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THE NOISE POLICY OF THE EUROPEAN UNION

YEAR 2 (1999-2000)

Towards improving the urban environment and contributing to global sustainability



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An Introduction to Our Work

The Commission has proposed a new Directive on Environmental Noise but at the beginning the legislation will not “reduce the noise levels by one single decibel”. And the reason? There is no such single decibel!

Our reports show that there are many ways, many different times, and different measuring places and methods to get to the noise value in decibels. Many Member States have invested in national legislation with training and education for engineers, scientists, lawyers and accountants. Others wait for the EU to provide a framework, while having national laws that are acknowledged to be anachronistic. So how do we go forward?

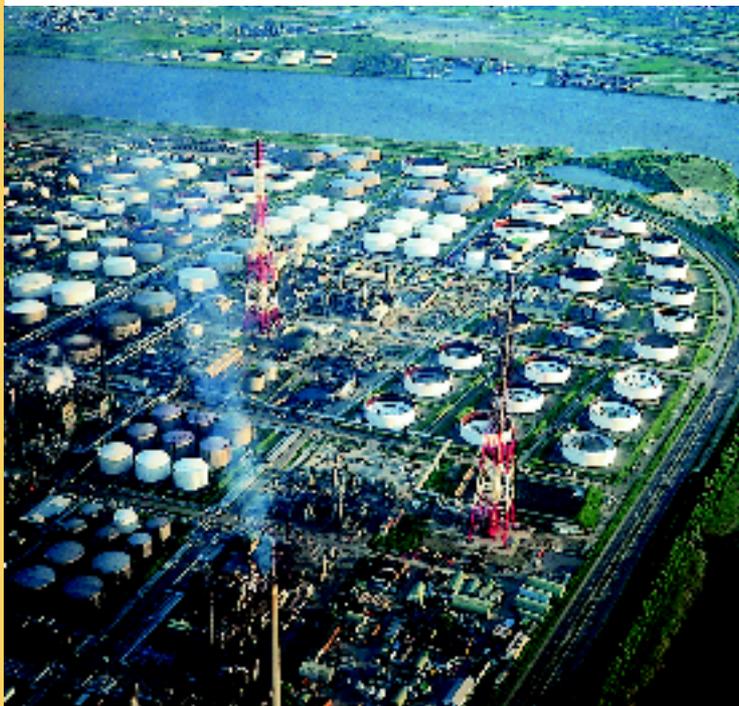
This booklet is an brief overview of the position achieved as the Noise Team prepares the Commission’s Proposal in spring 2000. It is not final nor authoritative, but it might be a useful little guide.

Its main elements are the following:

- Harmonisation of noise indicators and assessment methods.
- Noise mapping and action plans for ‘agglomerations’, ‘major roads’, ‘major railways’ and ‘major airports’, based on the common indicators and assessment methods.
- Target setting for the common noise indicators by Member States.
- Information for the public on noise maps and action plans.
- Periodic reports based on an EU data bank on noise maps and action plans.
- EU goal setting on the reduction of the number of noise affected EU citizen, combined with the strategies and measures to reach the goals. An important element of the latter will be the source related EU policy.
- Development of a future strategy on the protection of quiet areas.

I. OBJECTIVES AND CONTENTS OF OUR PROPOSED DIRECTIVE

The objective of the proposal is to establish a common EU framework for the assessment and management of exposure to environmental noise. Public awareness of exposure to noise pollution has increased in spite of EU legislation on noise sources, or legislation in some Member States and remedial actions at the local level. A more coherent, extensive and more effective approach to noise management is therefore needed in order to tackle this problem. This means we expect to determine a new way of talking about noise. We think of giving a means of expression to the public, to the administrator and to the politician. We will try to suggest that the problems be expressed in terms of numbers affected by noise, rather than simply suggesting a number of decibels. In saying that, it is should be understood that noise from different sources has different effects and the specific noises can be considered as different pollutants i.e. road traffic noise, aircraft noise, railway noise and noise from industrial equipment.



Our newly proposed directive supplies essential elements for such an approach.

First, it seeks to harmonise noise indicators and assessment methods because there are many ways to define and assess environmental noise.

Second, the directive seeks to gather noise exposure information in the form of 'noise maps' by use of the common indicators and assessment methods.

Third, it aims to make this authority-generated information available for the public, to an established standard. This exposure information will form the basis for action plans at the local level. Equally, it and its associated effects will form the basis for goal setting for improvement



at the EU level and for the design of an EU strategy and measures to reach these goals.

