about the exposure of citizens to transport noise. However, closer inspection of the examples these stakeholders provided suggests that their concerns stemmed from the specific way in which the two Directives have been implemented at national level, rather than suggesting overlaps or inconsistencies at EU level. Indeed, most Member State representatives at the stakeholder workshop did not view the inclusion of industrial noise within the END as duplicative.

A second area where UK stakeholders perceived a risk of duplication was in the designation of quiet areas in open country under the END and the designation of protected areas under the **Habitats Directive**. In the UK context, there already exist several policy mechanisms to designate protected areas of the countryside for different reasons, which can make the designation of quiet areas seem superfluous. However, this concern did not appear to be shared in other Member States. Moreover, the fact that the designation of quiet areas in agglomerations and in open country under the END is not required, but merely made possible, by the Directive, means that any potential duplication can be avoided in practice.

Some feedback was also received about the need to strengthen the END’s coherence with the **INSPIRE Directive<sup>38</sup>** which is concerned with infrastructure for spatial information in the EU. However, under subsidiarity, the lead responsibility for ensuring that END spatial data is aligned to the INSPIRE Directive remains with the Member States.

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<sup>35</sup> A detailed list of relevant legislative acts is provided in Annex 4.

<sup>36</sup> Directive 2010/75/EU, OJ L 334, 17.12.2010

<sup>37</sup> Council Directive 92/43/EEC, OJ L 206, 22.07.1992

<sup>38</sup> Directive 2007/2/EC, OJ L 108, 25.4.2007

Finally, since the Lisbon Treaty was adopted after the END, the provisions concerning the committee, which assists the Commission with regard to the END, require legislative alignment with the Lisbon Treaty.

### **6.3. Effectiveness**

Effectiveness examined the progress made towards reaching the two objectives of the Directive, as well as the effect the Directive has had on noise pollution in the EU. The functioning of the END Reporting Mechanism was also evaluated.

As the **first objective** of the Directive is to define a common approach to manage the harmful effects of noise, the establishment of common methodologies for noise mapping and action planning, as well as for health effect assessment, constituted an important step towards reaching this objective.

As noted in the introduction, the **common noise assessment methods** were adopted in 2015 through a revision of Annex II of the Directive. The revised Annex II with the common methods will be mandatory for all Member States by 31 December 2018. The adoption of the common noise assessment methods was a major step forward, and it is now up to the Member States to use these methods in their noise mapping. However, it is noted that the process of developing and agreeing on these methods was lengthy, which led to them being adopted 13 years after the Directive's adoption. This had knock-on effects on the effectiveness of the first objective, since Member States used several different noise mapping methods in the interim period and full comparability of noise maps will not be achieved before the fourth round of noise mapping. Nonetheless, the comparability was already significantly improved compared to the period before the Directive's introduction, when extremely fragmented and unreliable data meant that no EU-level assessments were possible. Following the Directive's implementation, even considering the issues with comparability and completeness of reporting, we now have at least a broad picture of noise pollution and its effects in the EU, as shown by the EEA's Noise in Europe 2014 report. Such a report would not have been possible without the END.

Work has also begun towards the future development of a **methodology for assessing the health effects of environmental noise** based on dose-effect relations, which is a legal requirement included in the Directive itself. Following the adoption of the revised Annex II (as explained above), the Commission began discussions with the Member States on the possible content of the revised Annex III and preliminary agreement was reached to base it on the upcoming WHO Environmental noise guidelines for the European Region<sup>39</sup>. Discussions will therefore continue after the publication of the WHO guidelines. The eventual adoption of the revised Annex III will complete the definition of the common approach to noise management, the first objective of the Directive.

In summary, **some progress has been made towards the achievement of the first objective of the END, but effects have not yet fully materialised** due to the delays in the technical

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<sup>39</sup><http://www.euro.who.int/en/health-topics/environment-and-health/noise/activities/development-of-who-environmental-noise-guidelines-for-the-european-region>

development and subsequently the legislative adoption of common methodologies and the delays in implementation by Member States.

With regard to progress made towards the **second objective**, recent EU noise-at-source legislative texts<sup>40, 41, 42</sup> and policy documents<sup>43</sup> have made reference to the END as a strategic reference point and referred to its explicit role in addressing the adverse health effects of environmental noise. This demonstrates that the **END is increasingly drawing attention at EU level to the significance of the harmful effects of noise on health. However, END noise population exposure data by source has not yet been used by the EU for the design of legislation on noise at source**, because of the lack of complete EU28-wide data to date due to the delay in implementation by Member States, and the lack of full comparability in the data between rounds and countries due to Member States not using comparable and consistent methodologies. Whilst this will be addressed in the future through common noise mapping methods, this delay in the development and adoption of Annexes II and III remains an area of weakness in the Directive's effectiveness to date.

In attempting to examine the effects the END has had on noise pollution in the EU, it can be noted that, according to a subset of comparable data for 2006 and 2011, average exposure to noise in selected urban agglomerations remained broadly constant. This can be due to an interaction of a number of possible factors both internal and external to the Directive, such as: delays in implementing the Directive, lack of ambition by Member States to tackle noise pollution with targeted measures, increases in traffic volumes counterbalancing noise-reduction measures etc. At present, therefore, there is no evidence that the END has contributed to achieving the goal of the 7<sup>th</sup> EAP to significantly decrease noise pollution in the EU by 2020. However, it must be noted that the benefits of most measures to address noise can only be seen in the longer term as noise reduction measures take long to be implemented (e.g. over a 20-year period), therefore **the impact of the END on noise pollution cannot be fully evaluated at the moment**.

What is clear from stakeholder feedback is that the EU's involvement in this policy field through the END has increased the visibility of environmental noise as a serious health issue in the Member States, thus strengthening the case for stakeholders who compete for scarce public resources domestically to implement measures to reduce noise pollution and/or exposure. In at least some countries, this has led to extra public funding being directed towards noise mitigation and the indications are that this funding's benefits exceeded its costs. A Swedish national study<sup>44</sup> has found that the obligations stemming from the Directive to develop strategic noise maps and action plans have contributed to increasing the relevance of the issue of noise

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<sup>40</sup> Regulation (EU) No 540/2014 of the European Parliament and of the Council of 16 April 2014 on the sound level of motor vehicles and of replacement silencing systems, OJ L 158, 27.5.2014

<sup>41</sup> Regulation (EU) No 598/2014 of the European Parliament and of the Council of 16 April 2014 on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Union airports within a Balanced Approach, OJ L 173, 12.6.2014

<sup>42</sup> Commission Regulation (EU) No 1304/2014 of 26 November 2014 on the technical specification for interoperability relating to the subsystem 'rolling stock — noise', OJ L 356, 12.12.2014

<sup>43</sup> Commission Staff Working Document on Rail freight noise reduction, SWD(2015)300 final

<sup>44</sup> NATURVÅRDSVERKET RAPPORT 6534: Åtgärdsprogram för att följa miljö kvalitetsnormen för buller. Naturvårdsverket, 2015. Available here: <http://www.naturvardsverket.se/Documents/publikationer6400/978-91-620-6534-8.pdf?pid=8062>

and that, as a consequence, further measures are being implemented to reduce noise exposure. In addition, case studies of 19 action plans adopted under the Directive indicate that, in cases where action plans include measures for noise management and those measures are implemented, they are effective in reducing the health effects caused by exposure to excessive noise<sup>45</sup>. This shows that the END is having some effect on noise pollution, albeit limited by its partial implementation and by the level of ambition of the Member States.

The END has also provided opportunities for Member States to benchmark their population exposure results to those of other Member States, and to consider how other Member States are tackling the problem of high levels of environmental noise, with some positive demonstration effects discerned. In addition, it has increased the amount of information on environmental noise accessible to the public. The latter has been achieved through three different approaches: the publication of noise maps and action plans by Member States (the majority of Member States published them online), making population exposure data available at the EU level through the EEA's Noise Viewer<sup>46</sup> which is based on END data, and public consultation during the development of noise action plans. The evaluation found that the indicators<sup>47</sup> used for the presentation of noise mapping data are not always fully understandable to the public. However, there are good practice examples of Member States publishing accompanying materials in order to increase the transparency of the information. While the process of publicly consulting draft action plans has not always been fully effective (with some competent authorities regretting a lack of interest from the public, and some NGOs complaining of their comments not having been taken up), a number of good practice examples and success stories have been identified as well.

