



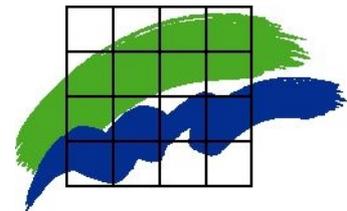
Assessment of the Effectiveness of European Air Quality Policies and Measures

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FINAL REPORT ON TASK 3.3:
Survey to assess successes and failures of the EU Air Quality Policies

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The views expressed herein are those of the consultants alone and do not represent the official views of the Commission.

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Table of Contents

Executive Summary.....	1
1. Introduction and Methodology Used	5
2. Impact of EU Legislation on Air Quality	7
2.1. Results from Question 1.1	7
2.2. Results from Question 1.2.....	10
2.3. Results from Question 1.3.....	14
2.4. Results from Question 1.4.....	17
3. Adequacy of Community-Level Measures With Respect to Air Quality Protection.....	19
3.1. Results from Question 2.1	19
3.2. Results from Question 2.2.....	21
3.3. Results from Question 2.3.....	23
3.4. Results from Question 2.4.....	26
3.5. Results from Question 2.5.....	26
4. Additional measures which might be considered for future EU action.....	29
4.1. Results from Question 3.1	29
4.2. Results from Question 3.2.....	33
4.3. Results from Question 3.3.....	36
4.4. Results from Question 3.4.....	37
4.5. Results from Question 3.5.....	39
4.6. Results from Question 3.6.....	40
5. Conclusions from Stakeholder Survey.....	41

APPENDIXES

Appendix I	List of Stakeholders to whom Questionnaire Sent
Appendix II	Questionnaire for European Stakeholders
Appendix III	Questionnaire for USA, Japanese and Swiss Stakeholders

Abbreviations Used

5th EAP	Fifth Environmental Action Programme
6th EAP	Sixth Environmental Action Programme
AQ	Air quality
Academ	Representatives from academia (universities, research institutions)
BAT	Best available techniques
BATNEEC	Best available technology not entailing excessive cost
CH₄	Methane
CLRTAP	UNECE Convention on Long Range Transboundary Air Pollution
EGTEI	Expert group on techno-economic issues
ELV	Emission limit value
EU-15	EU Member States before May 2004
EU-10	New EU Member States (as of May 2004)
EC	European Commission
EP	European Parliament
GHG	Greenhouse gases
IPPC	Integrated pollution prevention and control
LCP	Large combustion plant
LR	Representatives of local authorities
MERLIN	Multi-pollutant, Multi-Effect Assessment of European Air Pollution Control Strategies
MS	Member State
MW	Megawatt
NEC	National Emissions Ceiling
NGO	Non-governmental organisation
NH₃	Ammonia
NO_x	Nitrogen oxides
NR	Representatives of national authorities
O₃	Ozone
Pb	Lead
PM₁₀	Particulate matter < 10 µg in diameter
PM_{2.5}	Particulate matter < 2.5 µg in diameter
POPs	Persistent organic pollutants
RAINS	Regional Air Pollution Information and Simulation
SO₂	Sulphur dioxide
SUVs	Sports utility vehicles
VOC	Volatile organic compounds

FINAL REPORT ON TASK 3.3

Survey to assess successes and failures of the EU Air Quality Policies

EXECUTIVE SUMMARY

For Task 3.3 of the project “Assessment of the Effectiveness of European Air Quality Policies and Measures”, the project team developed a questionnaire that was sent to 90 stakeholders representing national and local governments of EU Member States, NGOs, the European Commission, the European Parliament, industry and academia. The questionnaire’s goal was to survey the personal opinions of these stakeholders on the effectiveness of EU-level legislation on air quality, and also to obtain their suggestions on improving existing measures or introduction of new ones. A second questionnaire was sent to policy-makers in the United States, Japan, and Switzerland to learn from the experiences of these countries.

The team received 49 responses in all (44 written answers, 5 answers via telephone interviews). Thirteen further telephone interviews were carried out to obtain additional information from stakeholders who had also filled in the questionnaire.

Whilst the survey did produce some valuable information, some limitations were noted with the survey approach adopted. The length of the questionnaire may have put off some respondents. In general, people offered more thoughts and suggestions when the questions were broad rather than specific and ranking (especially numerical, where more than 3 choices were given) was in the end not very helpful.

Impact of EU Legislation on Air Quality

Most respondents believe that EU legislation has had a significant impact on improving air quality, *inter alia* by reducing emissions and their effects in all EU Member States. The new EU MS (EU-10) acknowledged the positive effect that the EU legislation has already had or will have on curbing air pollution in their countries.

Almost all respondents found that the overall situation with air quality in their countries and/or at the EU level would have been worse without the EU legislation. 68% indicated a positive impact on ambient concentrations of PM₁₀, PM_{2.5} and ozone. Almost all agreed that EU legislation has had a major role in cutting down the ambient concentrations of SO₂ and NO_x. About 70% think that EU legislation has also contributed to lowering effects from pollution.

Over 80% responded that emissions from stationary industrial sources and road mobile sources would have been either “somewhat higher” or “much higher” without EU legislation. However, around 27% of respondents believe that the impact on emissions from stationary non-industrial and mobile non-road sources has been minimal.

The majority of the stakeholders think that the effects of air pollution on human health, acidification, eutrophication, and damage to buildings would have been somewhat worse without EU legislation.

Effectiveness of EU-Level Measures

All types of measures applied by EU air quality legislation were evaluated as effective and cost-effective by most of the stakeholders. The majority of national and local representatives believe that all the major EU-level air quality-related measures are well enforced. Several stakeholders believe that stationary source emission controls are more enforced than mobile source measures.

Assessment of the Effectiveness of European Air Quality Policies and Measures

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Many respondents praised the effects of product standards, like Euro-standards for cars, heavy-duty vehicles and quality of fuel. On the other hand, several stakeholders (including representatives of the EU-10, academia and several NGOs) also noted that while new emission limit values for cars, trucks and buses have been important, especially following the Auto-Oil Programme, the positive effects from cleaner cars have been counteracted by increases in traffic.

The effectiveness of the National Emission Ceilings was ranked on average as “somewhat effective”, although several respondents commented that it was too early to analyse its effectiveness. Most countries remarked that they did not expect any problems in achieving the NEC requirements, with some indicating that the NEC Directive does not set limits stringent enough to require additional control measures. Some EU-15 representatives also mentioned that the harmonised standards for stationary and mobile sources would be far more effective than the national emission reduction plans and the ceiling-per-country approach.

The following measures were listed most often by respondents as difficult to implement and problematic:

- **Air quality standards:** not always achievable, cost-effectiveness ignored, complicated quality assurance and quality control procedures;
- **Emission standards for mobile sources:** too weak, effectiveness undermined because of increased traffic, do not cover shipping and aviation;
- **Fuel quality:** more stringent standards needed for diesel (10 ppm for sulphur instead of current 50 ppm);
- **Directive on waste incineration:** Continuous measurement of hydrogen fluoride too costly and difficult;
- **LCP Directive:** loopholes for old plants, emission standards too lax, not adapted to the electricity sector (various operation loads);
- **IPPC:** BAT definition is vague, leaves too much flexibility, not easy to control and enforce.

Need for Additional or Modified Measures

26 out of 40 respondents do not think that all relevant air quality concerns are adequately addressed by the current EU legislation and the following sectors, sources and pollutants are not adequately covered:

- Small combustion sources
- Agriculture and its NH₃ and CH₄ emissions
- Shipping and aircraft emissions
- Heavy metals (cadmium, mercury)
- POPs, dioxins
- two-wheel transport (motorcycles, mopeds)
- Ambient air quality standard for PM_{2,5}
- VOC emissions
- Odours

Many respondents considered the current policy on transport emissions control as not sufficiently stringent. Several stakeholders noted that the need for a policy that addresses transport as a whole, and not just road transport vehicles. Many respondents also suggested that more stringent requirements for cars are needed, as well as improved inspections after vehicles are in use. It was also noted that more attention should be paid to the quality of fuel and fuel efficiency.

Assessment of the Effectiveness of European Air Quality Policies and Measures

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Several stakeholders offered their suggestions on how current EU measures could be improved. One proposal was to introduce a more integrated policy approach, taking into account environmental considerations in the development of other sectoral policies. The need to control emissions from agriculture was mentioned many times by various types of stakeholders. The introduction of tighter control of transport emissions was also high on the respondents' lists. Emissions from ships and aircraft still need to be controlled. Additional product standards were suggested for mobile transport, small stationary sources and agriculture. Some respondents advocated additional measures to control small combustion sources (including domestic heating systems), prevent waste generation, promote recycling, and address dioxins.

Several proposals were often mentioned to improve the use of economic instruments. In particular:

- Taxes or charges for road transport (at the national level) and aviation and ships (at the EU level);
- EU-level subsidies for further controls over emissions from large combustion plants and from agricultural sources;
- Minimum fuel tax and reinvestment of revenues in rail infrastructure;
- Taxation on air tickets and aviation fuel; and
- EU-level emission trading for pollutants from large combustion plants and industry.

Thirteen country representatives indicated that their regulations were or still are more stringent than those of the EU. The most frequently mentioned measures that are more stringent in individual countries than in the EU are emission standards for LCPs; emission standards for small industrial installations (below 50MW); product standards for fuels; and emission monitoring (and inventories) requirements.

In addition, respondents also offered examples from their country experiences when innovative policy solutions allowed them to achieve remarkable results:

- **Economic incentives** that led to significant positive changes (examples included fuel taxes in Scandinavian countries, Swedish differentiated port fees covering SO₂ and NO_x emissions from ships, mileage-dependent tax for heavy duty vehicles in Switzerland, SO₂ emission trading in the US);
- **More stringent emission limits** (emission standards in Italy for small combustion sources);
- **Better monitoring and inspection** strategies (the UK monitoring system that facilitates identification of hot spots, precise inventory methodology in the US);
- **Voluntary agreements** with industry (the Netherlands and Japan successfully used this approach to achieve desirable emission reductions);
- **Integration of various policy approaches** (integration of air quality and climate change policies in Belgium);
- **Control of hazardous air pollutants** (cadmium and mercury control for batteries in Switzerland, technology-based standards for hazardous air pollutants in the US, consideration of caps for mercury emissions in the US);
- **Measures reducing road transport emissions** (many examples from Italy, Germany, Switzerland and Japan);
- **Involvement/role of local authorities** (Italy and Finland gave examples of significant changes in emissions when local authorities were given responsibility to address specific pollution problems).

Thirty respondents also indicated a need for additional air quality-related research efforts at EU level. Areas identified for additional research included *inter alia* health effects from air pollution, emissions from agriculture, improved methods for forecasting air quality; formation of POPs during combustion processes and long-range transport of particulate matter and abatement measures for particulates.

1. INTRODUCTION AND METHODOLOGY USED

The main objective of Task 3.3 of the project “Assessment of the Effectiveness of European Air Quality Policies and Measures” was to survey the views of European policy makers and other stakeholders directly involved in air quality policy development and implementation on the successes and failures of the present European air quality policies. The survey also included several decision-makers from the USA, Japan and Switzerland to learn about these countries’ experiences with specific air quality policies.

It should be noted at the outset that this survey was not intended to be a scientifically representative survey. Rather, the TOR requested that a selection be made of key policymakers, decision makers and stakeholders comprising at least one person per country (EU-25).

Accordingly, the project team, with the assistance from the Commission, developed a list of approximately 90 people to be surveyed during the project (see Appendix I). The team took considerable effort to draw up a list of concerned stakeholders that was as broad and representative as possible. The list included representatives from the European Commission, the European Parliament, national-level representatives from the Member States, including those designated by the CAFÉ Steering Group, along with representatives of local authorities, NGOs, industry and academia.

The survey was conducted through a questionnaire and follow-up interviews. The questionnaire aimed to consider the key policies and EC legislation on air quality and used a set of criteria and a ranking system.

The scope and format of the questionnaires were developed in close cooperation with the Commission. A great deal of care was taken to ensure that the questionnaire was appropriate for the purpose. The questionnaire had to cover many topics regarding EC air legislation, but at the same time had to be relatively short and focused. A draft questionnaire was tested on three respondents before being finalised for the survey.

The questionnaire consists of four major parts. Part 1 includes questions about the impact of EU legislation on air quality. Part 2 is designed to learn about stakeholder opinions on the adequacy of Community-level measures with respect to air quality protection. Part 3 asks for opinions about various measures used in Community-level legislation on air quality as well as ideas for new or modified measures that could be effective in achieving better air quality in the EU. Part 4 includes questions about stakeholder involvement and transparency and was designed to assist with the implementation of Task 3.4 (on public participation and transparency) of the project. The analysis of responses for this part of the questionnaire is presented in the parallel Report for Task 3.4.

The final version of the questionnaire used to interview European stakeholders is attached as Appendix II. For the decision-makers from the USA, Switzerland, and Japan a separate questionnaire was developed, and is attached as Appendix III.

The team informed the interviewees by e-mail about the upcoming questionnaire a week in advance. Then the questionnaires were e-mailed to the list of 90 people. After people had the questionnaire for two weeks, the team sent reminders and also scheduled phone interviews.

In all, the team received 49 responses from the 90 enquiries. Most of the responses were from people who actually completed the questionnaire (44 completed questionnaires), and the remainder were responses obtained during phone interviews. Several phone interviews were conducted with people who had filled out the questionnaire to have a better understanding and more personal explanations of the written answers. In total, 17 interviews were conducted.

Table 1 summarises the number of responses received via the questionnaire and interviews from each stakeholder category:

TABLE 1: Summary of the number of responses received via the questionnaire and interviews

Category	Total no. of people originally contacted	No. of people who responded by completing the questionnaire	No. of people who responded through interviews	Total responses
European Commission	8	1	2	2
European Parliament	6	2	1	2
National Representatives	32	16	8	18
NGOs	13	8	3	8
Industry	6	2	1	3
Local Representatives	6	6	1	7
Universities	6	4	1	5
Representatives from the USA, Japan, and Switzerland	13	4	1	4
TOTAL	90	44	18	49

The team was somewhat disappointed, but not entirely surprised, with the relatively low rate of response to the questionnaire (around 50%). However, we believe that the 49 responses that we did receive provide a good overall perspective on the views of various EU stakeholders on the effectiveness of the EU legislation on air quality.

It should be noted that this survey approach had a number of limitations. In addition to not receiving as many responses as we had hoped, the questionnaire itself (which was developed in close cooperation with DG Environment) was not without flaws. It took at least half an hour to answer and some stakeholders may have been put off by its length. Very specific questions about directives and measures did not yield specific answers, so were not so useful. Also, people understandably preferred to comment only on those things they knew about, so when the questions were more general, they were able to reshape their responses to focus on the issues closer to them. In general, people offered more thoughts and suggestions when questions were broad, rather than specific.

Moreover, ranking (especially numerical, where more than 3 choices were given) was in the end not very helpful. It was not possible to determine how a response that a measure was "effective" differed from another response saying the same measure was "somewhat effective". If we were to redo that section of the questionnaire, we would use just three categories: "good/effective/etc", "bad/non-effective", etc., "no opinion/hard to evaluate". In sum, for future surveys, we would suggest keeping questionnaires as short as possible, and to do more testing of the questionnaire design on a representative sampling of stakeholders to see whether the approach used provided the desired information.

Having noted the limitations, we should also say that the survey approach also had some benefits, including an interesting synergy with the other tasks under this project. Many of the respondents to the survey and the interviews offered comments that corroborated the findings of the Task 3.2 Case Studies. Moreover, the survey approach yielded many interesting ideas and suggestions that were drawn upon in shaping some of our overall recommendations provided in the Task 3.5 report.

The remaining sections of this report present our analysis of the findings of the questionnaires. As the table above demonstrates, it was mostly national representatives that returned the questionnaire. We have tried in the analysis to make clear which comments were made by which groups.

2. IMPACT OF EU LEGISLATION ON AIR QUALITY

Respondents were asked for their opinions about the impact of EU legislation on air quality, either in their country or in the EU as a whole. All national and local representatives, most academia representatives and several NGOs responded from the perspective of their own country. Representatives of industry, the European Commission, the European Parliament and some NGOs responded from the perspective of the EU.

In this first section of the questionnaire, the stakeholders were asked to:

- assess the effects of the EU-level legislation on ambient air quality, emissions and effects from air pollution;
- rank the effectiveness and cost-efficiency of various EU-level measures;
- identify measures that are ineffective and list major problems with these measures that are contributing to their ineffectiveness;
- answer whether various major EU-level measures are well enforced in their countries or at EU level.

The following subsections provide brief summaries and detailed analyses of the responses to each of these questions.