Cost-benefit studies and cost-effectiveness studies will be used to optimise these strategies and measures. A strategy on noise sources will be developed with regard to its effectiveness to reduce the effects of environmental noise, combined with market access type-conformity considerations.

The Directive would require the Member States to demonstrate national limits (quantities of pollutants) to which they aspire, declared in terms of the harmonised indicators. So far it does not set common European-wide noise limits– this would not be possible at present because of the large differences in scale and comprehensiveness of implemented noise measures throughout the different Member States.

However, once the individual Member States' national limits are published for each pollutant and the noise maps and the action plans are published, both the public and national authorities will be able to compare noise situations, approaches and progress.

The Commission Services believe that this will be a strong mechanism to drive future improvement.



2. BACKGROUND ON ENVIRONMENTAL NOISE

Sound can be generated by many different sources and can be perceived as noise by humans in many different circumstances. Environmental noise, as defined in our proposal, is the sound generated by human activity outdoors (road traffic, railways, air transport and general industry plus recreation and construction) and perceived in the domestic environment (e.g. in and near the home, in public parks, in schools).



“Annoyance” is the scientific expression for non-specific disturbance by noise, as reported in a structured field survey. Nearly every person that reports to be annoyed by noise in and around its home will also experience one or more of the following specific effects:

- **reduced enjoyment of balcony or garden,**
- **when inside home with windows open: interference with sleep, communication, reading, watching television, listening to music and radio,**
- **closing of bedroom windows in order to avoid sleep disturbance.**

Some of the persons that are annoyed by noise also experience one or more of the following effects:

- *sleep disturbance when windows and doors are closed,*
- *interference with communication and other indoor activities when windows and doors are closed,*
- *mental health effects,*
- *noise-induced hearing impairment,*
- *hypertension,*
- *ischaemic heart disease.*

The two last effects occur in case of long term exposure to noise levels above 65 dB and may be responsible for a few percent of the heart attacks in the EU, including the related mortality.



Environmental noise is particularly difficult to define and is quite unlike other atmospheric pollutants to which we are exposed. The immediate effects can be described, even if the sources move on, while the polluted person remains behind. Even though the insidious nature of other pollutants is not experienced immediately, dose/effect curves and toxicity levels are accepted as a justification to set limits in legislation. Long term loss of quality of life and illness can be ascribed to such pollutants. As yet there is no such consensus concerning noise pollution. However, it is clear that environmental noise has several effects on humans. **(See box)**

Since whether or not a person experiences such effects is strongly dependent on his/her sensitivity for noise, the range of effects is so large that individual personal experiences are never a reliable measure for the effects of noise on a community. Policy on environmental noise should therefore be based on scientific results in which the variations due to different sensitivity are taken into account.

It is evident that people reporting noise-induced annoyance experience a reduced quality of life. Unfortunately, and this is a reality for at least 25% of the EU population.

Scientists and legislators have determined separate categories of noise: they have a need to do so in order to examine the options, the benefits and charges in applying restrictions, or licensing, or permitting and controlling operations. The main categories covered are road transport, railways, aircraft and generalised industry, thus EU thinking is consistent but seeks coherence.



To date most EU legislation in this area covers many potentially noisy products at the time of entry into the market. For noisy equipment it is necessary to protect the operator and accordingly legislation exists. There is also legislation on the noise insulation or noise absorption characteristics of building materials. The Member States have made the necessary transpositions and national laws exist. Often legislation was developed at European level to protect the market and avoid unilateral non-tariff barriers.

So our proposal is limited since it covers only road transport noise, railway noise, aircraft noise and industrial noise. It does not cover noises produced by animals, by nature, by neighbours and by the exposed person himself, and it also excludes perception of noise at work places and in means of transport.

3. THE GREEN PAPER ON FUTURE NOISE POLICY



So far, legislation on environmental noise is divided into two major categories namely, EU legislation on noise emission by products (cars, trucks, aircraft and industrial equipments)- essentially market access laws for type testing of conformity, and Member State legislation on allowable noise levels in the domestic environment. In principle these approaches are complementary and the combination should produce a good result.