The public appreciation of the importance of the Directive for keeping the spotlight on protecting citizens from noise pollution was confirmed by the online public consultation, where most respondents estimated that, if the Directive were to be repealed, noise protection in their Member State would diminish or at best stay the same. In replies to the open question in the consultation on this aspect, the most common reason quoted was that the END served as **a strong signal from the EU to keep the issue on the agenda in Member States**. In this context, many respondents also called for a more ambitious EU noise policy (e.g. with the introduction of noise limits at EU level). However, views on the latter from Member States are divided.

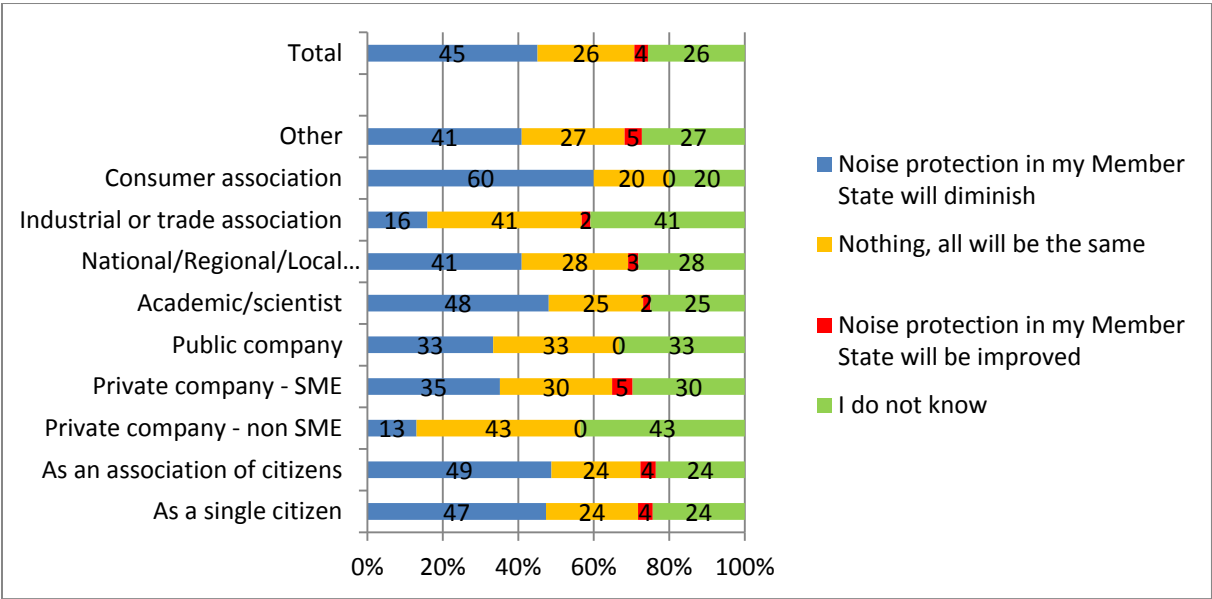
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<sup>45</sup> More details are available in Section 6.4.

<sup>46</sup> <http://noise.eionet.europa.eu/>

<sup>47</sup> The Lden and Lnight indicators can indeed be difficult to grasp. However, they are the result of lengthy discussions between both experts and Member States, which have shown them to be the best available solution for representing noise exposure.

**Figure 2: What would happen if the END were repealed?**



Source: Online public consultation (n=1429)

**The five-year timeframe for END noise-mapping and action-planning appears to be effective** and is not among the causes of the implementation delays faced by Member States. If a ten-year cycle were to be adopted, although this would reduce administrative costs, it could risk leading to a loss of organisational expertise, since only a small number of people work on END implementation, and experience and expertise is highly concentrated. **However, the one-year timeframe between the finalisation of noise maps and submission of action plans building on those maps was found to be far too short for stakeholders in many countries to prepare and consult action plans.**

**The END Reporting Mechanism was found to be effective** in enabling the prompt electronic submission of reporting data by Member State once these were available. Interviewed stakeholders were broadly positive about the mechanism (e.g. the reporting templates for the submission of reporting data and information, online pro forma for action plan summary). However, the evaluators found that the database itself could be improved by enhancing its design so as to facilitate the analysis of the submitted data by those following the implementation (i.e. the Commission and the EEA). The process of reporting itself does not constitute a significant administrative burden, as it consists mainly of electronically transmitting to the Commission of already existing documentation (noise maps and action plans). The only additional activity required exclusively for the purposes of reporting to the Commission is the preparation of short (maximum 10 pages) summaries of the action plans. However, this was not noted by Member State authorities to represent an administrative burden. The END Reporting Mechanism is also being examined in the context of the broader Fitness Check of monitoring and reporting obligations in environment policy<sup>48</sup>, and the findings of the evaluation will feed into that process.

<sup>48</sup> [http://ec.europa.eu/smart-regulation/roadmaps/docs/2017\\_env\\_002\\_monitoring\\_and\\_reporting\\_obligations\\_en.pdf](http://ec.europa.eu/smart-regulation/roadmaps/docs/2017_env_002_monitoring_and_reporting_obligations_en.pdf)

**The findings of the service contract also suggest that there has been weak enforcement of the requirements in the END** in relation to the timely submission of noise maps and action plans. Not all Member States have actively pursued the development of noise maps and adoption of action plans by their relevant authorities. For the monitoring and analysis of submissions of noise mapping data, the Commission has the support of the EEA and its European Topic Centre on Urban, Land and Soil Ecosystems. However, the volume of work required to monitor and check the compliance of action plans with the requirements of the Directive has proven to be challenging. Recently action has been taken by the Commission through 8 official enquiries to verify suspected non-compliance and 7 infringement cases have been opened with non-compliant Member States.

#### **6.4. Efficiency**

A twofold analysis was performed of the END's efficiency. On the one hand, the administrative costs of the implementation of the END's requirements were assessed. On the other hand, a cost-benefit analysis compared the costs of the health impacts with the benefits of the noise reduction actions that the END triggered.

The **administrative costs** of implementing the END entail the human resource costs in the relevant Member State authorities and the costs of drawing up noise maps and action plans, for which relevant authorities often contract external technical support through public procurement procedures. These costs were assessed based on a sample of 11 Member States for which data was available.

**Table 5: Administrative cost of noise mapping and action planning per capita in sample of Member States (total Round 2 costs)**

<b>Member State</b>	<b>Noise mapping cost in € per capita rounded in R2</b>	<b>Action planning cost in € per capita rounded in R2</b>
Bulgaria	0.17	0.01
Croatia	0.13	0.03
Czech Republic	0.16	0.02
Finland	0.18	0.09
Germany	0.11	0.29
Latvia	0.09	0.04
Lithuania	0.28	0.07
Poland	0.07	no data
Portugal	0.15	0.05
Slovakia	0.56	no data

<b>Member State</b>	<b>Noise mapping cost in € per capita rounded in R2</b>	<b>Action planning cost in € per capita rounded in R2</b>
United Kingdom	0.05	0.01
<b>Average</b>	<b>0.18</b>	<b>0.06</b>
<b>Median</b>	<b>0.15</b>	<b>0.03</b>

There were found to be wide variations in the level of human and financial resources that Member States have allocated to END implementation overall, reflecting different implementation approaches and different levels of centralisation and decentralisation. Nonetheless, **the median costs per inhabitant (out of the total population) were found to be low.** The costs of noise mapping per inhabitant taking the total population as a basis (which seems appropriate given that these costs are borne by public administration overall) had a median value of €0.15 in the current round. Less information was available on the costs of action planning since this mainly involves human resource inputs by civil servants. However, the median cost per capita (based on the total population) amounted to €0.03 in the current round, considerably lower than the cost of noise mapping<sup>49</sup>. These costs are calculated per reporting round, meaning that they occur once every 5 years. Taking into account the total EU population of 508 million, the administrative costs of full END implementation by all Member States would amount to around €91 million every 5 years, or approximately €18 million per year. There are also indications of a decline in the costs of noise mapping in many EU Member States between the two rounds, due to the one-off regulatory implementation costs incurred (such as familiarisation with the legislative requirements and information obligations) and experience gained in the first round. As the administrative costs of implementing the Directive are already very low, there is no potential to reduce the burden further. Moreover, no evidence was found to indicate that the Directive has any implications for SMEs.

It should be noted that some local authorities consulted during the evaluation stated that when costs are assessed at the aggregate level, rather than per capita, they can be seen as administratively burdensome by some public authorities. However, this is mostly the case in those Member States where the implementation of the Directive has been delegated (by the Member State, under the principle of subsidiarity) down to the local level. For example, in Germany, the responsibility for drawing up action plans for railways was historically delegated down to thousands of small municipalities. However, Germany has recently revised its approach and the action plan for railways is now under the responsibility of a national agency.