2.1. Results from Question 1.1

“What would have been the situation today (2004) with respect to ambient air quality, effects from air pollution and emissions to air **without** the EU-level legislation that has been put into place between 1980 and 2000?”

Box 1. Summary of Responses to Question 1.1.

- Almost all respondents find that the overall situation with air quality in their countries and/or at EU-level would be somewhat worse or much worse without the EU-level legislation. Opinions vary depending on the pollutant, effects and emissions.
- Up to 68% believe that ambient concentrations of SO₂, NO_x, PM₁₀, PM_{2.5} and O₃ would be “somewhat higher”. In addition, about 30% of respondents think that the ambient concentrations of SO₂ and NO_x would be “much higher”
- 70% think that effects from pollution would be somewhat worse.
- A larger share of respondents, (87%) believes that the situation with acidification would be “somewhat worse” or “much worse”.
- 81% and 89% respectively responded that emissions from stationary industrial sources and road mobile sources would be either “somewhat higher” or “much higher”.
- Around 27% of respondents believe that there would not be any difference in emissions from stationary non-industrial and mobile non-road sources.

Table 2 below shows the number and percentage of the respondents who chose the following answers in the questionnaire for the question on what would have been the situation today with respect to ambient air quality without the EU-level legislation: “much higher” (meaning that concentrations of listed pollutants in ambient air would have been much higher without the EU legislation), “somewhat higher”, “no difference”, “somewhat lower”, and “much lower”.

TABLE 2: Presumed Concentrations of Key Air Pollutants without the Impact of EU Air Quality Legislation

	Total respondents	Much higher	Somewhat higher	No difference	Somewhat lower	Much lower
SO ₂	36	10 (28%)	18 (50%)	8 (22%)		1
NO _x	37	12 (32%)	21 (57%)	4 (11%)		
PM ₁₀	36	8 (22%)	24 (67%)	4 (11%)		
PM _{2,5}	34	6 (18%)	23 (68%)	5 (15%)		
Ozone	36	7 (19%)	23 (64%)	5 (14%)	1	
Other		Lead		Benzene Ammonia		

The majority of national representatives (NR), including new EU-10 countries and EU-15, think that the levels of listed pollutants would have been somewhat higher without EU legislation. For NO_x emissions, however, nearly half of NR respondents think that levels would have been “much higher”. The majority of NGOs think that ambient levels would have been much higher for all pollutants. Not all industry representatives answered to this question; those who did said either “somewhat higher” or “no difference”. Almost all local representatives and representatives of academia responded that the levels would have been “somewhat higher”.

Several EU-15 NRs responded that there would not have been any difference. The pollutants that were mentioned in this context are SO₂ (mentioned by two countries), NO_x and PM (mentioned by two countries), ozone (mentioned by one country). Ammonia was added to the list by one country with a comment that there had not been any difference in ambient concentrations for this pollutant due to EU legislation.

Several NRs mentioned specific benefits in their countries that resulted from the EU ambient air quality directives. For example, the first Directive 80/779 on SO₂ and suspended particulates was considered very useful in clearing up smog problems in one northern city. The fact that limits were set in EU law made it easier for Ireland to focus the public debate and launch important actions. One of the outcomes was a 1990 local ordinance on smokeless fuels that has been effective. This ordinance has now been widened to cover other parts of the country.

Several EU-15 countries noted that the Air Quality Framework Directive and the 1st Daughter Directive were very important for controlling PM₁₀ and NO₂, and Directive 92/72/EEC and the 3rd Daughter Directive did the same for ozone. Several NR from EU-15 countries noted that EU legislation air quality is the driving force for their national legal frameworks on air quality.

Several NR from the EU-15 mentioned the importance of EU legislation on air quality in respect to its effect on public interest and awareness.

NGO representatives echoed this opinion that an additional benefit of the ambient air quality legislation was the increased general awareness about air pollution and its negative impacts. This awareness arose in the early 1980s, and was largely linked to damage to Scandinavian freshwaters and central European forests, and also the work under the LRTAP Convention and the understanding that these are trans-boundary problems. Moreover, increased attention to the health impacts of air pollutants during the 1990s resulted in more research activities, which in turn gradually generated increased knowledge and public awareness as well as political attention to air pollution problems.

Table 3 below shows the number and percentage of the respondents who chose the following answers in the questionnaire for the question on what would have been the situation today with respect to effects from air pollution without the EU-level legislation: “much better” (meaning that there would

Assessment of the Effectiveness of European Air Quality Policies and Measures

A project for DG Environment carried out by Milieu Ltd, the Danish National Environmental Research Institute, and the Center for Clean Air Policy

have been less effects from pollution on listed elements without EU legislation), “somewhat better”, “no difference”, “somewhat worse”, and “much worse”.

TABLE 3: Presumed Level of Effects from Air Pollution on Key Spheres

	Total respondents	Much better	Somewhat better	No difference	Somewhat worse	Much worse
Health	36	0	2	3	25 (69%)	6 (17%)
Acidification	37	2	1	2 (5%)	22 (60%)	10 (27%)
Eutrophication	37	0	2	5 (13%)	26 (70%)	4 (11%)
Damage to buildings	37	1	2	4 (11%)	26 (70%)	4 (11%)

The majority of all stakeholders think that the effects from air pollution on all listed elements - health, acidification, eutrophication, and damage to buildings - would have been somewhat worse without EU-level legislation.

Several stakeholders who responded “no difference” explained that the main reasons for the decrease of SO₂ and NO_x concentrations, as well as acidification, eutrophication and damage to buildings and cultural heritage, have been the international agreements for emission reductions in the 1980s and stricter national regulations. For example, a national requirement of catalytic converters in private motor vehicles in Finland that was introduced before the country joined the EU had a big positive influence on emissions and air quality. Denmark introduced strict regulations on SO₂ air emissions, which led to low ambient SO₂ levels much earlier than the enactment of the EU legislation was enacted.

Table 4 below shows the number and percentage of respondents who selected the following answers in the questionnaire for the question on what would have been the situation today with respect to emissions to air from the key source categories without EU-level legislation: “much lower” (meaning that there would have been much lower levels of emissions from listed source categories without EU legislation), “somewhat lower”, “no difference”, “somewhat higher”, and “much higher”.

TABLE 4: Presumed Levels of Emissions to Air From the Key Source Categories

	Total respondents	Much lower	Somewhat lower	No difference	Somewhat higher	Much higher
Stationary industrial sources	36	3	0	4	20 (56%)	9 (25%)
Stationary non-industrial sources	37	0	2	10- (27%)	20 (54%)	5 (13%)
Road mobile sources	36	1	1	1	18 (50%)	14 (39%)
Non-road mobile sources	31	0	2	8 (26%)	17 (55%)	4 (13%)

The majority of all stakeholders think that emissions from stationary industrial sources and road mobile sources would have been higher without the EU-level legislation. The situation is different with stationary non-industrial sources and non-road mobile sources. Around 27% of all respondents (mostly from EU-15) countries answered that the EU legislation had not made any difference in emissions from stationary non-industrial sources and in emissions from non-road mobile sources.

Directives that were mentioned as most effective in reducing emissions are the following: lead limit values, large combustion plants, the waste incineration Directives, sulphur content in fuels, vehicle emission and fuel standards, VOC Stage I. Several, mostly EU-10, countries noted that the EU Auto Oil directives had a significant effect on NO_x, SO₂, and VOC levels. Many NGOs expressed the same

opinion. The industry representatives also highlighted a major contribution of Euro-standards for cars to control mobile source emissions. On the other hand, academia representatives and several NGOs also noted that while new emission limit values for cars, trucks and buses have been important, especially following the Auto-Oil Program, the positive effects from cleaner cars have been counteracted by traffic increases.

In summary, most respondents believe that the EU legislation has had a significant positive impact on air quality, emissions and their effects. For example, one Southern EU-10 representative acknowledged that the whole procedure of harmonisation was very useful. Without the EU it would have taken a long time to develop and implement similar legislation in that country.

The new EU members acknowledged that EU legislation already has had a significant impact or will have such impact on air pollution in their countries. For example, several EU-10 representatives said that the EU legislation has led to a decrease in emissions of sulphur dioxide, nitrogen oxides and particulates. However, the same countries acknowledge that increased numbers of vehicles have caused an increase in the ambient air concentrations of nitrogen oxides and ozone. While new requirements for cars mean fewer emissions per car, the overall car fleet numbers are expected to continue to grow. Another concern expressed by several EU-10 countries is that the use of coal and fuel oil has gone down drastically due to the economic restructuring and more stringent emission limits, which has led to a growing dependency on natural gas from Russia, with possible implications for long-term energy security.

2.2. Results from Question 1.2

“What is your assessment of the effectiveness of each mentioned EU measure in achieving the specific air quality goal?”

The respondents were asked to assess effectiveness of each EU measure from air quality standards to emissions standards and product standards in achieving specific air quality goals (e.g., reduce emissions to air, reduce impact on human health, reduce ozone formation, and others). A ranking system was proposed with a scale from 1 (very effective) to 4 (totally ineffective). The respondents were also asked to rank each EU measure in terms of cost-effectiveness (i.e., the benefits received in relation to the overall costs of complying with the measure). Box 2 summarises the responses to question 1.2.

Box 2. Summary of Responses to Question 1.2

- Air quality measures were graded as “somewhat effective”. AQ limit values (80/779, 96/62, 99/30, etc.) got the worst ranking for their ability to affect ozone formation. However, air quality limit values were ranked as the most cost-effective in this group of instruments (between very effective and somewhat effective), while all other instruments were ranked as somewhat cost-effective.
- The effectiveness of national emission ceilings and emission inventories was ranked on average as “somewhat effective”.
- The ranking of measures related to regulating emissions varies significantly. The LCP Directive received the highest grading (very effective) for its effect on emissions;
- Product standards, like Euro-standards for cars, heavy-duty vehicles and quality of fuel, also received high ranking for their effects on emissions and on human health.
- Quality of petrol & diesel fuels requirements received high marks for their positive effects on ambient air quality.
- As for the differences among various stakeholders, no particular trend was observed.

Assessment of the Effectiveness of European Air Quality Policies and Measures

A project for DG Environment carried out by Milieu Ltd, the Danish National Environmental Research Institute, and the Center for Clean Air Policy

Table 5 below follows the structure of this question in the questionnaire and integrates all the responses. The number in parentheses shows how many people provided their ranking.

TABLE 5: Effectiveness of EU Measures

Measure / EU legal reference	Effectiveness (rank 1, very effective – 4, ineffective)						Benefits achieved in relation to cost (rank 1-4)
	Improve ambient air quality	Reduce emissions to air	Reduce impacts on human health	Reduce acidification and eutrophication	Reduce ozone formation	Reduce other effects	
<i>Air quality standards, programmes, monitoring</i>	2,3	2,5	2,5	2,8	3,0	2,5	2,2
AQ limit values (80/779, 96/62, 99/30, etc.)	2 (34)	2,2 (35)	2,1 (34)	2,6 (30)	3,6 (33)	2,7 (14)	1,7 (28)
Plans & programmes (80/779, 96/62)	2,4 (27)	2,4 (28)	2,3 (27)	2,7 (24)	2,5 (25)	2,3 (10)	2,2 (22)
Requirements for designation of zones (96/62)	2,4 (29)	2,9 (25)	2,8 (24)	3 (25)	2,9 (23)	2,6 (10)	2,3 (21)
Harmonised monitoring procedures (80/779, 92/72)	2,5 (32)	2,6 (25)	2,7 (27)	2,9 (25)	2,8 (28)	2,5 (12)	2,6 (24)
Other (please name)							
<i>National emission ceilings & reduction plans</i>	2,1	2,1	2,4	2,5	2,5	2,4	1,8
Emission inventories (2001/81)	2,3 (28)	2,3 (26)	2,6 (25)	2,4 (24)	2,5 (25)	2,4 (14)	1,7 (26)
National emission reduction plans (2001/81)	2,1 (28)	2 (32)	2,5 (27)	2 (28)	2,1 (29)	2,4 (13)	1,9 (25)
Other	2 IPPC(1)	2 (IPPC)	2 (IPPC)	3 (IPPC)	3 (IPPC)		
<i>Emission standards for stationary sources</i>	2,1	1,8	2,0	2,4	2,2	2,4	2,0
Large combustion plants (88/609, 2001/80)	1,8 (30)	1,2 (30)	1,7 (27)	1,3 (28)	2,3 (26)	2,5 (12)	2 (28)
VOC's evaporation losses petrol stations (94/63)	2,3 (29)	2,1 (29)	2,2 (28)	3 (24)	2 (27)	2,8 (10)	2,1 (30)
Incineration (89/369, 94/67, 2000/76)	2,1(24)	1,9 (25)	2 (23)	2,5 (22)	2,6 (21)	2,4 (9)	1,8 (24)
Large industrial plants (89/369), IPPC (96/61)	2,1 (28)	1,9 (28)	2,3 (28)	2,1 (24)	2,3 (24)	2,3 (11)	2 (26)
Solvents (1999/13)	2,1 (23)	2 (24)	2 (23)	3,1 (21)	2 (24)	2,2 (8)	1,9 (23)
Other	-	-	-	-	-	-	-
<i>Product standards to control mobile sources</i>	1,8	1,8	1,8	2,4	2,4	2,4	1,8
EURO standards for cars (70/220, as amended)	1,4 (30)	1,2 (30)	1,3 (28)	2 (25)	1,7 (26)	2,1 (8)	1,5 (25)
EURO standards heavy duty vehicles (72/306, as amended)	1,5(30)	1,3 (29)	1,4 (27)	2,1 (25)	2,9 (25)	2,1 (8)	1,6 (22)
Roadworthiness testing (96/96)	2,1 (26)	2,4 (24)	2,3 (22)	2,7 (24)	2,5 (22)	2,3 (8)	1,5 (19)
EURO standards for non road machinery (97/68)	2,3 (27)	2,3 (25)	2 (24)	2,7 (24)	2,4 (25)	2,8 (7)	2,2 (21)
EURO standards for 2/3 wheeled vehicles (97/24)	2,2 (26)	2,2 (24)	2,2 (21)	2,6 (22)	2,3 (21)	2,9 (7)	2,2 (21)
Quality of petrol & diesel fuels (98/70, 99/32)	1,3 (28)	1,6 (31)	1,7 (23)	2,1 (24)	2,4 (26)	2,3 (9)	1,7 (29)
Other	-	-	-	-	-	-	-

Assessment of the Effectiveness of European Air Quality Policies and Measures

A project for DG Environment carried out by Milieu Ltd, the Danish National Environmental Research Institute, and the Center for Clean Air Policy

While several individual respondents graded some measures as very effective (1) and in some cases as very ineffective (4), these highest and lowest marks did not make it to the table since average ranking was calculated based on the number of answers and their respective grading.

Air quality measures such as standards and programmes were graded between 2 and 3, as somewhat effective. Air quality limit values were ranked as the most cost-effective in this group of instruments (between very effective and somewhat effective). All other air quality-related instruments were ranked as somewhat cost-effective. AQ limit values (80/779, 96/62, 99/30, etc.) got the worst mark (3,6) for their effectiveness in reducing ozone formation.

NGO representatives gave the highest marks to air quality standards compared to any other instruments suggested in the table. They explained that the highest mark is almost never given to other instruments since a lot still needs to be done compared to achieving the long-term environmental objectives set in the 5th and 6th EAP. The air quality limit values Directives set clearly defined pollution concentrations in ambient air and are an important complement to the emissions control legislation, because even if there are emission standards on most sources, different sources add up and this factor is usually not reflected in emission standards. The highest mark was also given for the effectiveness of air quality standards to reduce impact on human health, since limit values are based on WHO guidance and, if complied with, would protect human health.

Several representatives who ranked EU air quality policies and measures as “somewhat effective” instead of “very effective” indicated that many of the EU goals were achieved in their countries before the EU legislation entered into force.

The effectiveness of national emission ceilings and emission inventories was ranked on average as “somewhat effective”. The cost-effectiveness of these measures is marked between “very effective” and “somewhat effective”.

Several NGO and national representatives (NR) mentioned that it was still rather premature to “grade” firmly some of the more recent directives like the NEC Directive. There is a “dynamic” aspect to new Directives (e.g. that countries take measures in anticipation of legislation) that can be judged, but the final impacts of, for example, the NEC Directive or the IPPC Directive, can not be properly evaluated until these Directives are in full implementation.

Most countries commented that they did not expect any problems in achieving NEC requirements and some stakeholders commented that the NEC Directive does not set very stringent limits that would require additional control measures. However, one representative from a northern EU-15 country noted that the NEC Directive is ambitious and the Directive will be difficult to implement for his country. The representative noted that the NEC is very effective from an environmental point of view – the problem is that the responsibilities are delegated to Member States and it could lead to distortions, unless more was done at the Community level to minimise such distortions. The representative proposed use of zoning to differentiate air quality requirements based on the current situation with air quality. Zones developed based on environmental/air quality conditions (not based on geographic and political borders), could be addressed by different EU-level measures more stringent measures for more polluted areas and less rigorous ones for zones with good air quality.