In order to improve the situation, the Commission had suggested a new framework for future action starting with: *“a proposal for a directive providing for the harmonisation of methods of assessment of noise exposure and the mutual exchange of information. The proposal could include recommendations for noise mapping and provision*

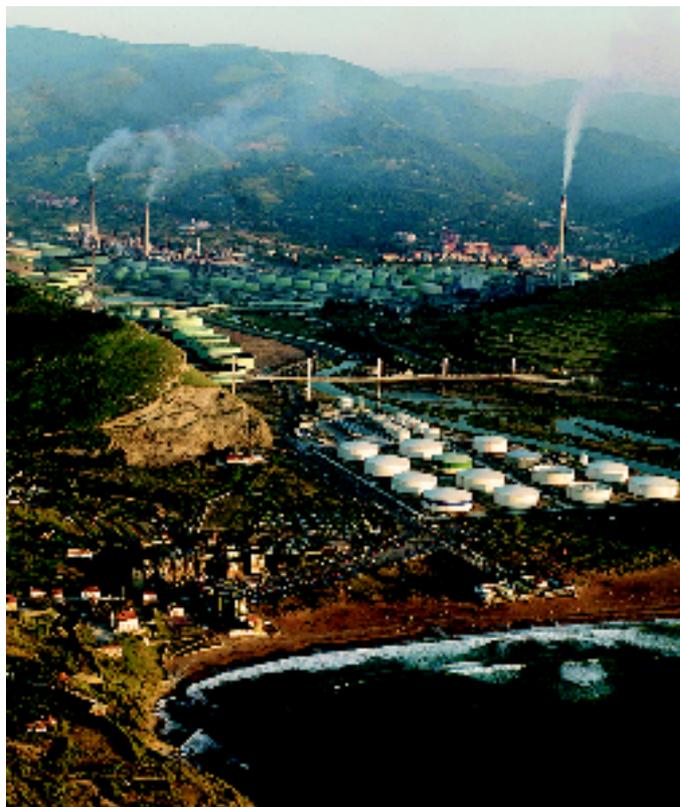


of information on noise exposure to the public. In a second stage consideration could be given to the establishment of target values and the obligation to take action to reach the targets”.

4. RELATION TO OTHER ENVIRONMENTAL PROGRAMMES, STRATEGIES AND POLICIES

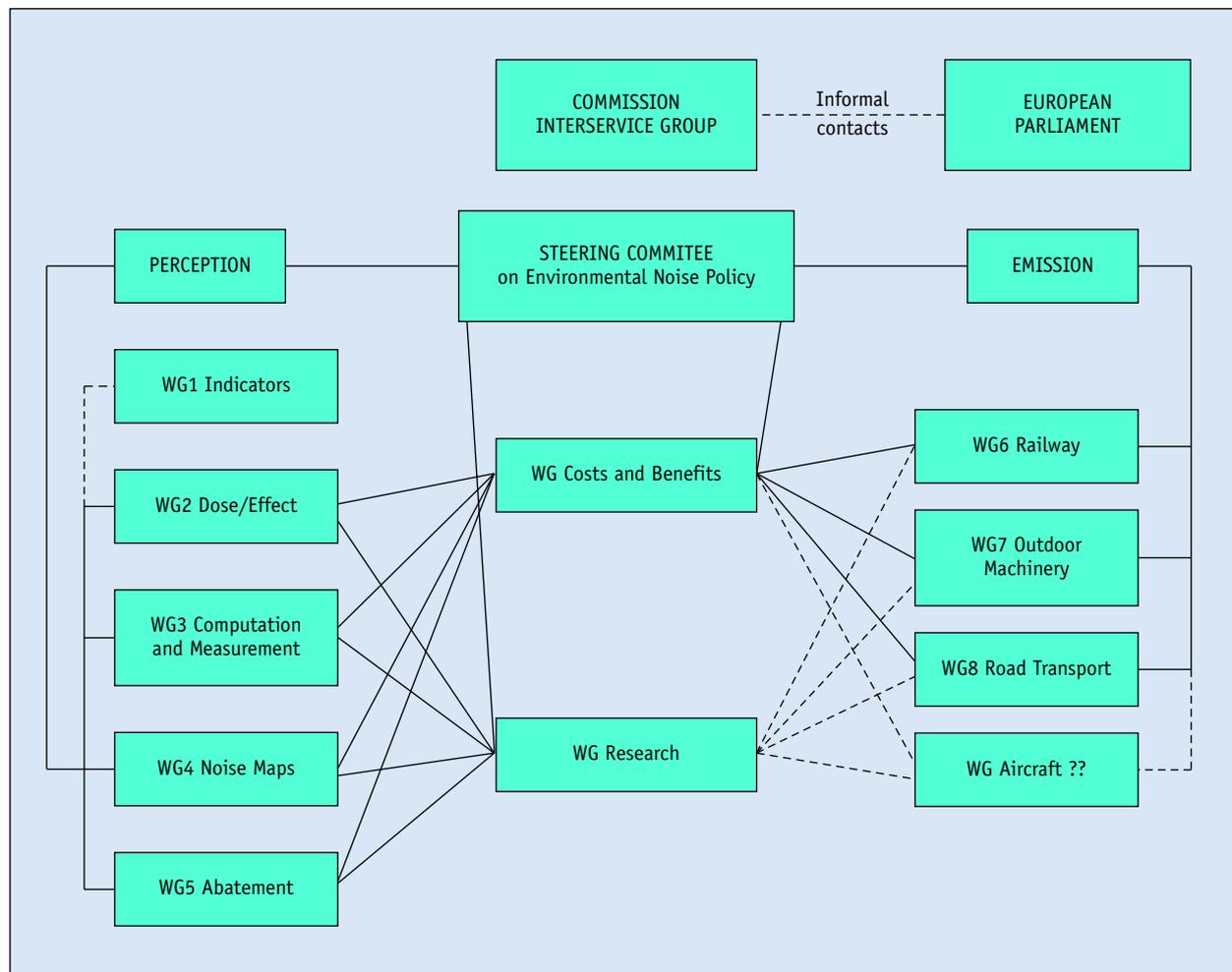
In 1999 the Council adopted a Strategy on the integration of Environment in the Transport Policy in which the problem of noise from road, rail and air transport is identified as one of the most urgent areas for action. The Communication on Air Transport and Environment contains recommendations for the harmonisation of noise indicators and assessment methods for aircraft noise and to the forthcoming framework directive on environmental noise. The Transport and Environment Reporting Mechanism, part of the EU programme and action in relation to environment and sustainable development, has identified the indicator “exposure of population to traffic noise” in the group “environmental consequences of transport” and shown that no harmonised methodologies or data are available. A solution is expected from the EU Noise Policy, the related working groups and the future framework directive on environmental noise.