A further analysis considered the **costs and benefits of noise-reduction measures from a sample of action plans** adopted under the END, to quantify the END's indirect impact. Before

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<sup>49</sup> A separate estimate by a German acoustics consultancy put the total administrative costs of noise mapping and action planning in the range of €1.5 - €2 per affected (exposed to high levels of noise) inhabitant. With approximately one quarter of the EU population (136,300,00 out of 508,000,000) affected by noise, this gives a range of €0.37 - €0.50 per capita of the total population, which is in line with the data provided by German authorities in Table 5 (€0.40 per capita for noise mapping and action planning combined).

embarking on such an analysis, it is important to note that the END does not require Member States to adopt noise-reduction measures – whether to do so and to what extent is left entirely at the discretion of relevant Member State authorities, provided that they follow the due process as prescribed in the Directive. Moreover, as **the END** does not contain any limit or target values for noise pollution, it **does not provide an incentive to Member State authorities to establish high ambitions for noise reduction**. However, it does require them to address the issue of noise pollution, consider potential actions and, notably, consult the public on their plans. At present there is no comprehensive study of the level of ambition across all action plans adopted under the END. However, a basic review of a sample of action plans shows that they are highly heterogeneous – ranging from those with no substantial measures foreseen to reduce noise, across varying mixes of noise-reduction measures, to highly ambitious plans which aim to reduce the noise exposure of the population significantly. For example, an ambitious action plan for an agglomeration can include a combination of measures to reduce noise from several transport sources, to be implemented over the long term, such as a programme to finance noise-optimised windows, improvement of tram tracks, speed limit reduction and control, retrofitting of train brake blocks and optimisation of flight routes for a nearby airport.<sup>50</sup>

The costs and benefits of the action plans were assessed using information from 19 test cases. According to the Directive, noise action plans should consider the costs and benefits of different measures, and should therefore over time provide the data necessary to assess the costs and benefits of the Directive. Efforts were made to select test cases representative of the EU. However, as the provision of financial information is a non-mandatory clause in the END, the availability of financial data in the action plans was eventually the primary criterion for the selection of the test cases. The **costs** considered included the administrative costs examined above (costs of developing noise maps and action plans) and the costs of implementing the noise-reduction measures included in the action plans. The **benefits** were calculated through a monetisation of the improvements in the four health endpoints for which dose-response relations were available (annoyance, sleep disturbance, acute myocardial infarction and hypertension) of the population experiencing a reduction in noise levels as a result of the action plan measures. The model used for the calculation of costs and benefits also included different levels of attribution of benefits to the END, based on whether the MS had any kind of noise legislation prior to the introduction of END or not<sup>51</sup>.

**The test cases revealed a high degree of variability in the costs and benefits associated with the implementation of measures to reduce noise.** The variability may be attributed to many factors, including the number and type of measures implemented, the size of the noise-affected and beneficiary populations and the influence of local conditions (e.g. topography) on the effectiveness of individual measures. As may be expected, the most cost-effective measures are those that require little capital expenditure and benefit a large number of people (e.g. the imposition of speed limits).

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<sup>50</sup> For an example of such a plan, see Final report of the service contract supporting the evaluation, Appendix F, case study F.1.4. Duesseldorf (pp. 148-155).

<sup>51</sup> These different levels of attribution also reflect the findings of the survey of public authorities, in which 73% of interviewees expressed the view that progress in noise reduction is at least in part the result of national legislation.



The test cases were then extrapolated to give a picture of what the order-of-magnitude of costs and benefits of END implementation at the EU level would be, if the Directive were fully implemented by all Member States. As the degree to which costs and benefits could be attributed to the END is not fully known, the analysis assumed that the degree of attribution was lower in those Member States which had noise legislation prior to the introduction of the END, and higher in those where no previous noise legislation existed<sup>52</sup>. Combining the information on administrative costs incurred at the EU level and the extrapolated values derived from the test cases, it was possible to provide an indicative assessment of the overall efficiency of the implementation of the END.

The overall findings are summarised in Table 6. This base case (most likely) scenario resulted in a **favourable cost-benefit ratio of 1:29 overall**.

**Table 6: Aggregate assessment of total costs and benefits at the EU scale under the base case (most likely) scenario**

	Total present value costs (€, million)	Total present value benefits (€, million)	Cost-benefit ratio
Administrative costs incurred at EU level <sup>53</sup>	3	-	-
Major airports <sup>54</sup>	438	2,854	1:7
Major roads	667	24,248	1:36
Major rail	82	7,317	1:89
<b>TOTAL<sup>55</sup></b>	1,190	34,418	<b>1:29</b>

*Source: Final Report of the supporting service contract. Cost-benefit analysis.*

**Even noting the underlying assumptions as well as the limitations of the analysis<sup>56</sup>, it can safely be concluded that, in cases where action plans including measures for noise management have been adopted and implemented, the implementation of the END has been efficient overall.**

**Moreover, the benefits are likely to be somewhat understated** as there are other known health effects of noise, which could not be quantified due to missing information (i.e. dose-response relations). Also, the analysis did not consider the impacts on productivity, employer

<sup>52</sup> These different levels of attribution also reflect the findings of the survey of public authorities, 73% of whom expressed the view that progress in noise reduction is at least in part the result of national legislation.

<sup>53</sup> The administrative costs incurred by the European Commission and European Environment Agency.

<sup>54</sup> The costs for major airports, major roads and major railways encompass both administrative costs (at Member State level) and costs of noise-reduction measures. These costs also account for the status of action plan implementation (i.e. differentiating between those Member States who have completed, or at least partially completed their action plans and those who have not).

<sup>55</sup> Agglomerations are not included in the Total. They were treated separately as it was not possible to obtain sufficiently comparable data across the test cases to support a reliable extrapolation. However, on the basis of an assessment of the typical measures applied in agglomerations, it can be concluded that the benefits of END implementation in agglomerations significantly outweigh the costs even though the cost-benefit ratios vary substantially between measures.

<sup>56</sup> Detailed methodology can be found in Annex 3.

costs and healthcare costs due to exposure to high levels of noise. Indirect impacts (e.g. on property values and greenhouse gas emissions) were also excluded from the analysis because of the difficulties in reliably quantifying and generalising these across the EU-28.<sup>57</sup>

## 6.5. EU added value

The assessment of EU Added Value (EAV) considered how far the END has added value over and above what could have been achieved at national level alone. What would happen if the END were to be repealed in future was also considered.

**The END has the potential to generate EU added value** by providing a common framework to facilitate the assessment and management of noise pollution in the Union. Each of its two objectives is designed to add EU value over and above what could have been achieved at national level alone. Objective 1 (common approach to assessment and management of noise) aims to reduce differences in which transport and industry infrastructure operators across the EU address the noise they produce which, had it been achieved, would have created **a level playing field across the EU** in which they can operate and compete. Objective 2 (informing source legislation) aims to **contribute to better-informed EU policy-making**, by providing complete and comparable data at EU level to policy makers responsible for noise-at-source legislation, who need it to inform the development of new, and the revision of existing, noise-at-source legislation.

Despite this considerable potential, **as a result of delays in implementation, the END has so far fallen short of delivering the full EU added value that it could provide.** On the one hand, seeing that over 50% of the entities covered by the scope of the Directive have failed to comply with the requirement to develop an action plan for noise management and consult the public on it, a level playing field has not yet been achieved. On the other hand, while EU policy makers responsible for noise-at-source legislation appreciate the role of the END in focussing attention on the health effects of noise pollution, they have not yet been able to use END-generated exposure data due to its incompleteness.

The question of what would happen if the END were repealed was addressed in discussion groups at the stakeholder workshop and in the public consultation. The majority of the stakeholders were of the opinion that, if the END were to be repealed, although some Member States would continue to produce noise maps and implement noise mitigation measures, this would not be the case across EU28. Stakeholders therefore agreed that, while the END has thus far fallen short of delivering its full potential, **if it were to be repealed, such progress as has been achieved to date towards its longer-term benefits** (level playing field across EU, informing legislation to tackle noise at source) **would be lost.**

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<sup>57</sup> Another approach to calculate the benefits of noise reduction is via revealed preference studies, which suggest that a 1 dB increase in noise levels can reduce house prices by between 0.08 and 2.22% depending on the noise source. (See Bristow, A.L. and Wardman, M. (2015) Comparing noise nuisance valuation estimates across methods, meta-analysis, time and space. Paper presented at the 22nd International Congress on Sound and Vibration (ICSV 22), Florence, Italy, 12-16 July 2015); Bristow, A.L., Wardman, M. & Chintakayala, International meta-analysis of stated preference studies of transportation noise nuisance V.P.K. Transportation (2015) 42: 71.)

