Highlights of the workshop on the
“State-of-the-art in noise valuation”
held in Brussels on 14 December 2001

Final Report – July 2002

M. VAINIO – G. PAQUE
European Commission – DG Environment
1. **INTRODUCTION**

Directive 2002/49/EC on the Assessment and Management of Environmental Noise (END) requires Member States to produce “strategic noise maps”, by using noise indicators ($L_{den}$ and $L_{night}$). These indicators will be used

- to assess the number of people affected by noise,
- to inform the public about noise exposure and its effects,
- to draw up “action plans” to reduce noise where necessary and
- to maintain environmental noise quality where it is good.

Both the EU and national policy makers need also to make a choice between the various measures available to mitigate noise. Further the Amsterdam Treaty requires that the costs and benefits of EU-wide environmental legislation are assessed. Therefore, the Directorate-General Environment of the European Commission seeks to develop a set of common tools to be used when carrying out the analysis of costs and benefits of noise mitigation measures.

Such an objective can be achieved through costs and benefits analysis (CBA), if sufficient data is available, and if common principles are shared between involved experts. DG Environment invited experts to Brussels on 14 December 2001 to take stock of the state-of-the-art so that:

- the best current estimates for monetary value of noise exposure can be included within the DG Environment’s guidelines, and
- research needs can be identified

2. **DISCUSSION**

In order to support the discussions during the workshop itself, Prof. Ståle Navrud had carried out a comprehensive review of economic valuation studies of noise from different transportation modes (air, road and rail) in Europe and in North America, covering both stated preference (SP) methods and revealed preference (RP) methods.

In the workshop, the following points were raised and discussed:

(1) **What should be the theoretical basis for estimating the value of noise? Is it defensible (and if yes: under what conditions) to use SP and RP methods to value noise?**

From the review of the different studies carried out and the different possible approaches, Stated Preference method, (including Contingent Valuation Method

\[1 \text{ $L_{den}$ (day-evening-night indicator) : noise indicator for overall annoyance, defined in Annex I of the END} \]

\[2 \text{ $L_{night}$ (evening-noise indicator) : noise indicator for sleep disturbance, defined in Annex I of the END} \]

\[3 \text{“The State-Of-The-Art on Economic Valuation of Noise”, by Ståle Navrud, Department of Economics and Social Sciences, Agricultural University of Norway} \]
(CVM)) and Revealed Preference method (including Hedonic Price Method (HPM)) are acceptable methods to be used for valuing the benefits of noise reduction. However, it was emphasised that each methodology needs to be followed rigorously in order to attain meaningful and policy relevant results.

For example, if the people understand the CVM question so that they themselves would not have to pay for the noise reduction (but that the public authority would do so), they would give too high responses. This is because the budget constraints of the respondents would play no role in the values that they express.

On the other hand, if the respondents fundamentally believe that it would be unjust to ask them to pay for noise reduction, they would give a response that would be too low (or even zero). It is important to identify such “protest zero” answers as well.

It was noted that there are different kinds of problems when using HPM. For instance, it is not evident how the value of noise is capitalised in the price of houses. If the housing markets are distorted (e.g. due to rent control or high transaction costs/taxation) the value of noise may not be reflected in the price of houses or apartments.

As for the “avoidance cost” approach, it is believed to provide insufficient information to be used in the noise valuation field.

The meeting concluded that both CVM and HPM methods can be used to estimate the value of noise but that each of the methodologies need to be used rigorously.

(2) Are the existing noise value estimates fit for benefit transfer? If yes, under what conditions, and what benefit transfer methods should be applied?

It was noted that the current practice of taking a value from a study from one country and use this in another country is rather arbitrary and lacks theoretical basis. Experiments in other environmental areas has demonstrated that the transfer of values from one country (or context) to another one has not proven to be robust. Therefore, it was highly recommended that more original valuation studies would be carried out in Member States. In addition, it was recommended that studies would try to estimate the values of different types of noise (e.g. road, rail and aviation).

Since there are too few such SP studies to construct mean values for the EU Member States, a second best approach would be to convert the results from existing SP studies into values per dB per household per year. Such an approach could be particularly appropriate for EU-wide analysis as it can be assumed that the differences of values among Member States would even out when analysis is carried out at European level.

(3) What should be the cut-off point used for valuing noise? Should it be L_{den} 50, L_{den} 55 or something else?