Important elements of this proposed directive are similar to the contents of the Directive on ambient air quality assessment and management: viz. data collection in agglomerations; action plans; adequate information for the public; improvement of computation and measuring methods; collection of data and reporting by the Commission. The proposal therefore supplements to the well-known air quality directive, covering another important environmental aspect particularly for the urban environment. Additionally the proposal covers several other aspects as noise control in the rural environment and the protection of relatively quiet areas.



5. SCIENTIFIC AND TECHNICAL BASIS FOR THE DIRECTIVE

A Steering Committee and a number of working groups have supported the Commission with the development of the Directive. Five working groups deal with the perception and transmission related aspects, other working groups cover emission related aspects.



The Working Group “Costs & Benefits” will generate cost-benefit and cost-effectiveness studies in co-operation with the other working groups.

The working group “Research” is supporting the other groups with the definition of research needs, priorities and financing.

The working group on “Indicators” has published its final position paper.

Working groups with longer-term tasks will prepare documents on future improvements of the technical annexes of the Directive and on guidelines that support the implementation of the Directive.

Several working groups support the development of the emission related EU policy in such a way that it becomes more effective for the reduction of health effects in the environment. The formation of a working group on noise emission by aircraft is still being determined.

The members of these working groups represent the most important “stakeholders”, our Member States, Local Authorities networks, NGOs, Industry, the Commission, WHO, Standardisation bodies.



6. INDICATORS AND EFFECTS

The two noise indicators, L_{den} and L_{night} , defined in the proposal are based on the recommendations of the Working Group “Indicators” in its final position paper.



Our proposal suggests a choice of two noise indicators. The first noise indicator is the day-evening-night level L_{den} in decibels, which is a well-known indicator for “annoyance”, while the second L_{night} in decibels, is the night time level. The day-evening-night indicator is already in use for aircraft noise in some Member States. The quantity is closely related to the day-night level L_{dnr} , which is widely used in the USA and is also applied in some Member States for the characterisation of aircraft noise.



When associated with dose-effect relations, L_{den} and L_{night} are both indicators that are able to predict the average response of a population that is subject to long-term noise exposure. This means that these indicators are suitable for planning purposes and for an integral approach for a residential area, a city and larger areas. They may not be optimal to judge the situation for individual dwellings or individual persons, and are certainly not appropriate to apply to short term situations as are often related to complaints. Such applications are outside the scope of the proposed directive.