## 7. Conclusions

The evaluation has shown that Directive 2002/49/EC relating to the assessment and management of environmental noise was and continues to be relevant to tackling the issue it addresses, although its requirements are procedural rather than substantive in terms of reducing noise pollution. The Directive does so in a way that is coherent and synergistic with other relevant EU legislation.

Progress has been made towards achieving the objectives of the Directive, but it has thus far fallen short of achieving its full potential. The Directive demonstrates considerable potential for EU added value within its scope, but has not yet delivered on this. Delays in the legislative adoption of common methods and in the implementation of the Directive in Member States are key factors, especially in the slow rate of adoption of noise action plans.

As the Directive is addressed to public authorities, it has no implications for SMEs, and no evidence was found during the evaluation that would indicate that they are affected by the Directive. The administrative costs of the Directive's implementation were found not to be overly burdensome, and are proportionate in that they are a small cost but allow for better planned expenditure. As the administrative costs of implementing the Directive are already very low, there is no potential to reduce the burden further.

The Directive intentionally allows space for different ambition levels, and does not imply that noise reduction should be achieved to the same extent in all Member States (there is no common noise reduction target set in the Directive)<sup>58</sup>. This means that the END does not provide an incentive to Member State authorities to establish high ambitions for noise reduction, and in cases where action plans including measures for noise management have been adopted and implemented, the Member State actions beyond the END requirements have indeed varied greatly in content and degree. They have nevertheless produced a broadly estimated favourable cost-benefit ratio of 1:29 identified under the most likely scenario in the cost-benefit analysis.

The Directive's five-year implementation cycles were found to be of appropriate length, striking a balance between minimising administrative costs and avoiding loss of expertise in the Member States. However, the one-year timeframe between the finalisation of noise maps and submission of action plans building on those maps was found to be too short for some Member States.

Regarding the potential for simplification, the evaluation found that the requirements of the Directive are rather simple, and that complications arise mostly from the manner in which the Member States have implemented the Directive under subsidiarity (e.g. delegating responsibility for implementation to several different levels of governance, resulting in complex competency arrangements within the Member State). Therefore the potential for simplification is at the level of Member State implementation, rather than at the level of the

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<sup>58</sup> The common approach referred to in Article 1 of the Directive consists in common noise assessment methods and a common approach to planning, but not in adopting common noise reduction measures

legal text of the Directive. Recent legislative revisions of national legislation transposing the END in some Member States have indicated that Member States recognise the issue.

The evaluation showed, and most stakeholders agreed, that if the END were to be repealed then such benefits as it has achieved would be lost. A number of possible technical improvements were identified including clarifications of the definitions and obligations related to agglomerations, quiet areas, major roads, industrial noise and action plans. Views on the introduction of noise limits or targets, however, remain inconclusive.

## **ANNEX 1: PROCEDURAL INFORMATION CONCERNING THE PROCESS TO PREPARE THE EVALUATION**

**Lead DG:** European Commission Directorate-General Environment, DG ENV

**Agenda planning reference:** 2016/ENV/065

### **Organisation:**

Preparations for the evaluation commenced shortly after its announcement by the Commission<sup>59</sup> in October 2013. The initial phase of the evaluation involved the preparation of the terms of reference for a supporting service contract (hereafter referred to as "the service contract"), the implementation of which started in November 2014 (ENV/F3/SER/2014/0027). The service contract was conducted by a consortium of experts led by the Centre for Strategy & Evaluation Services (CSES) and ACCON supported by a further acoustics and environmental consultancy, AECOM.

Although the Better Regulation Guidelines were not adopted until May 2015, when the evaluation was already under way, every effort was made to conform with them after they were developed. The originally drafted evaluation mandate was therefore redesigned as the evaluation roadmap, which was approved by the Steering Group and subsequently published<sup>60</sup> in November 2015. The consortium conducting the service contract was made aware of the Better Regulation Guidelines and asked to conform to them.

The findings come from several major sources: the Final Report of the service contract supporting the evaluation, the EEA Noise in Europe 2014 report, official data reported by Member States under the Directive and an online public consultation. As the latter was not a mandatory element of evaluations under REFIT at the time when the service contract was prepared, the consultation was not part of the contract and was conducted independently by Commission Services. The full final report of the service contract and the summary of the online public consultation are available here: [http://ec.europa.eu/environment/noise/evaluation\\_en.htm](http://ec.europa.eu/environment/noise/evaluation_en.htm). The Staff Working Document integrates the findings from these sources.

A Steering Group of relevant Commission Services was established to oversee the evaluation and met regularly throughout the entire evaluation process. Its mandate was to check key elements of the service contract, to support and monitor the evidence gathering and stakeholder consultation process, to review the draft and final evaluation report as well as the Commission Staff Working Document and to assist with the quality assessment of the contractor's evaluation report. The Steering Group was composed of DG ENV, GROW, JRC, MOVE, RTD and SG.

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<sup>59</sup> COM(2013)685 final

<sup>60</sup> [http://ec.europa.eu/smart-regulation/roadmaps/docs/2016\\_env\\_065\\_noise\\_evaluation\\_en.pdf](http://ec.europa.eu/smart-regulation/roadmaps/docs/2016_env_065_noise_evaluation_en.pdf)

The Commission also maintained a dedicated web page<sup>61</sup> to share information and provide feedback to stakeholders about the evaluation.

**Timing:**

<b>Date</b>	<b>Description</b>
02/10/2013	Announcement of evaluation by Commission under REFIT programme (COM(2013) 685 final)
25/06/2014	Launch of call for tender for service contract supporting the evaluation of Directive 2002/49/EC relating to the assessment and management of environmental noise
13/10/2014	Award of contract to consortium led by CSES
11/11/2014	Establishment of the Steering Group
03/12/2014	1 <sup>st</sup> Steering Group Meeting: Introduction to the evaluation, presentation and discussion on planning and methodology
16/12/2014	Teleconference with contractor to discuss case study approach
15/01/2015	Receipt and circulation of Inception Report
27/01/2015	2 <sup>nd</sup> Steering Group Meeting: Review and discussion of Inception Report. Followed up by three teleconferences (a, b and c) to discuss certain aspects of methodology in more detail.
16/03/2015	Steering Group Teleconference 2(a): Discussion on template for country fiches and questions for online survey and interviews
03 – 05/2015	Online surveys with (i) public authorities (ii) NGOs/community groups and (iii) acoustics consultancies
30/03/2015	Steering Group Teleconference 2(b): Initial discussion on data collection framework for cost-benefit analysis and feedback for other ongoing work
20/04/2015	Steering Group Teleconference 2(c): Review of the CBA method paper and revised version of the data collection framework
10/06/2015	3 <sup>rd</sup> Steering Group Meeting: Presentation by contractor of the progress made to date and an outline and discussion of the emerging findings
22/07/2015	Receipt and circulation of Interim Report
26/08/2015	4 <sup>th</sup> Steering Group Meeting (teleconference): Discussion of Interim Report and preparation of Validation Workshop
23/09/2015	Validation workshop to collect stakeholder feedback on the emerging evaluation findings
21/10/2015	5 <sup>th</sup> Steering Group Meeting: Progress update, workshop feedback and preparation of online public consultation
21/12/2015 – 28/03/2016	Online public consultation
04/01/2016	Receipt and circulation of draft final report from contract (excluding CBA)
18/01/2016	6 <sup>th</sup> Steering Group Meeting: Presentation and discussion of Draft Final Report (excluding CBA)
19/02/2016	Receipt and circulation of revised draft final report from contract (including CBA)
14/03/2016	7 <sup>th</sup> Steering Group Meeting: Discussion of revised Draft Final Report (including CBA)

<sup>61</sup> [http://ec.europa.eu/environment/noise/evaluation\\_en.htm](http://ec.europa.eu/environment/noise/evaluation_en.htm)

10/05/2016	Receipt and circulation of 2 <sup>nd</sup> revised draft final report from service contract
31/05/2016	8 <sup>th</sup> Steering Group Meeting: Discussion of 2 <sup>nd</sup> revised draft final report, quality assessment and structure of Staff Working Document
15/06/2016	Receipt and circulation of final report from contract
05/09/2016	Final report from contract approved
20/10/2016	Interservice Consultation launch for SWD
08/12/2016	Publication of Staff Working Document and Final Report of supporting service contract

## **ANNEX 2: STAKEHOLDER CONSULTATION**

### **Overall approach**

In accordance with the Better Regulation guidelines, a Consultation Strategy for the evaluation was developed by DG ENV and approved by the Steering Group.