Several countries also commented that the harmonised standards for stationary and mobile sources are far more effective than national plans and the ceiling per country approach.

The respondents provided many comments on emission and product standards. Ranking of these measures related to regulating emissions varied significantly from measure to measure and also their effects on ambient concentrations, emissions and environmental effects. The Large Combustion Plant

Assessment of the Effectiveness of European Air Quality Policies and Measures

A project for DG Environment carried out by Milieu Ltd, the Danish National Environmental Research Institute, and the Center for Clean Air Policy

Directive received the highest grading (between 1,2 – effect on emissions and 2,3 – effect on ozone formation). Product standards, like Euro-standards for cars, heavy-duty vehicles and quality of fuel, also received a high ranking.

One EU-15 representative highlighted that requirements on liquid fuel quality have a particularly direct effect on ambient air quality and emission reduction.

NGOs noted clear improvements had been achieved in the field of transport, but considered the legislation to be conservative in the sense that, under the label of combating technical trade obstacle, virtually all local or national initiatives to push the technical development come to be blocked by the EU. There remained little possibility for individual national governments to require more stringent standards based on more advanced technologies. One of the examples cited was the possibility to lower the emissions of particles from diesel cars drastically by applying more advanced technologies and requiring cleaner diesel fuels – a possibility now available. With another type of legislative structure – like the one in the USA – it might have been possible for an individual country or even an individual city to use its local power in order to push the technological progress.

One EU-15 local representative suggested more attention to connecting measures with technological possibilities - “the more a measure is linked to a technological aspect, the more results it has. The more it is ‘abstract’, the less it is effective”. The example of diesel engines was also used. The local representative suggested that it is necessary to develop technologies and to define lower emission limits for diesel vehicles.

Roadworthiness testing was marked by several countries and industry representatives as not very effective, since these tests are not conducted in an appropriate/effective manner.

Several EU-15 national representatives commented on the indirect effects of various instruments, saying that a good knowledge and public information on air quality and emissions to air, even if it does not contribute directly to emissions reductions, is a necessary step and has a strong indirect impact.

All types of emission standards mentioned in the table were ranked between 1 and 2 as cost-effective. Several country representatives commented that not so many studies have been carried out on cost effectiveness, but their personal judgement is that the measures, especially emission reductions, have been cost-effective.

NGOs commented that the studies written on cost-effectiveness of air pollution control show that such measures are extremely cost-effective, particularly with respect to health impacts. Usually the monetary benefits exceed the costs (usually overestimated *ex ante* by the regulated community) by at least a factor of three.

An industry representative commented that the last regulatory requirements on transport were not based on cost-effectiveness, and that infact cost-effectiveness was never analysed. He considered that these measures are effective, but probably not cost-effective.

2.3. Results from Question 1.3

“What are the main problems (limitations), if any, with respect to any of the EU-level measures named in previous questions?”

The respondents were asked to identify main problems with respect to current EU-level measures, such as air quality standards, emissions standards, product standards and others, and provide their

explanation on the possible causes of these problems. Box 3 summarises their responses.

Box 3. Summary of Responses to Question 1.3

The following bullet points include those measures and the associated problems that were mentioned most often by respondents:

- **AQ standards:** not always achievable, cost-effectiveness ignored, quality assurance and quality control procedures are complicated;
- **Emission standards for mobile sources:** too weak, do not account for increased traffic, do not cover shipping and aviation;
- **Fuel quality:** more stringent standards are needed for diesel fuel (10 ppm for sulphur instead of current 50ppm) to enable cleaner technology
- **Directive on waste incineration:** Continuous measurement of hydrogen fluoride is too costly and difficult;
- **LCP Directive:** loop-holes for old plants, emission standards are too lax, not adapted to the electricity sector (various operation loads);
- **IPPC:** BAT definition is vague, leaves too much flexibility, not easy to control and enforce;
- **NEC Directive:** levels are too low; energy scenario is not Kyoto compliant, need for European-level measures, individual states cannot make efficient national plans, lack of standardisation of NEC emission inventories.

Table 6 below lists the measures where various problems were identified by the respondents (first column). The second column provides a summary of the problems mentioned for a specific measure. The reasons for these problems, as offered by the respondents, are stated in the third column.

TABLE 6: Main problems with specific EU-level measures

Measure	Main problems (limitations)	Reason
Air quality related measures		
Air quality standards in general (NGOs, 2 EU-15 countries, EU-10, EP)	<ul style="list-style-type: none"> • promotes a non-serious hunt for minor reductions without looking at the overall cost-effectiveness • directive came very late • AQ standards not always achieved • Quality assurance and quality control (QA/QC) of the required assessments [measurements, emission inventories and dispersion modeling] is very complex; inappropriate time scheduling. • ozone limit values is more of a global problem than national, low effectiveness of national measures 	<ul style="list-style-type: none"> • standards are not always linked to technological developments (example timing of Euro IV against limits to be respected in 2005) • Distance between env. politics and energy and transport politics • Lack of administrative capacity and coordination among authorities; • lack of financial resources [e.g. for monitoring activities]
AQLVs for PM ₁₀ , PM _{2,5} (EU-15, EP, EU-10)	<ul style="list-style-type: none"> • Difficult to limit small particulates and to reach compliance with AAQS • 24h PM limit value hardly attainable everywhere, - inactivity unless limit value + margin of tolerance is exceeded 	<ul style="list-style-type: none"> • Evolving knowledge, geographic position and its influence, e.g. in-land position, higher background, effects of long-range transport, high influence of small sources, agriculture, more arid climate

Assessment of the Effectiveness of European Air Quality Policies and Measures

A project for DG Environment carried out by Milieu Ltd, the Danish National Environmental Research Institute, and the Center for Clean Air Policy

Measure	Main problems (limitations)	Reason
Harmonised monitoring (EU-10 representative)	<ul style="list-style-type: none"> no direct effects on air quality 	<ul style="list-style-type: none"> not very practical
AQ plans and programmes (NGO)	<ul style="list-style-type: none"> poor implementation 	<ul style="list-style-type: none"> complexity, lack of will, no EU control/reporting
Emission limitations related measures		
Emission standards for cars (NGO, EC, EU-10)	<ul style="list-style-type: none"> non-technically neutral standards emissions standards are too lax; One problem is the contradiction between air quality policy and the policy of reducing CO₂ emissions which has led to an emphasis on diesel engines and lower prices for diesel fuels. This has caused a “dieselization” of the motor vehicle fleet and an increase in particulates. It is also a problem that the standards for diesel cars are different than for petrol-fueled cars. However, if standards are made more stringent, that will slow down the rate of replacement of vehicles. Only apply to new cars standards for heavy duty vehicles not ambitious enough Test protocols do not correspond to "real world" driving conditions 	<ul style="list-style-type: none"> prevents cost-effective measures - including tax differentiation - to lower emissions strong lobby from industry additional instrument needed for new cars product standards do not consider “inherent characteristics”, e.g. is a SUV more like a heavy duty truck than a car
Emissions from road mobile transport (EP)	<ul style="list-style-type: none"> no measures to check the increase in motor vehicle traffic or to change the trend to switch from rail to road. More attention is needed to reverse that trend, and to get a better ratio between use of rail and road. 	<ul style="list-style-type: none"> no legislative competence at EU level for this issue, but at the same time there is a great need for a common approach on this.
Euro-standards for non-road mobile sources (NGO)	<ul style="list-style-type: none"> shipping and aviation are not subject to emissions control 	<ul style="list-style-type: none"> issues to resolve concerning whether the EU or international level maritime and aviation organisations are competent, strong lobby from ship and oil industry
Road worthiness testing (EU-10, EU-15)	<ul style="list-style-type: none"> Limited application 	<ul style="list-style-type: none"> Lack of administrative and monitoring/testing capacity [the last with regard to the accreditation of sites for testing and calibration laboratories]; not very effective administrative control over the licensed test sites; lack of financial resources for measurement equipment and maintenance of the required accreditations.
Fuel quality standards (NGO, EC)	<ul style="list-style-type: none"> The standard for diesel is currently 50 ppm, but it is time for 10 ppm sulphur fuel standards, Low sulphur fuel enables better technology for reducing emissions for diesel engines and for direct injection petrol engines via “de NO_x catalysts”. Only applies to new cars 	<ul style="list-style-type: none"> oil industry lobby [it was noted that some oil refineries can already meet the 10ppm standard]

Assessment of the Effectiveness of European Air Quality Policies and Measures

A project for DG Environment carried out by Milieu Ltd, the Danish National Environmental Research Institute, and the Center for Clean Air Policy

Measure	Main problems (limitations)	Reason
LCP Directive (NGO, industry, EP);	<ul style="list-style-type: none"> Emission standards are too lax - do not reflect BAT. Especially case for NO_x but also for SO₂ and dust. Deadlines are set too late, derogations are unnecessary; Not well adopted to the electricity sector with its varying loads for operation many loop-holes, esp. for old plants 	<ul style="list-style-type: none"> strong lobby from "special interest" such as fossil fuel industry The directive does not consider electricity load factors
Directive on the incineration of waste. (EU-10 and EU-15)	<ul style="list-style-type: none"> Continuous measurement of hydrogen fluoride is very expensive and problematic Emission standard PCDD/PCDF for all waste combustion plants are problematic since plants for hospital waste (capacity approx. 100 kg waste per hour) will have to shut down operation 	<ul style="list-style-type: none"> Substitution of continuous measurement of hydrogen fluoride by periodic measurements in all cases
IPPC (industry, EU-10 NR, EC)	<ul style="list-style-type: none"> BAT definition BAT documents ambitious but considerable range not easy to enforce or control IPPC (EC) 	<ul style="list-style-type: none"> not enough discussion on BAT requirements for industrial installations not specific enough, range for local authorities too broad
Emission inventories (2 EU-10 NR)	<ul style="list-style-type: none"> almost no pressure for improvement of emission control Data are not good for VOC, NH₃ and particulates 	<ul style="list-style-type: none"> Only reporting is required quality assurance system needs development
NEC requirements		
NEC Directive (NGO, EU-10, EU-15),	<ul style="list-style-type: none"> Level of ambition for NEC is too low Energy scenarios are not Kyoto compliant Lack of coherence between RAINS database and necessary measures on EU level to achieve these levels. Approach only based on environmental quality objectives causes economic distortions. Too few measures on EU level The most efficient measures (standards on petrol quality or emission limit values for mobile sources or industrial plants, tax measures, emissions trading) need to be taken at European level to prevent unfair competition. Member States cannot make efficient national plans lack of standardisation of NEC emission inventories 	<ul style="list-style-type: none"> Lack of political ambition, especially in some countries Lack of responsibility in DG Environment to assure consistency. Commission proposal did not look into distortion issues or consider need to avoid excessive costs for individual member states. Southern member states and industry oppose ambitious measures on EU level. For today's situation, NEC is not a good approach. Too much is changing with the energy supply, and the NEC ceilings do not take account of the problems of small countries, which have less flexibility and margin for manoeuvre.
Solvents (EU-15 NR)	<ul style="list-style-type: none"> This Directive is very complex to explain to small industries. 	<ul style="list-style-type: none"> It concerns many different sectors. A product approach is probably both more efficient and more simple.

2.4. Results from Question 1.4

“How well are the groups of various EU-level measures enforced (in your country) (at EU level)?”

Assessment of the Effectiveness of European Air Quality Policies and Measures

A project for DG Environment carried out by Milieu Ltd, the Danish National Environmental Research Institute, and the Center for Clean Air Policy

Table 7 below follows the table provided in the questionnaire and summarises all the responses according to category of respondent. The percentage figure refers to the number of respondents in that category. Since there were almost no responses that indicated that the measures are not at all enforced or that a respondent does not have any opinion, these two columns were not analysed.

Box 4. Summary of Responses to Question 1.4

- The majority of national and local representatives believe that all the major EU-level AQ-related measures are well enforced.
- Several EU-15 and NGO representatives noted that the national emission ceilings (NEC) have been in place only for two years and policies and measures are not fully in place yet, so it is too early to assess the enforcement of this Directive. However, NGOs also noted that Member States reporting of national plans and programmes is not adequate, both in terms of respecting the deadlines and in terms of report content.
- NGO and academia representatives suggested reasons for sometimes insufficient enforcement of some measures, such as lack of will, financial capacities and limited administrative capacity, lack of EU pressure and citizen awareness, potential pressure of various lobbies.
- Several stakeholders believe that stationary source emission controls are more enforced than mobile source measures. For example, industry representatives commented that not so much attention is paid once cars are on the market, and that enforcement (regular checks/inspections) should be improved, especially for trucks and commercial vehicles.

TABLE 7. Evaluation of enforcement of various EU-level measures

	EC (1)	EP (1)	NR (14)	NGO (6)	Ind (2)	LR (6)	Academ (6)	EC (1)	EP (1)	NR (14)	NGO (6)	Ind (2)	LR (6)	Academ (6)
AQ-related measures	Well enforced							Somewhat enforced						
Ambient AQ standards			10 71%	1	1	3 50%	2	1	1	4	6	1	3	4
National emissions ceilings			7 50%		2	3 50%	3	1		6	3		3	3
Stationary source emission controls		1	12 86%	1	2	5	5	1		1	4		1	1
Product-related standards	1		9 64%	1	1	6 100%	2		1	4	5	1		1
Information requirements			9 64%	1	1	4	3	1	1	5	5	1	1	1

The majority of national and local representatives believe that all the measures mentioned in the table AQ-related measures are well enforced. Several Scandinavian countries commented that the enforcement of the legislation has been very efficient because the implementation of the legislation was followed up by good monitoring of air quality, and effective permit systems operated by inspection in municipalities, counties and the central authorities.

One EU-10 representative commented that the AQ standard is difficult to enforce actively since

Assessment of the Effectiveness of European Air Quality Policies and Measures

A project for DG Environment carried out by Milieu Ltd, the Danish National Environmental Research Institute, and the Center for Clean Air Policy

ambient AQ is mainly a result of policies and measures aiming at emission reductions. The effectiveness in achieving the air quality standards is a result of compliance with emission standards and the level of activity (national and international).

NGOs commented that a high level of Commission scrutiny is needed to check the content of air quality action plans in order to verify if countries are indeed doing their best to achieve air quality limit values.

Several EU-15 representatives noted that as the NECs have only been in place for two years and policies and measures are not fully in place yet, it is too early to assess the enforcement of this Directive. NGO representatives made the same comment about it being premature to assess enforcement of the NEC requirements. However, NGOs also noted that Member States reporting of national plans and programmes is not adequate both in terms of respecting the deadlines and in terms report content.

An industry representative commented that measures addressing mobile sources are not well enforced. Not so much attention is paid once cars are on the market. Also enforcement depends on the type of vehicle. Enforcement has to be improved, especially for trucks and commercial vehicles. There is a need for regular checks/inspections.

NGO representatives suggested reasons for sometimes insufficient enforcement of some of the measures, such as lack of will, financial capacities and administrative capacity, lack of EU pressure and citizen awareness, potential pressure of various lobbies.

A northern EU-15 representative referred to some of these reasons in explaining its national situation with enforcement of VOCs and particulate standards. The issue of VOCs from small national scale burning of wood, representing approximately 25% of total national emissions, has not been addressed due to the lack of political interest in monitoring. It is unclear to what extent that country's towns and villages (or parts of them) have concentrations of PM₁₀ above the values of the Air Quality Framework Directive. Small scale combustion of wood is by far the single largest source of these emissions.

One academia representative also made a comment about the lack of political will as one of the reasons for not enforcing specific measures. The example of one Southern EU-15 country problems with implementing the LCP Directive was given. The main reason for non-compliance was the cost, and since both options given in the Directive (closedown of industries or install new technologies) were costly, the government did nothing. This situation lasted until forests started dying 100 km from the plants. Domestic pressure to solve the problem had a significant effect; the government finally mobilised and resolved the problem by re-allocating funds.

3. ADEQUACY OF COMMUNITY-LEVEL MEASURES WITH RESPECT TO AIR QUALITY PROTECTION

This section of the questionnaire was designed to obtain stakeholder opinions on the adequacy of EU legislation for addressing air quality problems throughout the Community. Stakeholders were also asked to provide their suggestions for additional measures for air quality problems that should be addressed. In addition, stakeholders were asked to identify any national measures that were in place before the EU-level measures were adopted. If some of the national measures were and/or are more stringent than the EU legislation, stakeholders were asked to provide their opinions on the reasons for these more stringent measures. The last question in this section addresses the adequacy of EU monitoring and reporting requirements.