Noise policy based on dose-effect relations is not new.

The value of noise indicators can be determined either by measurement or by computation. Usually, long-term indicators like L_{den} and L_{night} can be more easily and more cheaply computed than measured. For prediction purposes, computation methods are of course the only option.

None of the computation methods that are presently being used in the Member States satisfies the requirements for modern common methods. Working

Group 3 “Computation and Measurement” has started the process that should lead to the development of such methods.

For the interim period the Commission proposes an approach in which Member States use their national computation methods for the EU noise mapping (adapted to the definitions of the EU indicators) or use a recommended existing method (also adapted to the definitions of the EU indicators). For these recommended existing methods the Commission is following the advice of Working Group 3, as reflected in its position paper. In principle, the measurement of L_{den} and L_{night} is determined by their definitions.

The primary noise indicator is the day-evening-night level L_{den} in decibel, which is a well-known indicator for “annoyance” (“annoyance” is the scientific expression for non-specific disturbance by noise). The indicator L_{den} is already in use for aircraft noise in some Member States. The quantity is closely related to the day-night level L_{dnr} , which is widely used in the USA and is also applied in some Member States to characterise aircraft noise.

Long term exposure to noise levels above 80 dB may cause permanent hearing loss. Such exposure occurs rather often in working environments and probably in discos, but very seldom in the domestic environment. There are some indications that very strong short-term noises may also be damaging, but the evidence is weak.

Due to the relation between the specific effects and non specific annoyance, and due to the fact that the same noise always causes various health effects, a reduction of the value of L_{den} will not only reduce annoyance but also reduce the specific adverse noise effects in a population. However, for the reduction of some of these effects and





for noise control in special situations such a generalised approach might not be the most appropriate way and use of additional noise indicators may be advisable. In this context, the first specific effect to consider is sleep disturbance (which in his place is again connected with several other specific effects). In order to refine the approach for the protection of the dominant sleeping period, i.e. the night the Commission proposes the “overall night-time noise indicator L_{night} ”, following the Working Group recommendation. A reduction of the value of this indicator will reduce sleep disturbance and some other specific effects.

Combined with associated dose-effect relations, L_{den} and L_{night} are indicators able to predict the average response of a population subject to long-term noise exposure in terms of annoyance and ‘self reported sleep disturbance’. These indicators are suitable for planning purposes and for an integrated approach for a residential area, a city and larger areas. In that context they can also be applied for individual dwellings. They are not appropriate for short-term situations that are often related to complaints. The Commission follows the recommendations to apply the two noise indicators also in case of a low number of events or a limited time of exposure, but also recommends to consider the application of additional indicators for those cases. Literature clearly shows that the dose-effect relations for annoyance and for sleep disturbance are different for road, rail and air traffic noise. This implies that a direct comparison of these noises on the basis of the values of L_{den} or L_{night} is wrong and should be avoided.

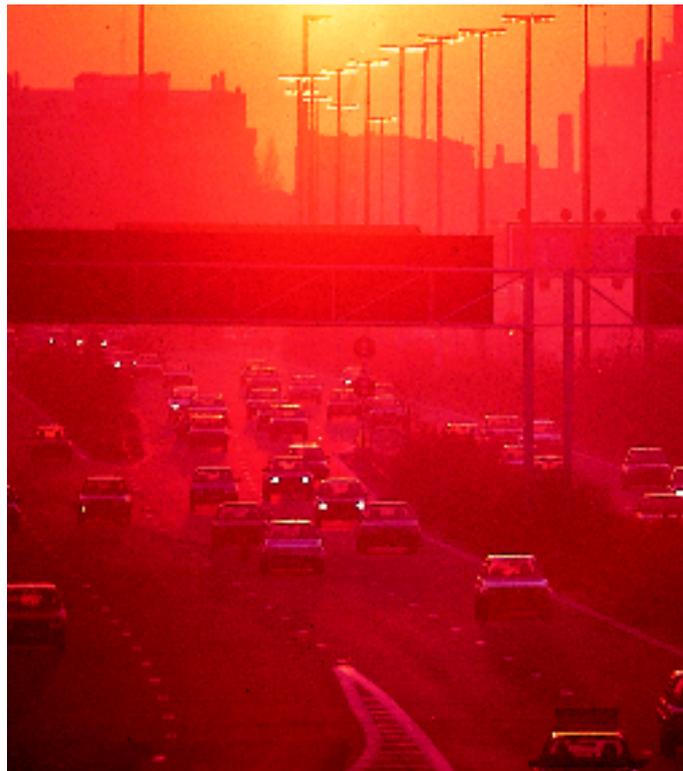


7. COMPUTATION AND MEASUREMENT METHODS

The value of noise indicators can be determined either by measurement or by computation. Usually, long-term indicators like L_{den} and L_{night} can be more easily and more cheaply computed than measured. For prediction purposes, computation methods are of course the only option.