The collection and analysis of stakeholders' experiences and views was one of the core elements of the evaluation methodology, as demonstrated by Section 4 of the Staff Working Document, where four of the six evaluation methods and data sources represented different forms of stakeholder consultation. Moreover, throughout the evaluation, DG ENV representatives discussed the evaluation at all stakeholder events which they attended, so as to ensure that its aims and objectives were understood by the stakeholders and that they were informed of all avenues for contributing to the evaluation. Such events were also used to collect preliminary feedback from stakeholders. They included events such as 'Euronoise' and 'Internoise', the major European and international congresses on noise with more than 500 participants. Finally, DG ENV established a dedicated web page to share information and provide timely feedback to stakeholders about the evaluation. This web page was regularly updated throughout the evaluation and a number of contributions to the evaluation from stakeholders were received as a consequence of the visibility given to the evaluation through the website.

This extensive and comprehensive consultation gives confidence that all types of stakeholders identified in the stakeholder mapping for the Directive were consulted, and that the full range of views on the Directive was captured. Consequently, the Commission's minimum standards for stakeholder consultation were fully met.

### **Scope of the consultations**

The stakeholder mapping conducted as part of the preparation for the evaluation found that the objectives and the provisions of the Directive made it relevant for the following stakeholders:

1. National and regional competent authorities dealing with noise pollution (including Member State representatives in the Noise Regulatory Committee)
2. Health and safety authorities
3. International organisations (including the World Health Organisation)
4. National and regional transport infrastructure operators (road, railways, airports), and their European and international associations
5. Transport supply chain and acoustics industries (e.g. tyre manufacturers, noise consultants)
6. European cities (city councils, networks like Eurocities)
7. Academics and experts in the field of noise and acoustics, including in Environmental Protection Agencies
8. Non-governmental organisations working on noise (including European umbrella organisations)
9. European Commission Services (MOVE, GROW, SANTE, ENER, JRC, RTD, SG) and EEA



10. The European citizen affected by noise from transport infrastructure and industry, and any organisations of such citizens

Authorities having to implement the policy (see points 1 and 2 above), and stakeholders with particular technical expertise and stated interest (3 – 8) were involved in the evaluation via an interview programme, three targeted surveys and the validation workshop. The interview programme and validation workshop were also extended to Commission Services working on managing noise at source (9), who also contributed to the evaluation via the Steering Group. European citizens and organisations of citizens (10) without specific expertise, but affected by the policy, were involved via the online public consultation.

## **Consultation methods**

### **1. Interview programme**

The contractor conducting the service contract supporting the evaluation carried out an interview programme with 104 stakeholders designed to be geographically balanced and a representative sample of relevant stakeholder groups (e.g. competent authorities, other bodies at national, regional and local level involved in implementation, industry associations at EU level, as well as NGOs and community organisations). DG ENV supported the contractor in reaching all relevant stakeholders by providing a letter of introduction and encouraging MS representatives to cooperate with the contractor. The **full list of interviewees** can be found in Appendix A to the Final Report of the service contract supporting the evaluation. The interviews were facilitated using a **checklist** to provide a semi-structured basis for discussion, tailored to the different groups of stakeholders.

### **2. Online survey**

In order to ensure that stakeholders not part of the interview programme were also able to provide their views, three different questionnaires targeted to different stakeholder groups were made available via an online survey. In total, 73 valid responses were received from public authorities, 7 from consultancies involved in strategic noise mapping, and 10 from NGOs/community groups. Whereas the responses to the online survey from public authorities were sufficient to allow for a quantitative analysis, the responses from acoustics consultancies and from NGOs/community groups were analysed only qualitatively due to the low number of reactions.

### **3. Validation workshop**

A validation workshop was held on 23<sup>rd</sup> September 2015 in Brussels to collect stakeholder feedback on the emerging evaluation findings. The workshop was attended by 53 stakeholders.

Three **working papers** were distributed in advance and discussed at the workshop, covering all the aspects of the evaluation. Following the workshop, the working papers were published on the website dedicated to the evaluation for written comments. In follow-up, 20 responses were received. The working papers are available on the evaluation web page: [http://ec.europa.eu/environment/noise/evaluation\\_en.htm](http://ec.europa.eu/environment/noise/evaluation_en.htm). The outcome of the workshop and

the views contributed through written responses were considered by the contractor for the final report of the service contract.

#### 4. Online public consultation

An online public consultation<sup>62</sup> was made available in 23 languages from 21 December 2015 to 28 March 2016<sup>63</sup>. As the other parts of the evaluation methodology had already covered a thorough investigation of other stakeholders' views, the online public consultation targeted primarily citizens and associations of citizens. However, all other interested stakeholders were invited to reply as well. The 13 questions addressed the relevance, effectiveness, efficiency and EU added value of the Directive. A total of 1429 replies were received, 79% of them from citizens and citizen associations. A full report on the online consultation is available on the webpage of DG ENV.

#### 5. Stakeholder events

DG ENV representatives regularly attend stakeholder events and meetings relevant to environmental noise policy. In the period leading up to and during the evaluation, special care was taken to use such events in order to announce, present and discuss the evaluation, its methodology and its emerging findings. This helped ensure that the aims and objectives of the evaluation were understood by the stakeholders and that they were informed of all avenues for contributing to the evaluation.

A short list of the most relevant events is presented below.

Date	Event
03/12/2013	Noise Expert Group meeting
24-25/04/2014	Meeting of Eurocities Working Group on Noise
27/05/2014	Aktuelle Fragen in der Lärmschutzpolitik
18/09/2014	Workshop on Aircraft Noise, EPA Network Interest Group on Traffic Noise Abatement
01/10/2014	Workshop on Future Trends in Aviation Noise Research
18/11/2014	UIC Workshop on Railway Noise
01-04/10/2014	EIONET Workshop on Noise
04/02/2015	Noise Expert Group meeting
19/03/2015	DAGA 2015 – Lärmschutzpolitik IV
16/04/2015	Meeting of Eurocities Working Group on Noise
01-03/06/2015	Euronoise
08-09/09/2015	CEDR Conference on Road Traffic Noise
14/09/2015	Noise Expert Group meeting
21-23/10/2015	EIONET Workshop on Noise
09-10/11/2015	Colloquium Bruit et climat: regards croisés
14-15/03/2016	UIC Workshop on Railway Noise

<sup>62</sup> As the online public consultation was not a mandatory element of evaluations under REFIT at the time when the Study contract was prepared, the consultation was not part of the contract and was conducted independently by Commission Services. Consequently its results are not reported in the final report of the Study, but are instead available in Annex 2 of this document.

<sup>63</sup> The standard 12-week period for responding was extended by 2 weeks in order to account for end-of-year holidays.

11-14/07/2016	23rd International Congress on Sound and Vibration
22-24/08/2016	Internoise 2016
21-22/09/2016	EIONET Workshop on Noise

## 6. Web page

On the DG ENV website on EUROPA, in the section on environmental noise, a dedicated web page was set up for the evaluation of the Directive:

[http://ec.europa.eu/environment/noise/evaluation\\_en.htm](http://ec.europa.eu/environment/noise/evaluation_en.htm)

The website was used to provide regular and timely updates about the evaluation to stakeholders and the broader public. It was updated throughout the evaluation to reflect the key developments and possibilities for providing input at every stage, for example to announce the validation workshop, to collect the views of those not able to attend the workshop and to invite stakeholders to respond to the online public consultation. It also provided a point of contact (by email) for all interested parties. As a result, a number of contributions to the evaluation from stakeholders not previously known to the Commission were received.