3.1. Results from Question 2.1

“Does current EU legislation address all of the relevant air quality concerns (for your country) (at EU level)?”

Box 5. Summary of Responses to Question 2.1

- Out of 40 respondents who provided their opinions for this section, 26 believe that current EC legislation does not address all of the relevant air quality concerns.
- According to their opinions, sectors, sources and pollutants that are not adequately covered are:
 - Small combustion sources
 - Odours
 - Agriculture and its NH₃ and CH₄ emissions
 - Shipping and aircraft emissions
 - Heavy metals (Cadmium, mercury)
 - POPs, dioxins
 - 2-wheel transport (motorcycles, mopeds)
 - Ambient AQ standard for PM_{2,5}
- Several respondents mentioned a need for more EU-level (i.e., Commission) leadership to achieve:
 - more coherent, environmentally friendly transport policy, including road transport policy, including road transport charging
 - more integration of sustainable development principles in energy policy, product policy
 - more effective coordination of MS in the context of international fora such as the IMO and IAO to reach agreements on emissions controls

Some stakeholders who do not think that current EU legislation addresses all of the relevant air quality concerns provided their comments on pollutants or sources that are not adequately covered. Their comments are presented in the table below.

TABLE 8. Stakeholder suggestions on pollutants and/or sources that are not adequately addressed by current EU legislation

Pollutants or sources not adequately covered	Specified by the following stakeholders	Explanations/suggestions
Small combustion sources	NGOs, 3 northern EU-15, 2 northern EU-10	
Odours	NGOs, 1 northern EU-15, 2 northern EU-10	1 northern EU-10 had to elaborate its own legislation on odours. There had been a lot of complaints about expansion of one city's port facilities and in particular the terminals for storage of fuels, chemicals, etc.
Agriculture and its ammonia emissions and CH ₄	NGOs, 3 northern EU-15	
Deposition of persistent and toxic compounds to soils and vegetation (e.g., Cd, mercury POPs such as PAH, dioxins;	2 northern EU-15, NGOs	
Shipping, aircraft emissions	NGO, 1 northern EU-15, 1 northern EU-10, EC, EP	
Lack of coherent environment friendly traffic policy at EU level.	1 northern EU-15, 1 northern EU-10, NGOs	<p>Current focus is on product standards and while this does result in lowering emissions per vehicle, the increase in the number of vehicles is wiping out any overall gains. Some specific measures on traffic needed.</p> <p>DG TREN's White Paper on a Common Transport Policy (2001) was mentioned as much more forward thinking than anything coming out of DG Environment. It discussed mobile shifts, road pricing, and other innovations. Unfortunately, it was adopted on 12 September 2001, at a time when the minds of Ministers of Transport were more focused on air safety.</p> <p>The key is transport policy, e.g., how we use vehicles in cities, emissions charges.</p> <p>The Swiss system of charging lorries is very innovative. It costs only 150 EUR per vehicle to install the "digitally-enhanced GPS" transmitters. The lorries are charged by type of vehicle and length of route.</p> <p>There also needs to be better elaboration to support alternative forms of traffic, e.g., bicycles.</p>
2 wheel forms of transport	1 southern EU-15	An inspection and maintenance system is needed for mopeds and motorcycles – need EU level requirements.
Issues related to fuel in mobile sources	Industry	Since fuel is a very important component in the scheme of emissions from mobile sources, future issues should be linked with fuel. Fuel efficiency should be the prime issue to look at.
Ambient air quality standards for PM _{2,5}	1 southern EU-15 1 northern EU-15	

Assessment of the Effectiveness of European Air Quality Policies and Measures

A project for DG Environment carried out by Milieu Ltd, the Danish National Environmental Research Institute, and the Center for Clean Air Policy

Pollutants or sources not adequately covered	Specified by the following stakeholders	Explanations/suggestions
VOC emissions	1 northern EU-15 1 northern EU-10	The VOCs issue should be treated in more detail. There is a need to develop Directives for VOC containing products.
New approaches are needed	1 northern EU-15	The EC should take stronger position concerning the “drivers” of emissions- activities. For example, rational use of energy, limitation of industrial worthless processes (packaging), limitation of car/truck, 2-wheels use in order to integrate the principle of sustainable development.
New role of the Commission is needed	EP	The Commission could play much more of a coordinating role among stakeholders, e.g., by establishing benchmarks, voluntary measures. The EU should coordinate the Member States to take common action in the context of the IMO and the IAO to get international agreement on measures to reduce pollution from shipping and from aviation. Global legislation is needed in these areas, but there is a great reluctance to agree on limit values. Coordinated international action is especially needed to counter the competitiveness arguments. The EU should be much more aggressive and effective in these international fora.

3.2. Results from Question 2.2

“Please note any suggestions that you may have concerning how a particular EU-level measure might be improved.”

15 people out of 44 who completed the questionnaire did not respond to this question. Since many respondents already provided their suggestions in the previous question (2.1), this question turned out to be somewhat repetitive.

Those who responded to this question in the questionnaire and in interviews provided the following suggestions:

General policy ideas:

- Use of fiscal instruments could be improved. Perhaps under the new policy of “reinforced cooperation” a smaller group of countries can come forward to start acting on this issue and put in place some common instruments. (EP)
- Better coordination between EU and CLRTAP is needed.
- The ground level ozone problem should be addressed in the international context. Further emission reductions in NO₂ and ozone are needed. If objectives are different in different Member States, the transboundary air pollution should be taken into account. Presently Member States do not have responsibility for or ways to address this issue (EU-15 country).
- Important to include environmental considerations while formulating energy and transport policies (EU-15 country).

Assessment of the Effectiveness of European Air Quality Policies and Measures

A project for DG Environment carried out by Milieu Ltd, the Danish National Environmental Research Institute, and the Center for Clean Air Policy

- Need for better structure and interaction between EU-national governments, local governments and municipalities (academia).
- More integrated policies on climate change and air quality (EC).
- More exchange of know-how between EU 15 and EU 10 (EU-10 country).
- Some geographical factors might be introduced when PM₁₀ and PM_{2.5} concentration levels are estimated. Dispersion models for regulatory purposes should be unified on European level. (EU-10 country).
- A standard for trichloramine and oxidant aerosols in the air of indoor pools and other recreational places should be set. Trichloramine is the most concentrated oxidant gas to which children are regularly exposed while exercising (more than 1,000 µg/m³) (academia).
- New Directives are needed to address POPs and heavy metals (EU-15 country).
- There is a need for binding limit values in the 4th and 3rd Daughter Directives, and sanctions for not meeting emission ceilings (EU-15 country).
- NEC level should comply with Kyoto (use appropriate energy scenarios) – (NGO/EC).
- There is a need to set limit values for PM_{2.5} (EP)

Suggestions related to stationary sources:

- IPPC: since it leaves flexibility, there are doubts about the effectiveness. It is not as stringent and easy to enforce as other EU Directives. The local authority has discretion to apply more or less stringent standards. Stringent standards might not be imposed in certain countries, and this could lead to distortions. Standards should be imposed based on BAT but without the flexibility that is currently present in the Directive (EU-15 country).
- There is a need for better coordination between measures/requirements in different Directives (e.g., 50MW in LCP Directive and 20 MW in EIA and coordination between NEC interim targets for O₃ and Directive 2002/3/EC relating to ozone in ambient air) (EU-10 country).
- Merge the LCP Directive with IPPC Directive. Over years, it should become one Directive based on the IPPC (EC).

Suggestions related to mobile sources:

- Vehicle fuel efficiency should be the prime issue. The issue of fuel is a complex one. Fuel also gives tax revenues for government. 80% of fuel price is tax. So any changes in type of fuel or consumption patterns will affect tax revenues that governments are used to relying on. The growing population means more people are driving which in turn creates more revenues. Other types of fuels do not provide the same type of revenues (industry).
- More stringent vehicle and fuel standards are needed.
- Regulations are needed to encourage use of particulate filters for cars. Also there is a need for taxing diesel at an appropriate level. Use of emulsion diesel could be required. (EC)

- Existing testing cycle for cars and heavy duty vehicles need to be improved (EU-15 country).

3.3. Results from Question 2.3

“Were national measures already in place before the EU-level measures were adopted? Are (were) the national measure more or less stringent than the EU-level measure?”

Box 6. Summary of Responses to Question 2.3

- 13 out of 20 countries that responded have had or have more stringent than EU regulations. They included 8 northern EU-15, 2 southern EU-15, and 3 northern EU-10 countries.
- The main reasons for more stringent measures are:
 - concern for health and environment,
 - existing poor air quality,
 - necessity provoked by the NEC requirements,
 - policy principles
 - local political, economic or environmental conditions.

TABLE 9. List of more stringent than EU-level measures by country

Country	Type of measure	Explanation
UK	<p>Several measures were in place before the EC legislation. They included:</p> <ul style="list-style-type: none"> • controls on industrial sources; • controls on domestic emissions; • basic controls on vehicle emissions. <p>Currently the UK air quality standards are more stringent in some cases.</p>	<p>UK had controls similar to those found in the IPPC regulation in place before the EC Directive. In 1999 the legislation similar to the IPPC required implementation of BATNEEC; thus the process was the same but a different time frame was used.</p> <p>The UK Air Quality Strategy allows the government to go further if needed (modeling results could show a need). The strategy was in place before directives, but does not have the same force of law.</p>
Austria	<ul style="list-style-type: none"> • Measures for stationary sources were often more stringent than EU legislation, e.g., for LCPs, fuel quality, etc. 	<p>Austria is a pioneer of unleaded fuel and low sulphur content in fuel.</p>
Belgium	<ul style="list-style-type: none"> • Prior to EU legislation Belgian had: <ol style="list-style-type: none"> 1. air quality limit value for lead (in early eighties), 2. emission limit values for existing LCP's, 3. emission limit values for all industrial sources (not yet taken up in EU legislation). • In addition, the Brussels Capital Region is the first to have proposed an air standard for trichloramine in indoor pools. 	<p>More stringent ELV's are necessary to achieve NECs (e.g. for LCP, small combustion installations, refineries, installations covered by the Solvent Directive).</p>
Denmark	<ul style="list-style-type: none"> • With respect to LCPs, national 	<p>The Danish ELVs for SO₂ and NO_x</p>

Assessment of the Effectiveness of European Air Quality Policies and Measures

A project for DG Environment carried out by Milieu Ltd, the Danish National Environmental Research Institute, and the Center for Clean Air Policy

Country	Type of measure	Explanation
	<p>arrangements were in place before the EU Directive.</p> <ul style="list-style-type: none"> • ELVs for municipal incineration plants were introduced before the Directive was adopted. • Also limitation of the sulphur content in liquid fuels was regulated before the Directive. 	<p>emissions from LCP's were more stringent than the Directive. This was due to the fact that the use of SCR-flue gas treatment resulted in lower emissions than the directive would give.</p>
France	<ul style="list-style-type: none"> • Emission inventories have been in place for a long time and cover far more pollutants than the NEC directive. • The integrated approach of the IPPC Directive for industries has been in place in France since 1976 and has produced very good results. • Monitoring of AQ is more developed in France than the minimum required by the directives. • Some thresholds for short term incidents are more stringent. 	<p>Requirements to report emissions have a significant indirect impact as the main industries are asked to give their emissions annually to the administration and these figures are often made public on web sites or annual reports of the local administrations.</p>
Ireland	<ul style="list-style-type: none"> • Smokeless fuel orders from 1990 were more stringent than EU-level. 	<p>There was a local smog problem in Dublin, so a ban on sale of bituminous coal in the Dublin area was introduced, which meant only smokeless fuel could be sold. Peat is classified as a smokeless fuel (this was partly political and partly for convenience).</p>
Germany	<ul style="list-style-type: none"> • Emission standards for LCPs were stricter in the late 1980s and 1990s. 	<p>These stricter standards were put in place because of the government's policy of precaution, i.e., air pollution should be reduced if technically and economically possible and without proof of the urgent need of a measure. Germany's strict ELVs for industrial plants follow precautionary approach and reduce emissions effectively. They can be enforced and controlled by local authorities, and provide a benchmark for public information.</p>
Italy	<ul style="list-style-type: none"> • In a few cases, regional authorities defined limits of emissions more stringently for some types of industrial sources (example of turbogas to produce electric energy). • In 1983, standards/limits were introduced for SO₂, NO_x and dust for installations below 50 MW (beyond Community level requirements). 	<p>In 1990 a law linking EU legislation and 1983 German standards was passed. After 1990, there was a switch to methane instead of heavy oil and coal for heating and power plants. The law gave responsibility to mayors to decide what fuel to allow. Many cities decided not to use coal (installations need to obtain a permit if they want to use coal). Now coal is completely forbidden for use in heating.</p> <p>Regional authorities are generally faster than national and EU authorities to adapt legislation that takes into account the evolution of technology.</p>

Assessment of the Effectiveness of European Air Quality Policies and Measures

A project for DG Environment carried out by Milieu Ltd, the Danish National Environmental Research Institute, and the Center for Clean Air Policy

Country	Type of measure	Explanation
Finland	<ul style="list-style-type: none"> • There have been (and still are) national guidelines for SO₂, NO₂, PM₁₀ and CO. The values of the guidelines are more stringent than the limit values, but on the other hand, they are not as binding. • There were also regulations about the ELVs to air at least for stationary emission sources and road mobile sources (compulsory three way catalysts for cars after the year 1991). • AQ limit values were in place before Finland joined the EU, as well as harmonised procedures for monitoring, emissions inventory and a national emissions reduction plan. 	
Sweden	<ul style="list-style-type: none"> • There are measures for emissions charging of shipping traffic. 	<p>Sweden has a system of fairway and port fees that are differentiated for SO₂ and NO_x emissions. Ships using access routes to ports such as Stockholm routes have to pay Swedish maritime authorities according to whether the ships burn low sulphur fuel, have NO_x burners, etc. The charges are revenue-neutral. If a ship goes through the waters frequently, e.g., ferries, it is cost-effective for them to make investments to reduce emissions. The Swedish measure has kick-started new technological developments for after-burn of shipping emissions, and tripled the global fleet of ships with this new technology. The new technology adds a new operating cost, so the fiscal incentive of avoiding charges is needed.</p> <p>Sweden had often more strict limit values or compliance dates due to the concern for health and environment. Since Sweden suffers badly from acidification, prior to 1995 it already had introduced numerous measures for reducing sulphur emissions from stationary sources. Sweden had also introduced emission limit values for cars in 1989 that made the use of three-way catalytic converters necessary.</p>
The Netherlands	<ul style="list-style-type: none"> • Measures that were more stringent than IPPC requirements were put in place in some cases for some sectors 	The Netherlands had to apply stricter regulations in some cases to be able to comply with the NEC directive.
Hungary		Complex programmes were launched and executed in areas where ambient air quality requirements were not met.

Assessment of the Effectiveness of European Air Quality Policies and Measures

A project for DG Environment carried out by Milieu Ltd, the Danish National Environmental Research Institute, and the Center for Clean Air Policy

Country	Type of measure	Explanation
Latvia	<ul style="list-style-type: none"> Latvia has VOC Stage II controls in place over the refuelling cycle. 	Many new petrol stations were being built at the end of the 1990s, and they had the money to install the vapour recovery equipment.

3.4. Results from Question 2.4

“If a national measure is more stringent than current EU legislation, what motivated this more stringent national measure?”

The main reasons for more stringent measures that were mentioned are:

- concern for health and environment,
- existing poor air quality situation,
- necessity provoked by the NEC requirements,
- policy principles
- local political, economic or environmental conditions.

The explanations provided by individual countries are presented in the table above (results from question 2.3.)

3.5. Results from Question 2.5

“Are EU monitoring and reporting requirements adequate for tracking the following pollutants, emission sources, and effects?”

The majority of responses indicate general satisfaction of various stakeholders with monitoring and reporting requirements. Only monitoring and reporting of PM_{2,5} was rated in many cases as inadequate. Monitoring of health effects was also ranked as inadequate by many national and local representatives.

The responses are presented in the table below by stakeholder group. The numbers in the table indicate how many stakeholders from various groups responded “adequate” compared to “not adequate” for each selected pollutant.