None of the computation methods presently used in the Member States satisfies the requirements for modern harmonised methods.

For the interim period the Commission proposes Member States either uses their existing national computation methods (adapted to the definitions of the EU noise indicators) or uses a recommended existing method (also adapted to the definitions of the EU noise indicators). In principle, the measurement of L_{den} and L_{night} is determined by their definitions. Guidance for actual measurements is given in two ISO standards.



8. CHARGES AND BENEFITS

Estimates on the annual financial damage in the EU due to environmental noise cover a range from € 10 to 40 billion. Examples of elements that contribute to the economic damage are a reduction of the price of housing, medical costs, costs of reduced possibilities of land use and cost of lost labour days. These do not cover all effects and all noises that are subject of the proposed directive. Consequently the actual damage due to environmental noise may be even larger than indicated by the published studies.





The added value of the proposal is that the public will get better information on noise exposure and on the measures that are taken by various authorities. This could be a basis for a more coherent and more effective approach by the EU and by the Member States.

Inaction would mean that the problem of noise would further increase and that, because of population increase and the increase of traffic, future mitigation measures would become more expensive. Furthermore it would mean that the reduced health quality of about 100 million members of the public would not be improved and that an annual economic damage of € 10 to 40 billion would not be reduced.

At this stage it is not possible to make accurate estimates of the costs and the benefits that are related to the implementation of our proposal: it depends entirely on the action plans and strategies that will be developed at the local, national and the European level.

An element of the costs that has been studied explicitly is the price of noise mapping and action plans in agglomerations. It was found that the price of noise mapping varies between € 0.15 to € 2 per resident, depending on various circumstances. The total costs of the initial noise mapping for agglomerations was estimated to be € 50 to 75 million, i.e. 10 to 15 million on an annual basis.



No explicit data could be presented on the action planning, but it is reasonable to assume that these will be of the same order of magnitude. If it is also taken into account that several Member States and Cities make already noise maps and action plans, and that the costs of a repetition of the making of noise maps and action plans will be lower than the initial costs, the increase of costs due to the proposed directive will be € 10 to 20 million.

No special study has been carried on the costs for major roads, railways and airports. As compared with agglomerations, the making of noise maps and action plans for major roads and railways is somewhat simpler and will cover a somewhat smaller number of dwellings and citizens. Furthermore, in at least half of the Member States noise mapping, zoning and action plans are already common practice. Consequently it is reasonable to assume that the increase of costs is similar to that for the agglomerations.

The costs of mapping and the making of action plans for airports will depend on the size of the airport and may range from € 50 000 to € 2 million, say € 0.5 million as an average. For a total of 150 airports this would add up to € 15 million annually. Taking into account that many airports are already subject to some kind of noise mapping or action planning, the total increase of costs will not be larger than € 10 million annually.

Taking the above into account it is estimated that the annual increase of costs for mapping and action planning as introduced by the proposed directive is € 30 to 40 million, i.e. in the order of 0.1 % of the annual damage due to environmental noise.



As said above the largest part of the costs and the benefits should be related to the action plans at the various levels and these can not be estimated at present.

On the longer term, the proposed directive should lead to a situation where more cost-effective approaches are applied, the polluter pays and less public money is spent.

9. EU ACTION VERSUS SUBSIDIARITY



“Why should Brussels be involved?”
Always a valid question.

The proposal aims to protect the health and well being of members of the public against harmful effects of an environmental pollutant and as such it contributes to the objectives of the latest version of our Treaty - Article 175. And in terms of competence, it is a shared responsibility. Some aspects can best be covered at the EU level, others at the national and local level.