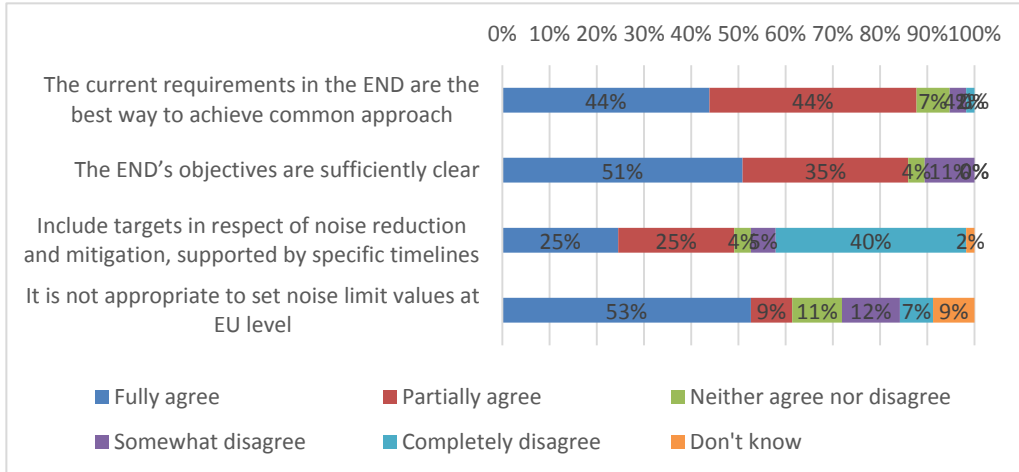
## **Results of consultations**

### **Relevance**

The majority of respondents to the online public consultation confirmed that environmental noise is an important issue for the quality of life of citizens. Furthermore, respondents mostly agreed that noise maps, action plans and public consultation on the action plans were the right approach to tackle environmental noise. All types of respondents, except the industrial associations and the private -non SME- companies, strongly indicated that the END approach of not setting any limits or targets, and leaving Member States free to choose if to intervene and how, is not appropriate. Instead, EU noise limits were by far the preferred option in the online public consultation, followed by EU recommended or trigger values and an EU exposure target (scoring about the same interest).

Participants to the survey of public authorities were asked to comment on statements related to the appropriateness of the END's objectives. 88% of respondents either fully or partially agreed that the current requirements in the END were the best way to achieve the END's first objective of a common approach. Half the respondents also agreed that the Directive's objectives were sufficiently clear, while 11% somewhat disagreed. When asked for the introduction of targets or limits in the context of reaching the Directive's objective, half of the respondents favoured targets, while limits were not considered appropriate by around 60 %.

**Figure 1 – Given the END’s objectives, how do you rate the following statements?**



Source: Survey of public authorities (n=57)

Interviews of END stakeholders further confirmed that the objective of Article 1(1) of a “common approach” to the assessment of environmental noise using common indicators remains highly relevant in the opinion of many END stakeholders. There is widespread acceptance among stakeholders at national level of the need to carry out strategic noise mapping to provide evidence of population exposure at both Member State and EU level. However, not all stakeholders, especially at local level, fully recognise the importance of adopting a “common approach” to the assessment of environmental noise. This reflects the fact that harmonised data is predominantly needed for European/national strategic purposes rather than for local decision-making purposes. This view is common amongst stakeholders involved in local decision making and is more frequently encountered in those Member States that have long-established national noise policies and legislation prior to the END, and in Member States with existing procedures to remedy noise problems at the local level.

Many stakeholders interviewed commented that although the objective of a common approach remains relevant, this is an intermediate objective. Also at the validation workshop, it was confirmed that the END’s relevance is undermined due to the fact that it does not set out a clear longer-term public health-based objective against which to evaluate its “relevance” (e.g. “reducing the number of EU citizens exposed to environmental noise above dB threshold X”). Several workshop participants commented that whilst the END remains relevant, the focus is on the process (a “common approach”), with a lack of a clear strategic goal that would concentrate competent authorities’ focus on what the Directive is ultimately trying to achieve.

The objective of Article 1(2) of providing a basis for developing Community measures to reduce noise emitted by major sources was viewed by most stakeholders (national, regional and local) as remaining highly relevant to identified needs. However, not all stakeholders were aware of the inter-relationship between strategic noise mapping under the END, data reporting requirements and the development of noise at source legislation (circa 15% were unaware). Several stakeholders expressed the view that the first objective of the END (Article 1(1)) was the core objective, and viewed the requirement to report data as being secondary to the challenge of managing noise at local level.

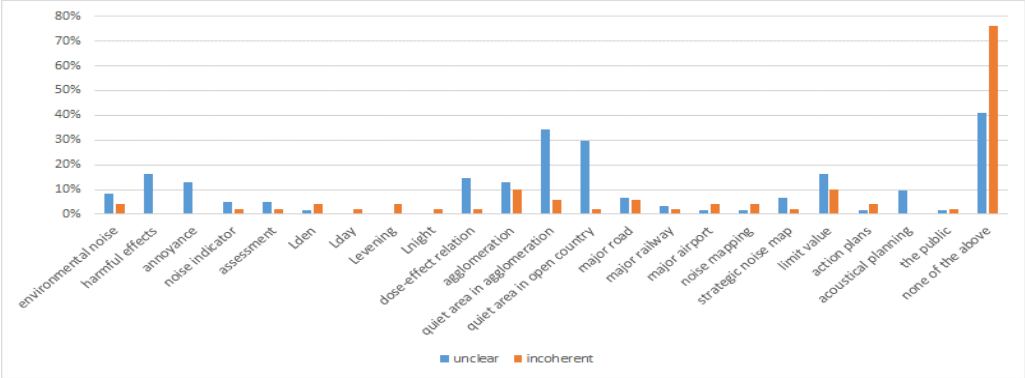
It was observed by many stakeholders (particularly NGOs/community organisations but also acoustics consultants) that the public does not generally understand the Lden and Lnight indicators, which in turn undermines the relevance of noise maps published. Moreover, making noise maps available showing population exposure data by individual transport source was seen as not reflecting citizens’ actual experience of noise, which is (i) cumulative across several transport sources and (ii) specific to living in a particular locality.

**Coherence**

The survey of public authorities showed that the END is regarded as being consistent with, and complementary to, other EU legislation by the majority of respondents (59%). Only 17% stated that the legislation was inconsistent and the remaining 24% indicated that they do not know.

The interview feedback broadly confirmed the findings from the survey. The relationship between the END and noise at source legislation was seen as symbiotic and mutually supporting by the majority of stakeholders. A number of stakeholders mentioned that coherence between the END and source legislation could be further strengthened by ensuring that the END (and the data collected on population exposure through noise mapping) is more explicitly taken into account in revising EU source legislation. A minority of stakeholders interviewed argued that since source Directives contain Limit Values (LVs) for noise at source, the same principles should apply to noise at receptor. However, many stakeholders were against setting common EU level LVs, since whereas there is a logic to setting LVs for source legislation by transport mode, this cannot be said for noise at receptor, which demands local-specific solutions. 50% of public authorities responding to the survey stated that in their view, at least some changes need to be made to the text of the END to strengthen its consistency, whilst another 5% believe that significant changes ought to be made. Public authorities’ perceptions as to the clarity of the legal text were also examined through the survey. 76% of respondents believe that none of the definitions in the END are inconsistent with other EU legislation while 40% believe that none of them lack clarity.

**Figure 2 – Please indicate which of the Directive’s definitions lack sufficient clarity (n=61) and which are inconsistent (n=50) with other EU legislation on noise?**



Source: Survey of public authorities

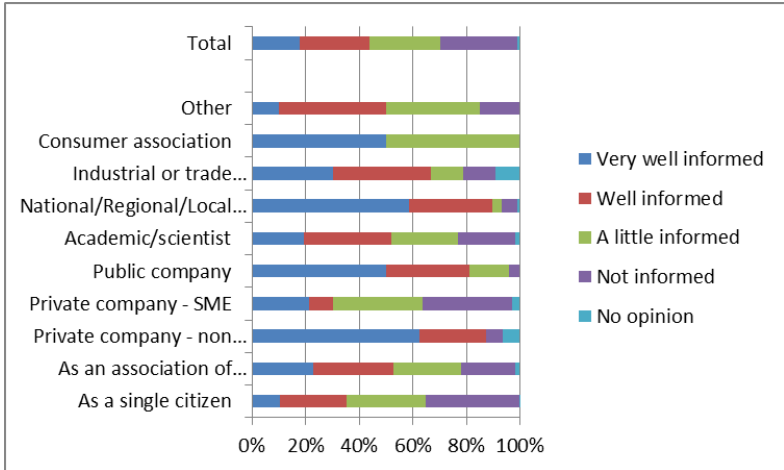
The terms whose definitions appear to be causing greater confusion among some END stakeholders are ‘quiet areas in agglomerations’ mentioned by 35% of respondents, quiet areas in open country (30%), harmful effects (16%) and dose-effect relations (15%). The definition of an agglomeration was regarded as being unclear among 12% of respondents whilst 10% found the term inconsistent. Limit values were cited as being unclear by 16% of respondents.

**Effectiveness**

Effectiveness of the END was tackled through a series of questions in the online public consultation.

Concerning how well informed the respondents are about the noise situation in their area, the outcome is balanced, with citizens and SMEs being the least informed.