TABLE 10. Summary of responses regarding adequacy of EU monitoring and reporting requirements by pollutant

Emissions / effects	Adequate							Not adequate						
	NR	E C	E P	L R	NGO	Ind	Acad	NR	E C	E P	L R	NGO	Ind	Acad
SO ₂	13		1	4	3	2	4	1						
NO _x	13		1	4	3	2	4	1						
PM ₁₀	11		1	3	2	1	3	3			2		1	1
PM _{2,5}	8			1	2		2	6		1	4		1	2
Ground level ozone	13		1	4	3	1	3	2						
VOCs	9		1	2		2	3	4			3			1
Other (please name)		Pb, CO							NH ₃					

Assessment of the Effectiveness of European Air Quality Policies and Measures

A project for DG Environment carried out by Milieu Ltd, the Danish National Environmental Research Institute, and the Center for Clean Air Policy

Stationary industrial sources	11	1	1	4	3	2	4	1						
Stationary non-industrial sources	9		1	2	3	1	2	3	1		1			1
Road mobile sources	9		1	2	1	2	3	2	1		1	1		1
Non-road mobile sources	7	1	1	1	1	1	2	4			2	1		1
Other sources (please name)														
Human health	5	1	1		1	1	2	6			3	2		2
Acidification	8	1	1	1	2	2	3	2			1	1		
Eutrophication	7	1		1	1	2	2	3		1	1	2		
Damage to bldgs & cult'l heritage	7	1				1	2	3		1	2	2		

NGO representatives commented that while available data is relatively good for some pollutants (e.g. SO₂), sectors (e.g. large stationary sources), and effects (e.g. acidification), the data could still be improved. Much better data is needed in regards to the pollutants, sectors, and effects where today the level of uncertainty is the biggest. For example, there appears to be a fairly high level of uncertainty in emissions data for NO_x, VOCs, and PM from domestic burners, from non-road mobile sources, and from boats/ships.

Table 11 below summarises the comments that were received from various stakeholders on monitoring and reporting requirements for specific pollutants, sources and effects. It also gives the total number of respondents who answered “adequate” and “not adequate” by pollutant, source and specific effect.

TABLE 11. Summary of Comments from Respondents on Monitoring and Reporting Requirements for Specific pollutants, Sources, and Effects

Emissions / effects	Adequate	Not adequate	Please explain
<i>Pollutant</i>			
SO ₂	27	1	Reporting obligations should be further streamlined. In practice, there are no EU-level requirements for the emission inventories, since their validation has been left to the member states.
NO _x	27	1	Reporting obligations should be further streamlined. In practice, there are no EU-level requirements for the emission inventories, since their validation has been left to the Member States.
PM ₁₀	21	7	Monitoring strategy and standards need to be improved. PM has historically been controlled by weight. Epidemiological findings indicate that the number of particulates is more important than the overall weight of particulates. So it may be more important to reduce the number of particulates.
PM _{2.5}	13	14	Monitoring strategy needs to be improved. There is no binding standard. There is no agreed monitoring methodology. A reference method is still missing, and there are not enough stations.
Ground level ozone	25	2	Unnecessary monitoring requirements
VOCs	17	8	No obligation to monitor VOC except benzene (only 1 station/country).
Other	Lead, CO	NH ₃ ,	

Assessment of the Effectiveness of European Air Quality Policies and Measures

A project for DG Environment carried out by Milieu Ltd, the Danish National Environmental Research Institute, and the Center for Clean Air Policy

		PM<1	
<i>Emissions</i>			
Stationary industrial sources	25	1	Partly adequate only due to the “academic” component of the inventories; EPER just started. More standardisation is necessary.
Stationary non-industrial sources	18	6	Very few tests, more standardisation is necessary. Emission factors for diffuse sources lacking.
Road mobile sources	18	6	Too little in-use testing; Need to know more how vehicles perform under real-life conditions. More standardisation is necessary; emission factors are under-estimated due to the lack of real world data.
Non-road mobile sources	14	8	Too little in-use testing. More standardisation is necessary.
Other sources (please name)		Agric prod.	The emissions and effects of small scale/domestic combustion are not monitored. In practice, there are no EU-level requirements for emission monitoring, since quality assurance of the measurements has been left to MS. The requirements are only for reporting of data [with un certain quality, because of many factors].
<i>Effects</i>			
Human health	11	13	More focus on health effects needed; limited epidemiological data. Better understanding of the health effects needed especially for fine particulates. The causes of health effects of PM are not known well enough. PM 10 should be replaced by PM _{2,5} or PM <1. No requirements to report effects. More research needed in general.
Acidification	18	4	No requirements to report effects.
Eutrophication	14	7	No requirements to report effects. More research needed.
Damage to bldgs & cult'l heritage	11	8	No requirements to report effects. More research needed.
Other effects (please name)			The monitoring requirements established by the daughter directives [to 96/62/EC] are precise and adequate but difficult to implement].

4. ADDITIONAL MEASURES WHICH MIGHT BE CONSIDERED FOR FUTURE EU ACTION

In this third section of the questionnaire respondents were asked for their opinions about the additional measures which might be considered for future EU action.

The stakeholders were asked to:

- Mention examples of noteworthy achievements with respect to air quality taken in their countries or another country (including non-EU countries);
- Evaluate effectiveness of different measures for addressing various factors related to AQ protection;
- Identify additional categories of products for which new or more stringent EU standards or action is needed;
- Answer whether additional use of economic instruments to achieve AQ objectives should be considered to control emissions from various sectors;
- Answer whether increased research efforts related to AQ protection is required at European level;
- Identify measures for which local/national actions are more appropriate than EU-level action.

The following subsections provide brief summaries and detailed analyses of the responses to each of these questions.

4.1. Results from Question 3.1

The respondents were asked to mention examples of noteworthy achievements in their countries with respect to air quality. In addition to EU member countries, this question was also sent to the representatives of Japan, the US, and Switzerland.

Box 7 below summarises major categories of measures that were utilised by individual countries and allowed them to achieve significant results in controlling pollution.

Box 7. Summary of Responses to Question 3.1

Categories of measures that allowed individual EU and non-EU countries to achieve remarkable results with respect to AQ are:

- Economic incentives that led to significant and desired changes
- More stringent emission limits
- Better monitoring and inspection strategies
- Voluntary agreements with industry
- Integration of various policy approaches)
- Specific controls over hazardous air pollutants
- Requirements for implementation of advanced technologies
- Measures reducing road transport emissions
- Involvement/role of local authorities

Suggestions that were offered by the respondents could be divided into several categories:

1) Economic incentives that led to a significant and desired change

Scandinavian countries (Finland & Sweden) were able to get quick results in the quality of liquid fuels because of the use of taxes to provide incentives. The tax incentives were very small at the time, but very dynamic. They led to very quick changes from leaded to unleaded petrol, and to low sulphur content in fuel. In Sweden, the sulphur content in diesel fuels is less than 0,05 %.

Another example of a successful economic incentive is Swedish differentiated shipping fees for emissions of SO₂ and NO_x. Differentiated shipping and harbour fees could be introduced in the EU, but in a different form as most Member States do not have fairway dues. It is a cost-effective way to stimulate improvements within the marine sector. The same system could be applied to road pricing and inclusion of all external costs in taxation. Sweden also has a sulphur tax, and a NO_x charging system for stationary sources.

The EC and NGO representatives gave the London road pricing (congestion charge) as another example of an effective economic incentive which led to a significant reduction in level of pollution.

Switzerland offered its own example of a mileage dependent tax for heavy duty vehicles that it considers to work very well.

The US suggested the use of emissions trading as the most cost-effective economic instrument. The EU could put in place emissions cap and trade programs, while retaining the requirement for ambient air standards and reducing reliance on best available technology. This adjustment in emphasis would achieve air quality goals at reduced cost, promote innovation and enhance economic competitiveness. An emissions cap with trading would be first choice where air quality problems are appropriately addressed by that mechanism and sources can be cost effectively monitored. Most other categories of sources would be appropriate candidates for charges or fees based on environmental output.

2) More stringent emission limits

Several EU countries suggested the need for more stringent emission limits, especially for road mobile sources. Several of them have already tried to use more stringent requirements. For example, German representatives mentioned emission limits for industrial sources (for SO₂ and NO_x) that were introduced in 1983 and 1986 in an attempt to protect plants and soil from deposition of toxic and persistent air pollutants. These emission limits brought emissions down quite effectively.

Germany also promoted cars with catalytic converters in the 1980s and 1990s by use of tax discounts and funding of retrofits. The lesson from these experiences that could be useful for future EU action is one Member State's willingness to fully exploit technological control options in legislation. It was suggested that this should happen for vehicle emissions in the future.

In Ireland, when problems with smoke became severe, a smokeless fuel order was introduced leading to cessation of smog episodes. Italy introduced standards/limits for SO₂, NO_x and dust for installations below 50 MW (beyond Community level requirements) that led to significant reductions, especially of SO₂ emissions.

3) Better monitoring and inspection strategies

A comprehensive monitoring and inspection network could assist in achieving environmental objectives. For example, comprehensive monitoring in the UK (but mainly for London) helped to

identify hot spots. Each hot spot is required to have an AQ management program. Hot spots are called “Air Quality Management Zones” in the UK. The lesson for the EU to learn is that better monitoring strategies are needed. Better use of monitoring and modelling is needed to get an improved estimation of the impacts of the measures.

Bulgaria also suggested that the development of a much more precise emission inventory methodology is needed and gave the example of the US AP 42 system developed by the United State EPA. The future development of the EU emission inventory methodology [CORINAIR] could follow the example of the USEPA. Bulgaria also cited the example of Japan where monitoring of ambient air quality levels of dioxins takes place in areas next to waste incinerators.

Sweden mentioned that an effective system for annual inspection of cars including exhaust measurements is very helpful in controlling vehicle emissions.

4) Voluntary agreements with industry

Several countries used this instrument and found it to be very effective. For example, Austria has voluntary contracts with specific industrial sectors. The Netherlands used voluntary agreements. Japan uses agreements between local government and industry to achieve desired emission reductions. Usually such agreements are not legally binding but companies followed them, and in many cases agreements have much stronger effects than laws (agreements might include emission limits or measures that need to be introduced by specific industries).

5) Integration of policy approaches

Integration of air and climate change regional policies: There were several suggestions that propose new or different approaches to regulating emissions. For example, Belgium gave an example of its “*Plan d’amélioration structurelle de la qualite de l’air et de lutte contre le rechauffement climatique, 2002-2010, Region de Bruxelles-Capitale*” – an important programme that integrates air and climate regional policies, trying to combine measures related to energy efficiency and level of activities (e.g., packaging). Thanks to this programme, Belgium achieved an important decrease in the ambient concentration levels of SO_x, Pb, benzene, NO, and CO measured at traffic-oriented monitoring stations.

Integration of air quality concerns into sectoral policies: NGOs suggested that EU sectoral policy instruments should be used more broadly to achieve multiple goals, including environmental policy goals. The EU should consider how to structure agriculture, energy, transport, to meet *inter alia* air quality goals.

Regional approach to ozone reduction: Hungary suggested more of a regional approach in ozone reduction programmes, including modelling for ambient air quality assessment.

6) Control of hazardous air pollutants

Switzerland gave an example of its national legislation that promotes limitation of cadmium and mercury content in battery and accumulators as well as an efficient collecting system.

The US applies Maximum Achievable Control Technology (MACT) standards for Hazardous Air Pollutants (HAPs), and is currently considering caps on mercury emissions from utilities.

7) Requirements for implementation of advanced technologies

Advanced technologies for controlling NO_x and SO₂ from stationary sources were also suggested. Switzerland has a regulation that requires DeNox systems and low NO_x burners, as well as fabric filters for particulate matter for stationary sources, and low NO_x burners and low sulphur content in fuel for stationary non-industrial sources.

8) Measures reducing road transport emissions

The NGOs refer to promotion of car-sharing schemes started in Germany and Switzerland (125,000 household members in CH alone!), and now available in Brussels (www.cambio.be).

Italy offered the whole list of measures applied by Italian municipalities:

- Circulation plans for cities with more than 50 000 inhabitants – plans to manage mobility, including parking, distribution of traffic on big roads, traffic limited zones, bus lines
- Development of pedestrian zones in the centers of cities
- Incentives for scrubbing old mopeds have led to to renewal with models that comply with EU limits
- Having mobility managers in big companies and institutions who are responsible for arranging transportation for employees (small buses that take people to metro and train stations), car pooling
- Financial support for car-sharing
- Renewal of the taxi and commercial transport fleets

Switzerland gave an example for road mobile sources of requiring 3-way catalytic converters, speed limits and mileage-dependent taxes for heavy duty vehicles for non-road mobile sources the Swiss NR also suggested particulate filters for construction machinery.

Japan explained that it sets more stringent standards for cars that are used in regions where air quality is not good. Those who do not meet these more stringent requirements are not allowed to use their vehicles in certain areas. There is also a law on NO₂ from cars that prohibits ownership of a vehicle in special areas if the car is old.

An industry representative suggested that the focus should be on fuel quality since it could be a solution to the problem of emissions from transport. Better quality fuels could be provided in towns where air quality problems are more acute. So fuel quality could be tailored to areas where it is necessary.

9) Involvement/role of local authorities

Italy and Finland gave examples of significant changes in emissions when local authorities were given responsibility to address specific pollution problems.

In 1990, Italy passed a law linking EU legislation and setting more stringent national standards for SO₂, NO_x and PM. Before this legislation, heavy oil and coal were used for heating and power plants; after 1990 there was a major switch to methane. The law gave responsibility to mayors to decide what fuel to allow. Many cities decided not to permit use of coal (since installations need to obtain a permit if they want to use coal). Now coal may not be used at all in heating. Only four LCPs use coal (3% of their production).

In Finland, a noteworthy achievement was the cooperation that took place in the 1990s between the Helsinki transit authority, the State Technical Centre, and the Finnish national oil refinery to change

Assessment of the Effectiveness of European Air Quality Policies and Measures

A project for DG Environment carried out by Milieu Ltd, the Danish National Environmental Research Institute, and the Center for Clean Air Policy

quality of fuels and in particular desulphurisation. This was backed up by the legislature's willingness to support the co-operation with tax incentives. The lesson here is the way that different actors can be brought together to achieve a dramatic result. It was suggested that the Commission can and should be playing this type of role.

Local authorities have also played a key role in promoting district heating in Helsinki Area and this has had beneficial effects on air quality. Use of co-generation has now spread throughout Finland. There has also been replacement of coal-burning plants with natural gas.

10) Independent research

NGOs suggested that there is a need for independent research. The example was given of the Health Effects Institute (HEI) in Massachusetts, which is funded by the US oil industry, the US car industry, the US EPA, and the California Air Quality Resources Board. The HEI focuses on science and its research results are considered neutral. Everyone reportedly respects the results, even industry. NGOs consider that more policy-oriented and independent research is needed in the EU. It might be useful for the EU to have some budget allocated to research that is conducted independently (not by community institutions) outside the Framework Research Programme. The EU needs a research body driven by the policy agenda, not by a research agenda. The research should also be independent of industry.

4.2. Results from Question 3.2

“How effective would the measures proposed in the questionnaire be for addressing various factors related to AQ protection, if applied within the EU?”

The respondents were also asked to rank each measure's priority for the EU using a scale of 1 (very high priority) to 4 (lowest priority).

Box 8. Summary of Responses to Question 3.2.

- The average ranking of all the suggested instruments (including revised or new AQ standards, systems for monitoring effects of air pollution on health, and environment, better correspondence between climate change & AQ policies, reporting & planning, new & more stringent national ceilings under the NEC Directive for additional pollutants, better coordination of short-term actions by MS in cases of regional (transboundary) exceedances, and requirements for progressive financial responsibility from emitters) is 2 – “high priority”.
- Requirements for progressive financial responsibility from emitters received the highest ranking and could be regarded as “very high priority”,
- Better coordination of short-term actions by Member States in cases of regional (transboundary) exceedances received a little lower than average ranking, so could be considered as simply “priority”.
- Stakeholders also offered additional measures for consideration, including:
 - Charges or standards on emissions from shipping and inland waterways
 - Education for citizens
 - Measures to reduce emissions from domestic heating systems
 - Stricter EU regulation (emissions, products – cars, fuel quality for vehicles, non-road mobile sources, LCP)
 - Measures for NH₃ emissions from agriculture
 - Minimum fuel tax and reinvestment of revenues in rail infrastructure
 - Taxation on air tickets and aviation fuel
 - Measures to prevent waste generation, promote recycling
 - Measures to address dioxins

The table below summarises all the answers and shows how many people identified one or another measure as effective, somewhat effective, or not effective. It was difficult to evaluate people’s ranking of priorities of specific measures for the EU. Different stakeholders from the same countries ranked the same instrument differently. Also each instrument received all types of ranking (from 1 to 4) showing that the responses are very subjective. The table shows how many times each ranking was used for a specific instrument, and the average ranking.

Several respondents also offered their suggestions for other instruments that might be effective if applied in the EU. The following groups of stakeholders offered their suggestions: 11 NR, 4 LR, 4 academics, 3 industry reps, 3 NGOs, 2 EC, and 2 EP. All of these suggestions are listed in the last row of the table; with numbers next to each suggestion to show how many times each suggestion was mentioned.