At this time, target setting for the noise indicators, and providing legislation on action plans for agglomerations, major roads, major railways and major airports are done by Member States to national standards and definitions. Thus, we feel a directive containing technical annexes to be the most appropriate instrument to define indicators and assessment

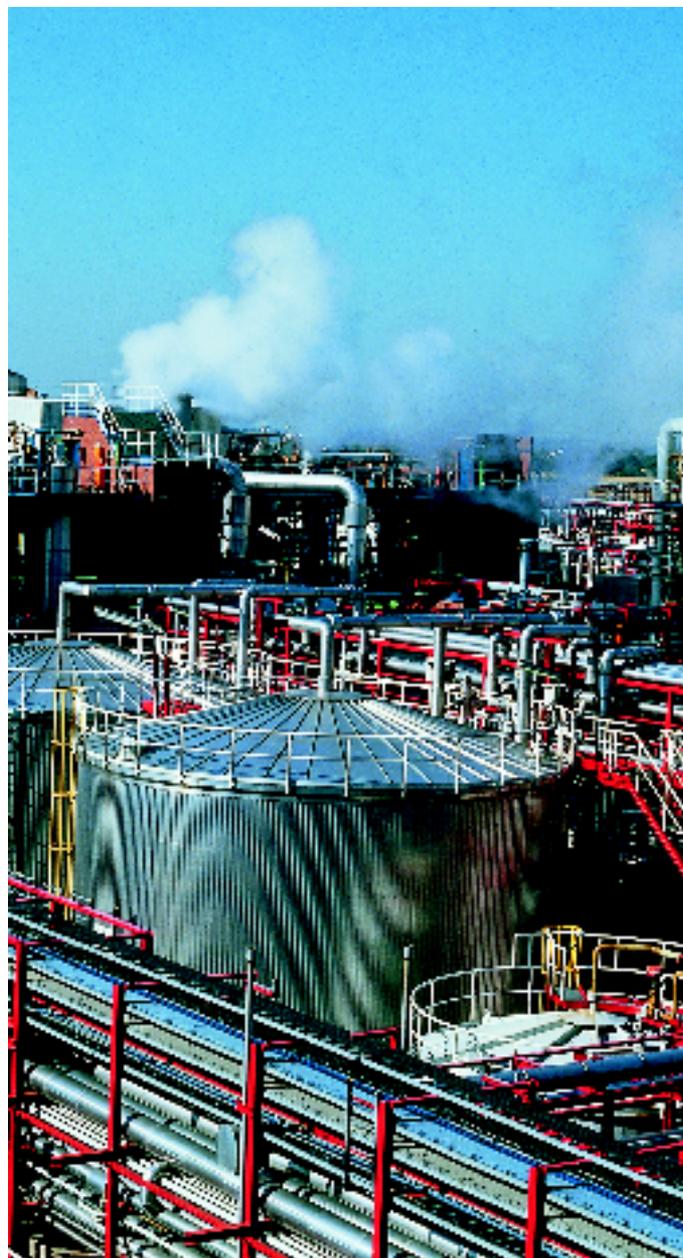


methods, the information for the public, the subjects to be covered by action plans and the other elements of the proposal. So that we have a directive setting out the general objectives because leaving the detailed execution to the Member States is not enough.

For limit setting, noise maps, action plans, information for the public and use of additional indicators, the directive gives initially only minimum requirements, outlines or general objectives and the Member States shall apply or develop their own methods and approaches.

The inclusion of noise mapping and action plans for major roads, railways and airports is a practical way to include rural areas, as opposed to our initial intention to cover only urban areas, on the one hand and to include major noise emitting systems on the other hand. Member States may decide to exclude noise mapping and the making of action plans by smaller agglomerations, since they may not have staff and experience to develop adequate noise maps and action plans.

The Commission services believe that the combination of results for large agglomerations, major roads, major railways and major airports will provide a representative picture of the current EU noise situation. Furthermore, the connection with action plans for the noisiest areas in the Member States (i.e.



the city centres and the areas near roads, railways and airports) makes the noise mapping much more cost-effective and should stimulate improvements of the noise situation in certain areas.

The Commission services have excluded dose-effect relations because it has the opinion that is better to wait for the results of an EU wide field survey that is being prepared. For the interim period, Member States may use the information on the present knowledge on dose-effect relations, as presented in a position paper of Working Group "Dose/effect".

Again the Commission services have the opinion that is not necessary to set a deadline for the adaptation of related existing legislation. Most Member States that have already zoning or mapping oriented legislation for roads, railways, airports or cities will probably adapt theirs to the EU methodology.



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