**Figure 3 – Are you sufficiently informed about the noise situation (e.g.: by means of the noise maps) in your area?**



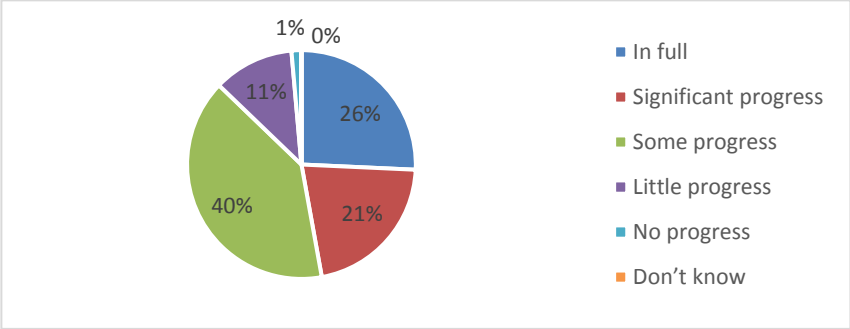
Source: Online public consultation

Similarly for information about planned measures to manage noise, there is no clear outcome, with a trend – amongst all respondents – to be even less informed about measures to manage noise than about the noise situation.

Replies to the question "Are you sufficiently informed about the measures your national/local authorities have planned in the adopted action plans to manage noise?" revealed that awareness of stakeholders of implemented measures to reduce noise is also limited (in particular for single citizens).

With the exception of public authorities and companies, the replies demonstrate that many stakeholders have not been given an opportunity to comment on noise action plans, and that they would have welcomed such an opportunity. This finding is only partially in line with the service contract report, which states that the competent authorities were proactively trying to involve citizens, but without success.

**Figure 4 – Assessment of progress towards the first objective of the END: a common approach - Article 1(1)**



*Source: Survey of public authorities (n=70)*

With regard to the END’s success at providing a basis for EU measures to reduce noise from transport and industry, the picture provided by the respondents is inconclusive. It seems that less than half of the respondents are satisfied by the influence of END on “measures at source”. For comparison, the service contract found that the END is likely to be a good basis for such measures, but it is still too early to see the full effects. This might be the reason for the inconclusive result.

Most respondents are unaware of quiet areas. This may be because quiet areas do not exist in their region, or because they are not appropriately announced. This is in line with the service contract’s finding on quiet areas.

Survey respondents (public authorities) were asked for their perceptions as to the extent of progress in respect of the first objective of the END. Among the 70 public authorities that responded to this question in the survey, 26% thought that the END has already achieved its objective of defining a common approach in full, whilst a further 61% believe that either “significant” or “some progress” has been made. Only 11% believe that little progress has been made (the interview feedback suggested that this was mainly to do with the comparability of noise exposure data).

It is important to set the survey results in an appropriate context, since additional feedback was obtained through the interview programme on the extent of progress. Many stakeholders stated that whilst significant progress has been made, a fully common approach, in which comparable data is available, will take considerable time to achieve, since the CNOSSOS-EU methodology, as incorporated in Commission Directive (EU) 2015/996, will not be implemented across EU-28 until R4 in 2022.

It was observed by a number of stakeholders interviewed that there is a lack of an effective EU-level enforcement mechanism relating to tackling the problem of delays in national competent authorities meeting END reporting deadlines stipulated in the Directive.

Public authorities responding to the survey were quite positive about progress made in making information publicly accessible in order to inform the public. 52% stated that significant progress has been made and 29% that some progress has been made. It is worth noting however

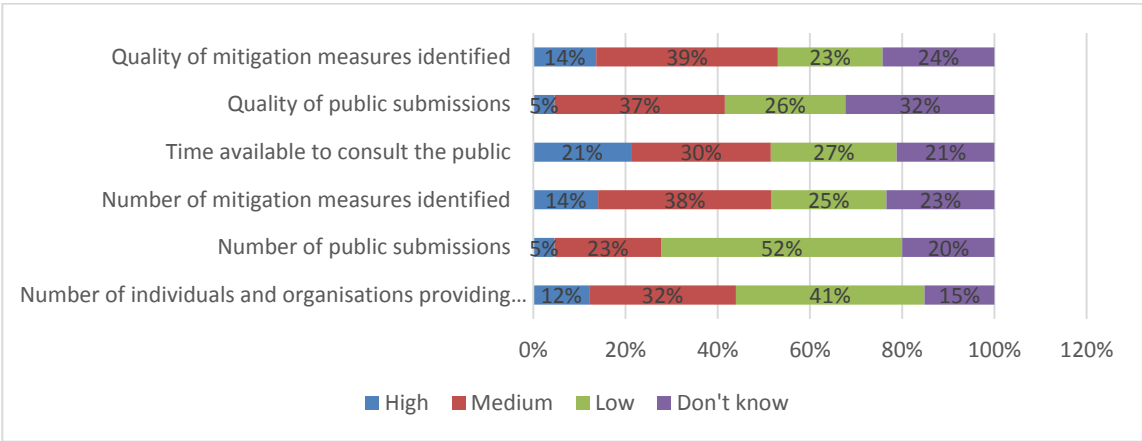
that a significant minority (16%) expressed the view that little progress had been made (quite possibly, the focus in their response was on public consultations rather than making mapping results available, since there appears to be much less of an issue with the latter).

Overall, stakeholders were positive about the benefits of an action planning approach, which included:

- A more strategic approach to noise management – in MS that had pre-existing national legislation on environmental noise, it was observed that the END had made them address noise at receptor more strategically, due to the need to prioritise resources to address noise.
- Greater prioritisation of resources on noise abatement and reduction - for instance through approaches that have defined noise “hotspots”. Whilst a “hotspot” approach is not compulsory, MS commonly have limited resources to tackle environmental noise. They often therefore prefer to target measures at those areas where noise exposure is greatest or the highest number of people are affected as part of a process of prioritisation based on noise mapping results.

Respondents to the survey for public authorities were asked how they would rate the Directive's impact so far on different aspects of the public involvement in the development of noise action plans, including views on the number of individuals and organisations providing input, whether consultation had increased the number of mitigation measures identified and strengthened the quality of mitigation measures put forward in NAPs, and whether sufficient time was available for the consultation process. The results are set out in Figure 5:

**Figure 5 – How would you rate each of the following aspects?**



*Source: Survey of public authorities (n=65)*

The survey responses suggest that public consultation can have a positive impact on strengthening the quality of mitigation measures identified. The quality of submissions from the public appears to vary significantly between and within EU MS since 37% assessed the quality as high (and 5% very high), but 26% of respondents stated that in their view, the quality of submissions was low.



Less positively, a problem identified in some MS, regions and localities was the lack of interest in public consultation processes relating to noise action planning under the END. In the survey, in relation to the total number of submissions received, 52% stated that the number was low. However, 23% stated that the number received was medium and only 5% high. In terms of the number of individuals and organisations providing input, which extends beyond providing a written response alone, and may include, for instance, taking part in public meetings relating to the draft NAP, or in a consultation committee, the position was somewhat better with 12% of respondents noting a high level of contribution, 32% a medium contribution. However, 41% of respondents attested to a low level of contribution.

These findings were confirmed through the interviews, which found that although in some countries, there was an adequate level of interest in public consultations, there was often a lack of public engagement. However, in some EU Member States, there has been very active engagement by the public/ interested stakeholder organisations in responding to consultations.

Through the survey, respondents' views were also solicited as to the extent of progress towards the second objective of the END. Most stakeholders had a positive opinion about progress. A combined total of 66% thought that either 'some progress' or 'significant progress' had been made, although 25% stated that little or no progress had been made, with 10 % of the respondents indicating that they do not know.

Whilst some END stakeholders stated that population exposure data was already 'good enough' to be used by EU policy makers responsible for source legislation, others were concerned that the data is not comparable since the EU is still in the process of harmonising noise at receiver data until CNOSSOS-EU is fully implemented.

NGOs and community organisations broadly welcomed the introduction of the END as having strengthened the political visibility of and the degree of policy attention to environmental noise. However, some such organisations interviewed were concerned about the potential unintended consequences, such as the risk that the costs of noise mapping might displace funding that would otherwise have been used directly for noise mitigation, abatement and reduction measures.

Several respondents raised concerns about END data being used beyond what it was originally designed for, expressing concern that the consequences of any assumptions and limitations were not always appreciated, or even brought to the attention of the end user.