Assessment of the Effectiveness of European Air Quality Policies and Measures

A project for DG Environment carried out by Milieu Ltd, the Danish National Environmental Research Institute, and the Center for Clean Air Policy

TABLE 12. Summary of Responses Regarding Possible Effectiveness and Priority of Hypothetical New Measures That Could be Implemented in the EU

<i>Measures to consider for possible EU action</i>	<i>Very effective</i>	<i>Somewhat effective</i>	<i>Not effective</i>	<i>No opinion</i>	<i>Priority for EU</i>
Revise or impose new AQ standards to improve protection of health / environment (please specify pollutant(s) <u>PM, PM_{2.5}, VOC, NO₂</u>)	11	15	1	3	1 (8x) 2 (10x) 3 (5x) 4 (1x) 1.9 (ave)
Imposition & harmonisation of system for monitoring effects of air pollution on health, environment, etc.	10	18	4	2	1 (9x) 2 (9x) 3 (2x) 4 (4x) 2.1 (ave)
Better correspondence between climate change & AQ policies, reporting & planning	13	21	1	1	1 (8x) 2 (10x) 3 (4x) 4 (4x) 2.2 (ave)
New & more stringent national ceilings under the NEC Directive for additional pollutants, such as PM, POP, NH ₃ , VOC, PM _{2.5} , NO _x)	11	11	1	5	1 (7x) 2 (4x) 3 (5x) 4 (1x) 2.1 (ave)
Better coordination of short-term actions by MS in cases of regional (transboundary) exceedances	6	14	4	2	1 (5x) 2 (4x) 3 (11x) 4 (4x) 2.5 (ave)
Require progressive financial responsibility from emitters	20	11	1	1	1 (10x) 2 (8x) 3 (3x) 4 (1x) 1.8 (ave)
<p>Other (offered by the respondents):</p> <ul style="list-style-type: none"> • Charges or standards on emissions from shipping and inland waterways (1) • Education for citizens (1) • Improved enforcement (1) • Measures to reduce emissions from domestic heating systems (2) • Stricter EU regulation (emissions, products – cars, quality of fuel for vehicles, non-road mobile sources, LCP) (3) • Measure for NH₃ emissions from agriculture (1) • Minimum fuel tax and reinvestment of revenues in rail infrastructure (1) • Taxation on air tickets and aviation fuel (1) • Measures to prevent waste generation, promote recycling (1) • Measures to address dioxins (1) 					

4.3. Results from Question 3.3

“Are there any additional categories of products for which new or more stringent EU standards or action is needed?”

Box 9. Summary of Responses to Question 3.3

- There were many suggestions from academia and NGO representatives, local representatives, industry, EC and EP, but few national representatives provided their suggestions.
- Many product standards were suggested for mobile transport (road and non-road), small stationary sources and agriculture.

All the suggestions can be found in the table below. Suggestions are not placed in the order of priority since this list integrates responses from all 49 respondents and several suggestions were mentioned many times. The following groups of stakeholders offered their suggestions: 11 NR, 4 LR, 4 academics, 3 industry, 3 NGOs, 2 EC, and 2 EP. The numbers next to each suggestion show how many times each suggestion was mentioned.

TABLE 13. Suggestions from Stakeholders on Possible Additional Categories of Products and Sources of Emission for Which New or More Stringent EU Standards are Needed

<i>Product</i>	<i>Source of Emission</i>
1. car standards (1) <ul style="list-style-type: none"> • diesel engines (2) • after-treatment systems, e.g., particulates treatment in cars (1) • 3-way catalytic particulate filters, NOx traps (1) • improve testing cycle for mobile sources (2) 	1. mobile road sources (8) <ul style="list-style-type: none"> • urban buses (1) • heavy vehicles (2) • 2-wheel vehicles (2) • PM2,5 from road vehicles (2) • optimisation of combustion process in cars (2)
2. fuel standards (2) <ul style="list-style-type: none"> • diesel fuel (1) • alternative fuels (1) • bunker oils (2) • sulphur in marine fuels (1) 	2. mobile non-road sources : <ul style="list-style-type: none"> • emission from ships (especially PM) (11) • aviation and airport activities (10) • diesel railway locomotives (1) • non-road machinery (3)
3. More stringent standards on solvents (1) <ul style="list-style-type: none"> • all domestic products (paint, varnish, cosmetics) (2) • VOC in paint and in other products (4) 	3. agriculture (9) <ul style="list-style-type: none"> • use of fertilizers
4. small furnaces (1) <ul style="list-style-type: none"> • wood heating systems (2) 	4. Small combustion installations and stoves (2) <ul style="list-style-type: none"> • combustion plants below 50MW (1) • domestic heating (2)
5. cement – rotary kilns for production of clinker (1)	5. odours (1)
6. Mercury containing products (1)	6. nuisance dust (1)

Several stakeholders offered their comments and explanations:

One EU-15 local representative explained that wood heating systems are now fairly significant sources of particulate matter emissions. Various different types of wood heating systems are now on the market emitting different sorts of particulate matter. A product standard needs to be put in place for a domestic heating system that will burn wood.

The need to control emissions from agriculture was mentioned many times by various types of stakeholders. NH₃ emissions from agriculture are an important source for PM, acidification,

eutrophication. Several EU-15 local representatives expressed their concern with ammonia emissions from agriculture. A need to introduce measures that would change agricultural methods in order to reduce GHG (methane) emissions was mentioned. Industry representatives mentioned both ammonia and methane as important pollutants coming from the agriculture sector that should be controlled.

Introduction of a tighter control over transport emissions was also high on the respondents' lists. National representatives from EU-15 mentioned that emission limits for road transport, particularly for heavy duty vehicles, are not ambitious enough. They feel that the control potential for vehicle emissions has not yet been fully exploited, especially for heavy duty and light duty vehicles, and that testing requirements do not reflect real driving conditions. They also suggested studies for diesel engines that could reveal new emission reduction opportunities. One EC representative suggested that the EU might consider introducing standards for greater energy efficiency for vehicles, and maybe a standard or mechanism to define the nature of cars (size, efficiency, important design specifications). This suggestion to define the nature of cars was offered in particular in response to the growing popularity of higher emitting sports utility vehicles (SUVs).

Many stakeholders mentioned ships and aircraft as sources of emissions that need to be controlled. One northern EU-15 representative mentioned that as air traffic emissions are growing and contribute to large-scale ozone & PM levels, as well as GHG emissions, measures should be applied to this sector. A need for regulation of fuel quality for air and maritime transport was also mentioned. The representative from one southern EU-15 added that airport activities are now a major concern with regards to local NO_x emissions and that airport emissions in the capital region are equivalent to the emissions from the entire waste incineration industry.

One respondent also mentioned the need for more to be done on non-road machinery and on fuel for non-road machinery. The US has set a deadline of 2009 to reduce emissions from these sources, and there is a need for the EU to match this.

One EU-10 representative brought up domestic heating and the need for better control of this sector to avoid return to solid fuels because of lower prices.

NGOs suggested that the use of sectoral policies (shift in transport, agriculture reform, energy demand and production policies) made is now more important than product standards and that addressing sectoral policies would have a greater impact on altering emission levels, patterns and exposure.

4.4. Results from Question 3.4

“Should additional use of economic instruments to achieve air quality objectives be considered to control emissions from various sectors?”

The project team now realise that this table was difficult to understand and hard to analyze. Many respondents answered for every type of instrument trying to match them with all of the proposed sectors. Several respondents suggested the same sector for several different instruments. When proposing several sectors in the same row (for one type of instruments), respondents sometimes marked one level of implementation (either EU or national) and sometimes both. This made it impossible to determine for which sectors what level is suggested.

<p>Box 10. Summary of Responses to Question 3.4.</p>

Based on the answers that were received, the following trends could be observed:

- Charges and fees are more often proposed for road transport, aviation and ships. Both national and EU levels are suggested, but national level is mentioned much more often than EU level. Based on the explanations provided by some respondents, EU-level is proposed for aviation and ships.
- Taxes are also suggested by many stakeholders for road transport, aviation and ships. Again, both national and EU levels are suggested.
- National subsidies were mentioned more often for road transport, agriculture and solvents.
- EU-level subsidies were suggested for LCP installations and agriculture.
- Emission trading was proposed for LCP installations and industry. EU-level of implementation was chosen as the most appropriate.

The table below summarises all responses to Question 3.4. The numbers in parentheses indicate how many times each sector was mentioned as appropriate for the implementation of specific economic instruments listed in the table.

TABLE 14. Summary of Stakeholder Suggestions on Sectors that could be Controlled by the Various Types of Instruments

Type of instrument	Sectors	EU level	National level
Charges & fees	Road transport (15), Other mobile sources (5), Combustion – larges installations (7), Combustion – small installations (7), Industry (7), Agriculture (3), Solvents & other product use (6), Aviation (7), Ship (8)	x	x
Taxes	Road transport (12), Other mobile sources (4), Combustion – larges installation (7), Combustion – small installations (3), Industry (3), Agriculture (2), Solvents & other product use (4), Aviation (9), Ships (9)	x	x
National subsidies, e.g. fiscal incentives	Road transport (6), Other mobile sources (2), Combustion – larges installations (4), Combustion – small installations (3), Industry (5), Agriculture (4), Solvents & other product use (4), Aviation, Ships		x
EU-level subsidies, e.g., structural funding	Road transport (3), Other mobile sources, Agriculture (7), Combustion – larges installations (6), Combustion – small installations (2), Industry (3), Agriculture, Solvents & other product use (2), Ships	x	

Assessment of the Effectiveness of European Air Quality Policies and Measures

A project for DG Environment carried out by Milieu Ltd, the Danish National Environmental Research Institute, and the Center for Clean Air Policy

Emissions trading	Road transport, Combustion – large installations (8), Combustion – small installations (3), Industry (8), Aviation (2), Ships (2)	x	
Others	(no other suggestions provided)		

Many respondents favour charges, fees and taxes. They marked almost all sectors as appropriate for these types of economic instruments. Aviation and ships were mentioned the most often. Opinions varied regarding the level of implementation of these types of economic instruments for these two sectors. However, the majority prefers international (EU level) for their implementation.

NGOs commented that well-designed economic incentives are in most cases the fastest and most cost-effective way of reducing emissions. At present, EU legislation in several ways prevents even willing Member States from using these instruments, thereby increasing both environmental damage and the cost for environmental policy. The examples provided by NGOs also focused on aviation and shipping.

Emission trading was marked by the respondents with both interest and caution. Several EU-15 representatives suggested that it could be used for SO₂ and NO_x emission control, but could be difficult to implement. In the Netherlands a system of emission trading is being implemented at the moment. This system is limited to NO_x and the large emitters, but could be extended to other sectors or gases in the future. Trading was also suggested for control of emissions from aviation and ships.

EU level subsidies were preferred for promoting public modes of transportation. Several EU-15 representatives mentioned that EU level subsidies may be important if they drive policy development towards sustainability. For example, in the transport sector they could promote a shift from transporting goods by road to rail or ships.

Transport was also mentioned as a sector where charges & fees could be applied to all forms of transport, including road use charges in general. Taxation of fuels was also suggested, with a differentiated tax system that favors low-polluting vehicles by lower taxes.

Several EU-15 representatives suggested additional sectors that could be controlled with the help of economic incentives, such as charges, fees and taxes, including small scale combustion sources, tourism and recreational activities.

4.5. Results from Question 3.5

“Are increased research efforts related to air quality protection required at European level?”

Thirty respondents said “Yes” and only four answered “No”.

Below is a selected list of areas that were identified for additional research:

- **Health effects**
 - Health effects of PM₁₀ and PM_{2.5} (proposed by 5 NR, 3 LR, and EC)
 - Health effects from ozone (1NR, and 1 LR)
 - Health impacts: combination of toxicology, clinical and epidemiological studies (proposed by industry representatives and 1 LR)
 - Health effects from combined pollution (EC)
 - Health effects of biofuel combustion (2 NR)
- **Agriculture**

- Depositions and effects on soil and food chain (1 LR)
- Emissions from agriculture and potential for their reductions (2NR, 1 LR, 1 academ)
- **PM**
 - Long-range transport of particulates
 - Abatement measures for PM (1 NR)
- **Air quality**
 - Integrated and improved methodologies to assess the impact of various sources on emissions and air quality particularly in urban areas (1 academ)
 - Impacts of regional and global change on urban air quality and climate (1 academic)
 - Improved methods for forecasting air quality (1 academic)
 - Transport emissions (2 NR, 1 academ)
- **Further development of models** like RAINS and MERLIN (1 NR)
- **Cost-benefit analysis**, including further development of the EGTEI cost database (1 NR)
- **On low-coal economies**: use of non-coal fuels, demand-side management, energy savings (EP)
- **Formation of POPs** during combustion processes including combustion of waste (2 NR)

4.6. Results from Question 3.6

“For which of the above mentioned measures do you think that local/national actions are more appropriate than EU-level action?”

Box. 11. Summary of Responses to Question 3.6.

- Economic instruments were suggested as more appropriate for local/national level.
- It was also commented that the EU legislation must be designed in such a way that those MS that want to go further the EU requirement would be able to do so.

Economic instruments were suggested as more appropriate for local/national level. Examples were given on :

- National subsidies, e.g. fiscal incentives to introduce new emission standards for mobile sources earlier than required,
- Funding and economic incentives for innovative clean technology (before it might become EU law)
- Various charges and fees. It was noted, however, that there would be benefits from having a harmonised EU system, even if the charges themselves were set locally.
- Taxation of fuels. However, this could cause problems at boundaries if only national level taxes were used. It was noted that motorists from Northern Ireland come across the border now to buy petrol in Ireland, whereas ten years ago they went the other way.

It was commented by several respondents that the EU legislation must be designed in a way that would allow those Member States that want to go further than the EU requirement to do so. It was also mentioned that actions at the local level are very important, but ironically the local decision-makers are the hardest to convince. The EU could give inspiration to local decision-makers.

5. CONCLUSIONS FROM STAKEHOLDER SURVEY

The aim of the Task 3.3 survey was to gather the informal views and opinions of a cross-section of government officials, academic experts, business associations, environmental NGOs and other stakeholders throughout the enlarged EU who are involved in the development of European policies and legislation on air quality. Efforts were made to achieve a balance among the different types of stakeholders.

While some of the questions asked for specific responses that could be tabulated, other questions were more open-ended and aimed at gathering individualised views about directions in which EU air quality policy could go in the future. It should be emphasized that this was not a scientific poll. The respondents were asked to give their personal views, rather than the official views of their government or organisation.

Given the range of stakeholders who participated in the survey, and the fact that we specifically requested stakeholders' personal views, it is hardly surprising that the responses also had considerable range. We have tried to reflect this in the report. Many good suggestions were made by the individuals who provided their views in this survey, and we have tried to incorporate them fairly into the report. Because of the range of responses and the inherent subjectivity of the exercise, it is somewhat difficult to draw conclusions. However, some commonalities can be identified.

EU air quality legislation has contributed significantly to improving air quality. For example, it was significant that virtually all respondents believed that EU air quality legislation has had a significant impact on improving air quality and reducing emissions and effects in all Member States. All types of air-quality related measures were evaluated as effective and were considered at least somewhat well enforced, with stationary source controls considered better enforced than controls over mobile sources.

Only the NEC Directive was considered too recent to be able to analyse for effectiveness and enforceability. However, some interviewees identified a need to link it more closely to other EU environmental protection objectives, including Member State efforts to reach the air quality goals set under the Air Quality Framework Directive goals, and the EU commitments under the Kyoto Protocol.

Gaps remain in EU air quality legislation. Nonetheless, a number of sources and pollutants are considered not yet adequately covered by EU legislation, including small combustion facilities; ammonia from agriculture; heavy metals, dioxins and POPs; and odours.

Shipping and aviation emissions were particularly mentioned as among the last major sources of emissions still not regulated under EU law. Because of international competitiveness concerns, it was recognised that international action through the IMO or ICAO was needed, and some respondents thought that the EU should take a more aggressive leadership role in these fora towards that end.

More strategic approach needed for mobile sources. All stakeholders considered the Euro-standards for cars and fuel quality standards to have been very effective, but they noted that the gains had consistently been offset by increases in motor vehicle traffic. Several stakeholders called for a more strategic approach on the part of the EU in order to better integrate sustainable development principles into EU transport policy in general. For example, several respondents mentioned the need for incentives to reverse the current trend to use road rather than rail for shipping on land.

On a more concrete level, respondents considered there to be a particular need for more stringent measures to combat pollution from diesel-fueled vehicles. The "dieselisation" of the EU car fleet was

Assessment of the Effectiveness of European Air Quality Policies and Measures

A project for DG Environment carried out by Milieu Ltd, the Danish National Environmental Research Institute, and the Center for Clean Air Policy

seen in fact as an instance of a policy decision being taken to meet the environmental goal of combating climate change, but which ended up exacerbating the environmental goal of reducing particulates in ambient air. Stricter diesel fuel standards (<10 ppm for sulphur) were supported to enable use of cleaner technologies, and it was suggested that the timetable for requiring these should be speeded up. There was also broad support for more effective inspection systems aimed at higher polluting vehicles.