The participants of the workshop agreed that it would be useful to agree on a harmonized cut-off point for noise valuation.
As for the noise indicator to be used, it was agreed to use $L_{den}$ being the indicator provided in the environmental noise directive.

As an upper limit to the cut-off point value, one can refer to the limit of 70 dB(A) which is considered to be the limit for important health effects. As for the lower limit, costs and also accuracy of the prediction methods make it difficult to go below 50 dB(A). Considering that a lot of studies carried out in the past used 55 dB(A) as the cut-off point and that 55 dB(A) is fairly close to $L_{den}$ 55 it was recommended that $L_{den}$ 55 would be kept as the interim value for lower cut-off point until further notice.

(4) **Beyond this cut-off point, what should the value of noise be per decibel per person affected, in euros (2001 price level)?**

This question of course raised many comments from the participants. Although it would be very useful to have a shared and agreed figure that could be used in every CBA relating to noise, it seemed difficult to agree on a fixed figure. A first rough assessment could place this figure between €5 and €50 per household per decibel per year with a cut-off point of $L_{den}$ 55, and further considerations could limit this range of values.

It was agreed that it would be useful to choose a reference value, which could be used in order to allow for a comparison between the different studies carried out in the field of noise valuation. The European Commission may come forward with such a value.

(5) **Should the value of noise be different in different transport modes (air, rail, road)? If so, what should be the difference?**

There was a common agreement amongst the workshop participants that a differentiation should be introduced for noise from different transport modes.

The easiest way to introduce such a differentiation would be to use the dose-effect relationships already established for noise (expressed in $L_{den}$) and annoyance (percentage of annoyed or highly annoyed persons) under the EC noise expert network (Working Group 2 “dose-effects”).

(6) **Should the value of noise be the same in different Member States or socio-economic groupings, as well as in accession candidate countries?**

There is no evidence available at the present time to make the case for a differentiation among Member States or different socio-economic income groups. For this reason, it was recommended to use the same value in the EU. For Accession Candidate Countries the reference value(s) could be adjusted e.g. by purchasing power parity adjusted per capita income. It was noted that it would be important to carry out studies which would analyse if the willingness-to-pay for noise mitigation differs among socio-economic groupings.

(7) **What research gaps exist (e.g. value of night time noise vs. day time noise, more accurate information on noise from specific sources)?**
There is a need to carry out studies on the valuation of sleep (which could then be used for noise valuation using dose-effect relationships for noise and sleep disturbance).

More generally, it would also be useful to carry out more research on that topic in Member States, using comparable methodologies or at least aiming at producing results expressed in the same indicators, in order to improve the expertise in that field.

3. **FOLLOW-UP**

As a result of the workshop, and in order to anchor the debate about noise valuation, it was decided to carry out the following:

- In order to highlight the importance of the how much people are willing to pay to reduce noise the material presented at the workshop, including the report from Prof. Navrud, will be made available on the Commission’s web-site.

- A database on CBA and noise should be created.

- Linking noise levels, levels of annoyance and economic values for different annoyance levels done across different Member States an in accession candidate countries.

- Communication between experts involved in noise economics should be developed. A mailing list could be set up, and international conferences (Inter-noise…) could be useful opportunities to debate the related issues.

- A close link between EC working group on “Health and socio-economic aspects of noise” and the experts in noise valuation should be established.

- The Commission (DG Environment) will propose a set of preliminary guidelines relating to noise valuation, to be used until further information is available on that topic.

4. **PARTICIPANTS:**

Phil BRADBURN, Department of Transport TLR, United Kingdom  
Jacques DELSALLE, European Commission, DG Economic and Financial Affairs  
Prof. David GILLEN, University of California, Berkeley, USA  
Dr. Jacques LAMBERT, INRETS, France  
Prof. Ståle NAVRUD, Agricultural University, Norway  
Anne OHM, COWI, Denmark  
Gilles PAQUE, European Commission, DG Environment, Air Quality and Noise Unit  
Dr. Kjartan SAELENSMINDE, Transport Economic Institute, Norway  
Dr. Stephan SCHMID, University of Stuttgart, Germany  
Dr. Matti VAINIO, European Commission DG Environment, Air Quality and Noise Unit  
Prof. Montserrat VILADRICH GRAU, Public University of Navarra, Spain  
Stephen WHITE, European Commission, DG Environment, Sustainable Development Unit