A number of issues were identified in relation to the END Reporting Mechanism through the interview research. Overall, Reportnet was viewed as being a reasonably efficient mechanism for the submission of reporting data. However, there were aspects of the mechanism that could be improved, such as:

- The need to strengthen the user-friendliness of the reporting mechanism;
- The need to streamline and/ or simplify reporting procedures;

- The problem that it can take a lot of time and resources to upload END reporting information, especially summaries of action plans since there are many different data fields and the civil servant uploading data must familiarise themselves with the data codes.

### **Efficiency**

In terms of whether the costs were seen as proportionate by END stakeholders, most stakeholders interviewed considered the costs as being reasonable. The costs, *per capita* and *per affected inhabitant*, were generally viewed as low by END stakeholders. However, it was noted by some local authorities (and some NGOs) interviewed that when costs are assessed at the aggregate level, rather than per capita or per affected inhabitant, these can be seen as administratively burdensome by some public authorities, but this depends on the budgetary arrangements put in place by the particular Member State concerned.

The online public consultation showed that respondents considered measures not to be proportionate to their benefits.

### **EU added value**

The results from the survey show that most stakeholders perceive the END as demonstrating strong EU added value. Overall, 86% of respondents to the survey of public authorities agreed with the statement that the Directive has added value to what Member States were already doing (and 7% strongly agreed), whilst only 7% disagreed (or disagreed strongly).

Most respondents from public authorities agreed that the END in combination with national legislation has triggered positive developments in noise reduction. However, 61% of respondents agreed and a further 12% strongly agreed that progress in noise reduction was primarily the result of what EU Member States were already doing rather than EU legislation in the field of environmental noise.

The interview programme found that the small number of stakeholders that were less positive about EU added value tended to be from Member States where there was already existing legislation before the END. A similarly high percentage of respondents acknowledged that the END had at least partially contributed to noise reduction.

In the online public consultation, however, the majority of citizens – as the largest group of respondents – doubted that any noise reduction measures would have been taken by their Member State without EU legislation on environmental noise.

Most respondents feared that – should the Directive be repealed – the acoustic environment would worsen or remain unchanged. This is in line with the findings of the other consultations, which indicated a clear support of stakeholders to maintain the Directive.

### **ANNEX 3: METHODS AND ANALYTICAL MODELS USED IN PREPARING THE EVALUATION**

The contractor supporting the evaluation developed a model for a cost-benefit analysis (CBA), to provide a structured framework for identifying, quantifying and comparing the monetary and non-monetary costs and benefits of the implementation of the END. The CBA was developed on the basis of data collected through 19 test cases covering agglomerations, major roads, major railways and major airports. This information was then used to extrapolate to the EU level and assess the efficiency of the END.

A detailed description of the methodology and the data used can be found in the appendices to the Final Report of the service contract supporting the evaluation, as follows:

- Appendix D – Methodology for cost-benefit assessment
- Appendix E – Methodology for the case studies
- Appendix F – Test case summaries

## **ANNEX 4: LIST OF RELEVANT EU LEGISLATION**

### **Road traffic noise**

Regulation (EU) No 540/2014 of the European Parliament and of the Council of 16 April 2014 on the sound level of motor vehicles and of replacement silencing systems, and amending Directive 2007/46/EC and repealing Directive 70/157/EEC Text with EEA relevance  
*OJ L 158, 27.5.2014*

Directive 97/24/EC of the European Parliament and of the Council of 17 June 1997 on certain components and characteristics of two or three-wheel motor vehicles

*OJ L 226, 18.8.1997*

Regulation (EU) No 168/2013 of the European Parliament and of the Council of 15 January 2013 on the approval and market surveillance of two- or three-wheel vehicles and quadricycles

*OJ L 60, 2.3.2013*

Regulation (EC) No 1222/2009 of the European Parliament and of the Council of 25 November 2009 on the labelling of tyres with respect to fuel efficiency and other essential parameters (Text with EEA relevance)

*OJ L 342, 22.12.2009*

### **Air traffic noise**

Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of the Regions - Air transport and the environment Towards meeting the challenges of sustainable development  
/\* COM/99/0640 final \*/

Regulation (EC) No 1592/2002 of the European Parliament and of the Council of 15 July 2002 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency (Text with EEA relevance)

*OJ L 240, 7.9.2002*

Council Directive 89/629/EEC of 4 December 1989 on the limitation of noise emission from civil subsonic jet aeroplanes

*OJ L 363, 13.12.1989*

Council Directive 92/14/EEC of 2 March 1992 on the limitation of the operation of aeroplanes covered by Part II, Chapter 2, Volume 1 of Annex 16 to the Convention on International Civil Aviation, second edition (1988)

*OJ L 076, 23.3.1992*

Commission Directive 1999/28/EC of 21 April 1999 amending the Annex to Council Directive 92/14/EEC on the limitation of the operation of aeroplanes covered by Part II, Chapter 2, Volume 1 of Annex 16 to the Convention on International Civil Aviation, second edition (1988) (Text with EEA relevance)

*OJ L 118, 6.5.1999*

Directive 2002/30/EC of the European Parliament and of the Council of 26 March 2002 on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Community airports (Text with EEA relevance)

*OJ L 85, 28.3.2002*

Directive 2006/93/EC of the European Parliament and of the Council of 12 December 2006 on the regulation of the operation of aeroplanes covered by Part II, Chapter 3, Volume 1 of Annex 16 to the Convention on International Civil Aviation, second edition (1988) (codified version) (Text with EEA relevance)

*OJ L 374, 27.12.2006*

Regulation (EU) No 598/2014 of the European Parliament and of the Council of 16 April 2014 on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Union airports within a Balanced Approach and repealing Directive 2002/30/EC

*OJ L 173, 12.6.2014*

### **Rail traffic noise**

Directive 2008/57/EC of the European Parliament and of the Council of 17 June 2008 on the interoperability of the rail system within the Community (Recast) (Text with EEA relevance)

*OJ L 191, 18.7.2008*

2002/735/EC: Commission Decision of 30 May 2002 concerning the technical specification for interoperability relating to the rolling stock subsystem of the trans-European high-speed rail system referred to in Article 6(1) of Directive 96/48/EC (Text with EEA relevance) (notified under document number C(2002) 1952)

*OJ L 245, 12.9.2002*

Directive 2001/16/EC of the European Parliament and of the Council of 19 March 2001 on the interoperability of the trans-European conventional rail system

*OJ L 110, 20.4.2001*

Commission Decision 2004/446/EC of 29 April 2004 specifying the basic parameters of the Noise, Freight Wagons and Telematic applications for freight Technical Specifications for Interoperability referred to in Directive 2001/16/EC

*OJ L 155, 30.4.2004*

Directive 2004/50/EC of the European Parliament and of the Council of 29 April 2004 amending Council Directive 96/48/EC on the interoperability of the trans-European high-speed rail system and Directive 2001/16/EC of the European Parliament and of the Council on the interoperability of the trans-European conventional rail system

*OJ L 164, 30.4.2004*

Directive 2012/34/EU of the European Parliament and of the Council of 21 November 2012 establishing a single European railway area Text with EEA relevance

*OJ L 343, 14.12.2012*

Commission Regulation (EU) No 1304/2014 of 26 November 2014 on the technical specification for interoperability relating to the subsystem ‘rolling stock — noise’ amending Decision 2008/232/EC and repealing Decision 2011/229/EU Text with EEA relevance

*OJ L 356, 12.12.2014*

Commission Implementing Regulation (EU) 2015/429 of 13 March 2015 setting out the modalities to be followed for the application of the charging for the cost of noise effects Text with EEA relevance

*OJ L 70, 14.3.2015*

### **Other relevant legislation**

Directive 2000/14/EC of the European Parliament and of the Council of 8 May 2000 on the approximation of the laws of the Member States relating to the noise emission in the environment by equipment for use outdoors

*OJ L 162, 3.7.2000*

Directive 2005/88/EC of the European Parliament and of the Council of 14 December 2005 amending Directive 2000/14/EC on the approximation of the laws of the Member States relating to the noise emission in the environment by equipment for use outdoors (Text with EEA relevance)

*OJ L 344, 27.12.2005*

Directive 2003/44/EC of the European Parliament and of the Council of 16 June 2003 amending Directive 94/25/EC on the approximation of the laws, regulations and administrative provisions of the Member States relating to recreational craft (Text with EEA relevance)

*OJ L 214, 26.8.2003*

Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE)

*OJ L 108, 25.4.2007*

Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds

*OJ L 20, 26.1.2010*

Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora

*OJ L 206, 22.7.1992*

Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) Text with EEA relevance

*OJ L 334, 17.12.2010*