Support for more use of economic instruments, but mostly on national level. There was great interest in more extensive use of economic instruments across a range of stakeholders and particularly with respect to charges and fees.

A system of road fees, particularly for heavy duty and light duty vehicles, was suggested by several interviewees. The Swiss system of road charging was considered particularly interesting, with London's system of road charges also noted as a good model. This use of charging was considered best applied at national or local level. It was suggested that the EU could facilitate this by setting in place a common legal framework for road use charges at EU level, while letting the Member States decide how much to charge.

Charges at EU-level were, however, considered appropriate for addressing emissions from shipping and aviation, perhaps via taxation on air tickets and aviation fuel. The Swedish use of differentiated port fees was mentioned several times.

There was also interest in various applications of emissions trading, through some respondents were uncertain about how it would work for emissions of air pollutants, given all of the requirements and restrictions that were already in place at EU and national level. More than one respondent mentioned the possibility of emissions trading among mobile sources, including ships.

More monitoring of health effects from air pollution desirable. Finally, respondents considered the current structure for air quality monitoring to generally be adequate. However, many respondents noted a particular need for better monitoring of health effects and particularly in relation to PM_{2.5}.

APPENDIX 1

LIST OF STAKEHOLDERS

LIST OF STAKEHOLDERS TO WHOM QUESTIONNAIRE SENT

Stakeholders in the European Commission and the European Environment Agency

1. Patrick Murphy, Directorate B, Head of Unit 1 “Water, the Marine and soil”, European Commission, DG ENV
2. Mr Prudencio Perera Manzanedo, European Commission, DG ENV, Director of Directorate B “Environment quality of natural resources”
3. Mr Herbert Aichinger, European Commission, DG ENV Directorate D, Head of Unit 3 “Industry and Implementation”
4. Mr Gernot Schnabl, European Commission, DG ENV Directorate G, Unit 2 “Industry”
5. Manfred Bergmann, European Commission, DG ECFIN
6. Ian Hodgson, European Commission, DG TREN
7. Dr Roel M van Aalst, European Environment Agency
8. Jimenez Beltran, Ex-director, EEA

Stakeholders in the European Parliament and Regional Committee

1. Caroline Jackson, European Parliament
2. Bernd Lange, European Parliament
3. Raquel Cardoso, European Parliament
4. Mr Paul Lannoye, MEP, European Parliament
5. Miss Hautala Hautala, Heidi Anneli, Ex-MEP from Finland, Finnish Parliament

National Representatives

1. Bob Nieuwejaers, (Belgium), Air Unit, Ministry of Flemish Community Sectieverantwoordelijke Lucht Ministerie van de Vlaamse Gemeenschap, Administratie Milieu-, Natuur-, Land- en Waterbeheer (AMINAL)
2. Angel Kostov, (Bulgaria), Ministry of Environment, Buglaria
3. Mr. Stanislav Bosak, (Czech Republic), Head of the Air Pollution Protection, Department of the Czech Environmental Inspectorate
4. Christos Malikkides (Cyrus) Head, Industrial Pollution Control and Air Quality Section Department of Labour Inspection, Apelli 12, 1480 Nicosia
5. Mr. Anders Carlsen (Denmark) Regional Medical Health Officer
6. Ulrik Torp (Denmark) Senior adviser Danish Environmental Protection Agency
7. Mr Margus Kört (Estonia) Environmental Research Centre
8. Mr Tarmo Pauklin (Estonia) Tallinn Transport and Environment Department
9. Mr Aare Sirendi (Estonia) Environmental Inspectorate
10. Ms Patricia Blanc (France) SGCI (Secrétariat général du Comité interministériel pour les questions de coopération économique européenne).
11. Mr Alain Morcheoine (France) Directeur (direction de l'air, du bruit et de l'efficacité énergétique) à l'ADEME (agence de l'environnement et de la maîtrise de l'énergie)
12. Per Mickwitz (Finland) Finnish Environment Institute (SYKE)
13. Alec Estlander (Finland) Finnish Environment Institute (SYKE)
14. Tarja Koskentalo (Finland) Head of Air Quality Research, Helsinki Metropolitan Area Council
15. Prof. Dr. Dieter Jost (Germany) Federal Environmental Agency
16. Mr. Endre Kovács (Hungary) Ministry for Environment and Water
17. Micheal Young (Ireland) Department of Environment, Heritage & Local Government
18. Ciaran O'Donnell (Ireland) Environmental Protection Agency (competent authority for the AQFD)
19. Mr. Guido Lanzani (Italy) Arpa Lombardia
20. Ms. Giuliana Gasparini (Italy) Director - Ministry for the Environment and Territory - Department for Research, Environment and Development –Regional Conventions and Protocols - EU Directives and Regulations
21. Mika OhBayashi (Japan) Institute for Sustainable Energy Policies,

22. Taishi Sugiyama (Japan) Central Research Institute of Electric Power Industry,
23. Nobuhisa Naito (Japan) Chubu Electric Power Co
24. Armands Plate (Latvia) MEPRD
25. Mrs. Ruta Bubniene (Lithuania) Environmental Expert, Center for Environmental Policy
26. Sarah Blau (Luxembourg) Former EEB, Luxembourg Permanent Representation in Brussels
27. Mr. Erland Røsten (Norway) Norwegian Pollution Control Authority
28. Maria Klokocka (Poland)
29. Doc. Dusan Zavodsky (Slovakia) Slovak Hydrometeorological Institute
30. Mr. Franci Posel (Slovenia) Institute for Environment Maribor
31. Peter Straehl (Switzerland) Swiss Agency for the Environment
32. Lars Lindau (Sweden) Swedish Environmental Protection Agency (Naturvårdsverket)
33. Ms Tilly Zwartepoorte (Netherlands) Director of the Directorate Climate Change and Industry of our ministry
34. Dr Martin Williams (United Kingdom) US Environmental Protection Agency
35. Brian McLean (United States) US Environmental Protection Agency
36. Dallas Burtraw (United States) Resources for the Future
37. Jim Boyd (United States) California Energy Commission
38. Tom Cackette (United States) California Air Resources Board
39. Allan Lloyd (United States) California Air Resources Board

NGOs

1. Duncan Lanxen, BEE
2. Christer Ågren, Swedish NGO Secretariat on Acid Rain
3. Jan Fransen, Stichting Natuur en Milieu
4. Paal Frisvold, Bellona Europa
5. Tim Williamson, NSCA
6. Magnus Nilsson, Swedish Society for Nature Conservation, Sweden
7. Fransisco Ferreira, Quercus
8. Per Kågeson, Former T&E
9. Christian Hey, Formerly at EEB, now Rat von Sachverständigen für Umweltfragen (SRU)
10. Fraser Goodwin, former T&E, now ETSC

Industry

1. Jean-Guy Bartaire, Electricite De France
2. Keith Harsham, Senior Environmental Adviser, BP International Ltd
3. Dr Suzie Baverstock, Regional Director HSSE for Europe at BP
4. Stefan Larson, Regulatory Projects at ACEA (Association des Constructeurs Europeens d'Automobiles)
5. Peter Tjan Secretary General, EUROPIA
6. Johannes Drielsma, Toyota

Local Representatives

1. Mrs Annick Meurrens, Brussels Institute for Management of the Environment
2. Martin Lutz, Senatsverwaltung für Stadtentwicklung (Senate Department of Urban Development)
3. Maurizio Tomassini Roma Societa Trasporti Automobilistici S.p.A (STA)
4. Mr. Nicos Manalis, Head of the Air Quality Department at the EARTH (National Monitoring Network of Air and Noise) of the Ministry for Public Works and the Environment, Athens
5. Maria Kazmukova Prague URM- útvar rozvoje hlavního města Prahy City Development Authority of Prague

Universities

1. Thomas STERNER Department of Economics Göteborg University
2. Rainer FRIEDRICH IER University of Stuttgart
3. Ranjeet SOKTHI Department of Environmental Science, University of Hertfordshire
4. Prof Alfred Bernard toxicologist, University of Louvain

5. Tanja A. Börzel Humboldt University Berlin

Others

1. Jorgen Schneider Air Quality and Health (AIQ) WHO European Centre for Environment and Health
2. Michal KRZYZANOWSKI Air Quality and Health (AIQ) WHO European Centre for Environment and Health,
3. Richard BALLAMAN Swiss Agency for the Environment, Forest and Landscape Air Pollution Control Division
4. Keith BULL UNECE

APPENDIX 2

QUESTIONNAIRE FOR EUROPEAN STAKEHOLDERS

Questionnaire for Informal Survey of Key Stakeholders

Country	
Person answering questionnaire	
Organisation / Company	
Position	
Daytime telephone number	

Type of stakeholder (check one) : ___ Government official (national)
 ___ Government official (local)
 ___ Academic/scientific expert
 ___ Business sector
 ___ Environmental NGO
 ___ Other _____

Note: This questionnaire is part of an effort to evaluate the effectiveness of various air quality policies and measures already in place in Europe and in other countries around the world, with a view to gathering background information for DG Environment's work of developing the Thematic Strategy on Air Pollution. It is being sent to some 60 government officials, academic experts, business associations, environmental NGOs and other stakeholders throughout the enlarged EU who are involved in the development of European policies and legislation on air quality.

We are seeking your **personal views**, rather than the official views of your government or organisation, and we would like to hear from each of you in order to ensure that all relevant points of view are taken into account. Your individual answers will be held confidential. They will be compiled together with the views of the other stakeholders, to form the basis of a report to DG Environment, a copy of which will also be sent to you.

The questionnaire itself is in four parts. The first part looks at the **impact** of various EU policies and measures on air quality, while the second part aims to evaluate the **adequacy** of current EU policies and measures. The third part seeks opinions concerning **various additional measures** that might be considered for the EU in the future, and the fourth part looks at **stakeholder involvement** in the development, adoption and implementation of EU air quality policies and measures. Some of the questions are designed to gather views via structured answers, while other questions are more open-ended. You can enter your answers electronically, or on paper.

Please be sure to provide a **daytime telephone number** for yourself since after you have completed the questionnaire, we will be contacting you by telephone to interview you directly concerning your answers.

Please return the questionnaire with your answers by email to s.scott@milieu.be or by fax marked for attention of Sonia Scott on fax number +32 2 514 3603, by 23 April 2004. You may also contact Milieu by phone at +32 2 514 3601, if you have any questions you would like to discuss directly.

Thank you for your assistance with this survey. We will send you the project report on the results.

Milieu Ltd (March 2004)

Assessment of the Effectiveness of European Air Quality Policies and Measures

A project for DG Environment carried out by Milieu Ltd, the Danish National Environmental Research Institute, and the Center for Clean Air Policy

1 Impact of EU legislation on air quality

The questions in this first section aim to gather your opinion – on the basis of the evidence available to you -- about the **impact** of EU legislation related to air quality. If you are a stakeholder primarily involved with issues concerning national or local air quality, you are asked to answer the questions from the perspective of your own country. If you are a stakeholder primarily involved with EU-level issues concerning air quality, please answer for the EU as a whole.

Please indicate whether you are answering : ___ From the perspective of your country or
 ___ For the EU as a whole

1.1 What would have been the situation today (2004) with respect to ambient air quality, effects from air pollution and emissions to air **without** the EU-level legislation that has been put into place between 1980 and 2000? (*For Acceding Countries, what impact is the EU legislation expected to have in the future?*) Please select one box per row.

<i>Ambient air quality (by pollutant)</i>	Much higher ambient levels	Somewhat higher levels	No differ- ence	Somewhat lower levels	Much lower ambient levels
SO ₂					
NO _x					
PM ₁₀					
PM _{2.5}					
Ground level ozone					
Other pollutant (please name)					
<i>Effects from air pollution</i>	Much better	Somewhat better	No differ- ence	Somewhat worse	Much worse
Human health					
Acidification					
Eutrophication					
Damage to bldgs & cult'l heritage					
Other effects (please name)					
<i>Emissions to air</i>	Much lower	Somewhat lower	No differ- ence	Somewhat higher	Much higher
Stationary industrial sources					
Stationary non-industrial sources					
Road mobile sources					
Non-road mobile sources					
Other sources (please name)					

What were the key EU-level measures that drove decreases in specific air pollutants and effects?
Were there any other factors that led to air quality improvements? Please explain: _____

Assessment of the Effectiveness of European Air Quality Policies and Measures

A project for DG Environment carried out by Milieu Ltd, the Danish National Environmental Research Institute, and the Center for Clean Air Policy

1.2 Please note in the following table, on the basis of the evidence available to you, your assessment of the **effectiveness** of each EU measure in **achieving the specific air quality goal** for that column. Please rank from 1 to 4, using the following scale:

- 1 = very effective
- 2 = somewhat effective
- 3 = not very effective
- 4 = totally ineffective

Then, using the last column, rank each EU measure in terms of its **cost-effectiveness**, *i.e.*, the benefits received in relation to the overall costs of complying with the measure. Again, please rank from 1 to 4:

- 1 = very cost-effective
- 2 = somewhat cost-effective
- 3 = not very cost-effective
- 4 = not at all cost-ineffective (zero benefits received in relation to cost)

Measure / EU legal reference	Effectiveness (rank 1 - 4)						Benefits achieved in relation to cost (rank 1-4)
	Improve ambient air quality	Reduce emissions to air	Reduce impacts on human health	Reduce acidificat'n eutrophic'n	Reduce ozone formation	Reduce other effects	
<i>Air quality standards, planning, monitoring</i>							
AQ limit values (80/779, 96/62, 99/30, etc.)							
Plans & programmes (80/779, 96/62)							
Requirements for designation of zones (96/62)							
Harmonised monitoring procedures (80/779, 92/72)							
Other (please name)							
<i>National emission ceilings & reduction plans</i>							
Emission inventories (2001/81)							
National emission reduction plans (2001/81)							
Other (please name)							
<i>Emission standards for stationary sources</i>							
Large combustion plants (88/609, 2001/80)							
VOC's evaporation losses petrol stations (94/63)							
Incineration (89/369, 94/67, 2000/76)							
Large industrial plants (89/369), IPPC (96/61)							
Solvents (1999/13)							
Other (please name)							
<i>Product standards to control mobile sources</i>							
EURO standards for cars (70/220, as amended)							
EURO standards heavy duty vehicles (72/306, as amended)							
Roadworthiness testing (96/96)							
EURO standards for non road machinery (97/68)							
EURO standards for 2/3 wheeled vehicles (97/24)							
Quality of petrol & diesel fuels (98/70, 99/32)							
Other (please name)							

Please explain _____
 _____ [continued next page]

Assessment of the Effectiveness of European Air Quality Policies and Measures

A project for DG Environment carried out by Milieu Ltd, the Danish National Environmental Research Institute, and the Center for Clean Air Policy

1.3 In the table below, please note the main problems (limitations), if any, with respect to any of the EU-level measures named in the previous table.

Then, in the third column, please note what have been the main reasons for the measure's ineffectiveness, *e.g.*, inappropriateness of the measure, overly high cost of compliance, insufficient monitoring and reporting requirements, etc.

Measure	Main problems (limitations)	Reason
1.		
2.		
3.		
4.		
5.		

Please explain _____

1.4 On the basis of the evidence available to you, please indicate how well the following groups of measures are enforced (in your country) (at EU level).

AQ-related measures	Well enforced	Somewhat enforced	Not at all enforced	No opinion
Ambient AQ standards				
National emissions ceilings				
Stationary source emission controls				
Product-related standards				
Information requirements				

If a measure is not properly enforced, what are the main reasons? *E.g.*, no clear responsible parties, lack of administrative capacity.

Assessment of the Effectiveness of European Air Quality Policies and Measures

A project for DG Environment carried out by Milieu Ltd, the Danish National Environmental Research Institute, and the Center for Clean Air Policy

2. Adequacy of Community-level measures with respect to air quality protection

The questions in this section are aimed at assessing whether current EC legislation related to air quality is **adequate** for addressing air quality problems throughout the Community.

2.1 Does current EC legislation address all of the relevant air quality concerns (for your country) (at EU level)?

- Yes
 No

Please explain _____

2.2 Please note any suggestions that you may have concerning how a particular EU-level measure might be improved.

2.3 (For country-level stakeholders) With respect to the measures named in the table for question 1.2, were national measures in any of these areas already in place before the EU-level measure was adopted? Are (were) the national measure more or less stringent than the EU-level measure?

Please explain _____

2.4 If a national measure is more stringent than current EU legislation, what motivated this more stringent national measure?

Please explain _____

Assessment of the Effectiveness of European Air Quality Policies and Measures

A project for DG Environment carried out by Milieu Ltd, the Danish National Environmental Research Institute, and the Center for Clean Air Policy

2.5 Are EU monitoring and reporting requirements adequate for tracking the following pollutants, emission sources, and effects?

Emissions / effects	Adequate	Not adequate	Please explain
<i>Pollutant</i>			
SO ₂			
NO _x			
PM ₁₀			
PM _{2.5}			
Ground level ozone			
VOCs			
Other (please name)			
<i>Emissions</i>			
Stationary industrial sources			
Stationary non-industrial sources			
Road mobile sources			
Non-road mobile sources			
Other sources (please name)			
<i>Effects</i>			
Human health			
Acidification			
Eutrophication			
Damage to bldgs & cult'l heritage			
Other effects (please name)			

3. Additional measures which might be considered for future EU action

3.1 Could you mention examples of noteworthy achievements with respect to air quality taken in your country or another country (including non-EU countries)? Please specify below.

Are there any lessons from these experiences that could be useful for future EU action?

Assessment of the Effectiveness of European Air Quality Policies and Measures

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3.2 In your opinion, how effective would the following measures for addressing various factors related to AQ protection be, if applied within the EU? Please use the last column to indicate the priority for the EU of each measure, using a scale of 1 (very high priority) to 4 (lowest priority).

Measures to consider for possible EU action	Very effective	Somewhat effective	Not effective	No opinion	Priority for EU
Revise or impose new AQ standards to better protect health / environment (please specify pollutant(s) _____)					
Imposition & harmonisation of system for monitoring effects of air pollution on health, environment, etc.					
Better correspondence between climate change & AQ policies, reporting & planning					
New & more stringent national ceilings under the NEC Directive for additional pollutants (please specify pollutant(s) _____)					
Better coordination of short-term actions by MS in cases of regional (transboundary) exceedances					
Require progressive financial responsibility from emitters					
Other (please name)					

3.3 Are there any additional **product standards** needed at EU level in order to reduce emissions? If so, please list in order of priority.

Are there any other **sources of emissions** for which new or more stringent EU controls are needed (e.g., agriculture, aviation, road transport in general)? If so, please list in order of priority.

<i>Additional product standards needed</i>	<i>Other sources of emissions needing controls</i>
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.
7.	7.
8.	8.

Please explain _____

Assessment of the Effectiveness of European Air Quality Policies and Measures

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3.4 Should additional use of economic instruments to achieve air quality objectives be considered to control emissions from various sectors? Please indicate below if a particular type of economic instrument should be considered with respect to a particular economic sector and, if so, whether at national or EU level.

Type of instrument	Sectors (provide numbers from list below)	EU level	National level
Charges & fees			
Taxes			
National subsidies, e.g., fiscal incentives			
EU-level subsidies, e.g., structural funding			
Emissions trading			
Others			

- | | |
|---|---|
| <ul style="list-style-type: none"> 1. Road transport 2. Other mobile sources 3. Combustion – large installations 4. Combustion – small installations 5. Industry | <ul style="list-style-type: none"> 6. Agriculture 7. Solvents & other product use 8. Aviation 9. Ships 10. Other (please name) _____ |
|---|---|

Please explain _____

3.5 Are increased research efforts related to air quality protection required at European level?
 Yes
 No

If yes, please indicate in which fields:

- 1. _____
- 2. _____
- 3. _____

3.6 For which of the above mentioned measures do you think that local/national actions are more appropriate than EU-level action? Please explain.

Assessment of the Effectiveness of European Air Quality Policies and Measures

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4.0 Stakeholder involvement and transparency

4.1 Do you think that enough has been done to make the public sufficiently aware of the air quality, air pollution and emissions information that is available?

- Yes
 No

Please explain _____

4.2 What are the main methods used in your country to provide information to the public on air quality, air pollution and on emissions? Please rank in order of importance.

Information Source	Rank (in order of importance)
Official website pages linked to Ministry of Environment or Environment Protection Agency, giving air quality info	
Phone numbers (free or paying)	
Teletext (i.e. information pages on TV)	
National forecasts (on television or radio)	
Regional forecasts (on television or radio)	
Alert messages (on radio, television and in the press)	
Any other forms of active dissemination (please list):	

4.3 Please assess the standard of information provided to the public on air quality and on emissions, by marking whether or not you agree with the following statements (✓):

	YES	NO
Information provided to the public is adequate		
Information provided to the public is clear (i.e. not obscurely presented)		
Information provided to the public is comprehensive (i.e. capable of being understood)		
Information provided to the public is accessible (i.e. easy to locate and/or retrieve information)		

If you answered no to any of the above, please give details of the deficiency _____

4.4 Should additional European measures be taken in order to increase access to information on emission, air quality and the effects of air pollution?

- Yes
 No

If yes, please explain what additional measures should be taken:

Assessment of the Effectiveness of European Air Quality Policies and Measures

A project for DG Environment carried out by Milieu Ltd, the Danish National Environmental Research Institute, and the Center for Clean Air Policy

4.5 In your opinion, have local authorities and other stakeholders been sufficiently consulted when existing European legislation relevant to air quality was developed?

Local authority	<input type="checkbox"/>	Yes	Other stakeholders	<input type="checkbox"/>	Yes
	<input type="checkbox"/>	No	(please name)	<input type="checkbox"/>	No

Please explain _____

If no, what could be done in order to increase the involvement of local authorities in the development of European actions?

What could be done in order to increase the involvement of other stakeholders (*e.g.*, business representatives, local citizens, environmental NGOs) in the development of European actions?

Finally, have you ever been involved in the **development of national, regional or local plans and programmes** to improve ambient air quality or reduce emissions?

Yes
 No

If no, please supply us (if possible) with the name of another person who has been involved in development of a plan or programme whom we could interview: _____

Similarly, have you ever been involved in **consultation of the public**, whether on the development of national air quality legislation or local, regional or national plans and programmes to improve air quality?

Yes
 No

If no, please supply us (if possible) with the name of another person who has been involved in the consultation of the public whom we could interview: _____

Please also provide references of any studies that have assessed the contribution / limitation of EU and national legislation and that you have found particularly useful.

APPENDIX 3

QUESTIONNAIRE FOR STAKEHOLDERS IN USA, JAPAN & SWITZERLAND

Assessment of the Effectiveness of European Air Quality Policies and Measures

A project for DG Environment carried out by Milieu Ltd, the Danish National Environmental Research Institute, and the Center for Clean Air Policy

Questionnaire for Informal Survey of Key Stakeholders

Country	
Person answering questionnaire	
Organisation / Company	
Position	
Daytime telephone number	

Type of stakeholder (check one) : ___ Government official (national)
 ___ Government official (local)
 ___ Academic/scientific expert
 ___ Business sector
 ___ Environmental NGO
 ___ Other _____

Note: This questionnaire is part of an effort to evaluate the effectiveness of various air quality policies and measures already in place in Europe and in other countries around the world, with a view to gathering background information for the European Commissions' DG Environment's work of developing the Thematic Strategy on Air Pollution. It is being sent to some 60 government officials, academic experts, business associations, environmental NGOs and other stakeholders throughout the enlarged EU and other countries who are involved in the development of policies and legislation on air quality.

We are seeking your **personal views**, rather than the official views of your government or organisation, and we would like to hear from each of you in order to ensure that all relevant points of view are taken into account. Your individual answers will be held confidential. They will be compiled together with the views of the other stakeholders, to form the basis of a report to DG Environment, a copy of which will also be sent to you.

The questionnaire itself is in three parts. The first part looks at the **impact** of various policies and measures in your country on air quality. The second part seeks opinions concerning **various measures** that are applied in your country and might be considered for the EU in the future, and the third part looks at **stakeholder involvement** in the development, adoption and implementation of air quality policies and measures. Some of the questions are designed to gather views via structured answers, while other questions are more open-ended. You can enter your answers electronically, or on paper.

Please be sure to provide a **daytime telephone number** for yourself since after you have completed the questionnaire, we will be contacting you by telephone to interview you directly concerning your answers.

Please return the questionnaire with your answers by email to s.scott@milieu.be or by fax marked for attention of Sonia Scott on fax number +32 2 514 3603, by 30 April 2004. You may also contact Milieu by phone at +32 2 514 3601, if you have any questions you would like to discuss directly.

Thank you for your assistance with this survey. We will send you the project report on the results.

Milieu Ltd (March 2004)

Assessment of the Effectiveness of European Air Quality Policies and Measures

A project for DG Environment carried out by Milieu Ltd, the Danish National Environmental Research Institute, and the Center for Clean Air Policy

1 Impact of legislation on air quality in your country

The questions in this first section aim to gather your opinion – on the basis of the evidence available to you -- about the **impact** of the legislation related to air quality in your country. Please answer the questions from the perspective of your own country.

1.1 What were the key measures that drove (led to) improvements in ambient air quality and effects from air pollution and emissions in your country?

a) *Acidification, eutrophication (SO₂, NO_x, NH₃, CO)*

Please list and describe the measures that were the most effective in your country for abating acidification and eutrophication (e.g., ambient air quality standards, emission standards, etc., including stationary and mobile sources, and product standards):

b) *Ground level ozone (NO_x, VOCs)*

Please describe the measures that were the most effective in controlling NO_x and VOCs emissions (e.g., ambient air quality standards, emission standards, etc., including stationary and mobile sources, and product standards):

c) *PM (PM₁₀ and PM_{2,5})*

Please describe the measures that were the most effective in controlling PM (e.g., ambient air quality standards, emission standards, etc., including stationary and mobile sources, and product standards):

d) *Other pollutants (e.g., asbestos, mercury)*

Please describe the measures that were the most effective (e.g., ambient air quality standards, emission standards, etc., including stationary and mobile sources, and product standards.)

Assessment of the Effectiveness of European Air Quality Policies and Measures

A project for DG Environment carried out by Milieu Ltd, the Danish National Environmental Research Institute, and the Center for Clean Air Policy

1.2 What measures are the most effective in your country for controlling emissions from the following sources:

<i>Emissions to air</i>	List the most effective measures that address emissions from the following sources
Stationary industrial sources	
Stationary non-industrial sources	
Road mobile sources	
Non-road mobile sources	
Other sources (please name)	

1.3 Please note in the following table, on the basis of the evidence available to you, your assessment of the **effectiveness** of each key measure that is applied in your country in **achieving the specific air quality goal**. Please rank from 1 to 4, using the following scale:

- 1 = very effective
- 2 = somewhat effective
- 3 = not very effective
- 4 = totally ineffective

Then, using the last column, rank each measure in terms of its **cost-effectiveness**, *i.e.*, the benefits received in relation to the overall costs of complying with the measure. Again, please rank from 1 to 4:

- 1 = very cost-effective
- 2 = somewhat cost-effective
- 3 = not very cost-effective
- 4 = not at all cost-ineffective (zero benefits received in relation to cost)

Assessment of the Effectiveness of European Air Quality Policies and Measures

A project for DG Environment carried out by Milieu Ltd, the Danish National Environmental Research Institute, and the Center for Clean Air Policy

Measure	Effectiveness (rank 1 - 4)						Benefits achieved in relation to cost (rank 1-4)
	Improve ambient air quality	Reduce emissions to air	Reduce impacts on human health	Reduce acidification eutrophication	Reduce ozone formation	Reduce other effects	
<i>Air quality standards, programmes, monitoring</i>							
Ambient air quality limit values							
Plans & programmes (e.g., state, prefecture, or local)							
Requirements for designation of zones (e.g., non-attainment areas)							
Harmonised monitoring procedures							
Other (please name)							
<i>National emission targets & reduction plans</i>							
Emission inventories							
National emission reduction plans							
Other (please name)							
<i>Emission standards for stationary sources</i>							
For power plants							
Incineration							
Large industrial plants							
Other (please name)							
<i>Product standards to control mobile sources</i>							
Standards for cars							
Standards heavy duty vehicles							
Roadworthiness testing							
Standards for non road vehicles							
Standards for 2/3 wheeled vehicles							
Quality of gasoline & diesel fuels							
Other (please name)							

Please explain _____

1.4 In the table below, please note the main problems (limitations), if any, with respect to any of the measures named in the previous table.

Then, in the third column, please note what have been the main reasons for the measure's ineffectiveness, e.g., inappropriateness of the measure, overly high cost of compliance, insufficient monitoring and reporting requirements, etc.

Measure	Main problems (limitations)	Reason
1.		
2.		
3.		

Assessment of the Effectiveness of European Air Quality Policies and Measures

A project for DG Environment carried out by Milieu Ltd, the Danish National Environmental Research Institute, and the Center for Clean Air Policy

4.		
5.		

Please explain _____

1.5 On the basis of the evidence available to you, please indicate how well the following groups of measures are enforced in your country.

AQ-related measures	Well enforced	Somewhat enforced	Not at all enforced	No opinion
Ambient AQ standards				
National emissions limits				
Stationary source emission controls				
Product-related standards (e.g., fuel content)				
Information requirements				

If a measure is not properly enforced, what are the main reasons? *E.g.*, no clear responsible parties, lack of administrative capacity.

1.6 Have international instruments and agreements affected national policies and the choice of instruments/measures in your country and, if so, how?

2. Additional measures which might be considered for future EU action

2.1 Could you mention examples of noteworthy achievements with respect to air quality taken in your country or another country (including non-EU countries)? Please specify below.

Assessment of the Effectiveness of European Air Quality Policies and Measures

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Are there any lessons from these experiences that could be useful for future EU action?

2.2. In your opinion, how effective are the following measures for addressing various factors related to AQ protection?

Measures to consider	Very effective	Somewhat effective	Not effective	No opinion
Revise or impose new ambient AQ standards to better protect health / environment (please specify pollutant(s) _____)				
Imposition & harmonisation of system for monitoring effects of air pollution on health, environment, etc.				
Better correspondence between climate change & AQ policies, reporting & planning				
New & more stringent national limits for additional pollutants (please specify pollutant(s) _____)				
Require progressive financial responsibility from emitters				
Other (please name)				

Assessment of the Effectiveness of European Air Quality Policies and Measures

A project for DG Environment carried out by Milieu Ltd, the Danish National Environmental Research Institute, and the Center for Clean Air Policy

2.3 What are the categories of **products** for which standards or action are applied in your country?
Please list in order of priority.

What are the categories of **sources of emissions** for which standards or action are applied in your country? Please list in order of priority.

Product	Source of Emission
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.
7.	7.
8.	8.

Please explain _____

2.4 Please list economic instruments that are used in your country to achieve air quality objectives.
Should additional use of economic instruments to achieve air quality objectives be considered to control emissions from various sectors? Please list below the instruments that are already in use and in a separate category your suggestions for additional use of economic instruments.

Type of instrument	Sectors (provide numbers from list below)	National level	Regional or local level
Charges & fees			
Taxes			
National subsidies, e.g., fiscal incentives			
Emissions trading			
Others			
<i>Your suggestions</i>			
<i>Type of instrument</i>	<i>Sectors and/or pollutants</i>	<i>Level of applicability (e.g., national)</i>	

- | | |
|---|---|
| <ul style="list-style-type: none"> 1. Road transport 2. Other mobile sources 3. Combustion – large installations 4. Combustion – small installations 5. Industry | <ul style="list-style-type: none"> 6. Agriculture 7. Solvents & other product use 8. Aviation 9. Ships 10. Other (please name) _____ |
|---|---|

Assessment of the Effectiveness of European Air Quality Policies and Measures

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Please explain _____

2.5 Are increased research efforts related to air quality protection required?

- Yes
 No

If yes, please indicate in which fields:

1. _____
 2. _____
 3. _____

3. Stakeholder involvement and transparency

3.1 What are the main methods used in your country to provide information to the public on air quality, air pollution and on emissions? Please rank in order of importance.

Information Source	Rank (in order of importance)
Official website pages linked to Ministry of Environment or Environment Protection Agency, giving air quality info	
Phone numbers (free or paying)	
Teletext (i.e. information pages on TV)	
National forecasts (on television or radio)	
Regional forecasts (on television or radio)	
Alert messages (on radio, television and in the press)	
Any other forms of active dissemination (please list):	

Finally, if you have ever been involved in the development of national, regional or local plans and programmes to improve ambient air quality or reduce emissions, we would like to interview you to learn more about your views on how effective such plans and programmes have been.

- Yes, I have been involved in development of air quality plans and programmes.
 No, I have not been involved development of air quality plans and programmes.

If no, please supply us (if possible) with the name of another person who has been involved in development of a plan or programme whom we could interview:

Assessment of the Effectiveness of European Air Quality Policies and Measures

A project for DG Environment carried out by Milieu Ltd, the Danish National Environmental Research Institute, and the Center for Clean Air Policy

Please provide references of any studies that have assessed the contribution / limitation of national legislation that you have found particularly useful.
