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**POLICY INSTRUMENTS TO REDUCE AIR POLLUTION**

Summary report on the workshop of the Network of Experts on Benefits and Economic Instruments (NEBEI), prepared by the rapporteur in collaboration with the secretariat

**Introduction**

1. The European Community hosted the third workshop of the Network of Experts on Benefits and Economic Instruments (NEBEI). This workshop, which focused on policy instruments to reduce air pollution, was held in Brussels on 11 and 12 November 2004. The papers and presentations can be found on the Internet at <http://www.unece.org/env/nebei> and at [http://europa.eu.int/comm/environment/air/nebei\\_workshop/index.htm](http://europa.eu.int/comm/environment/air/nebei_workshop/index.htm)
2. The main purpose of the workshop was to: (a) bring together the most recent research findings from practical applications of economic and other instruments to reduce air pollution in the European Union (EU) and UNECE countries; (b) give policy guidance to the finalization of the European Commission's Thematic Strategy on Air Pollution; and (c) provide input for the review of the 1999 Gothenburg Protocol that will start, following decision by the Parties, after entry into force of the Protocol.

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3. Experts from Austria, Belgium, Czech Republic, Denmark, the European Community (EC), Finland, France, Germany, Ireland, Italy, the Netherlands, Norway, Portugal, Romania, Slovakia, Spain, Sweden, Switzerland, the United Kingdom and the United States attended the workshop. Representatives of the Organization for Economic Cooperation and Development (OECD), the European Environment Agency (EEA), non-governmental organizations and industry also attended. The UNECE secretariat was represented.

4. Mr. S. Navrud (Norway), rapporteur of NEBEI, and Mr. M. Vainio (EC) co-chaired the workshop.

5. In his opening address the Director General of the European Commission's Directorate General for Environment, Ms. Catherine Day, stressed the importance of practical applications of policy instruments and of translating theory into political, economic, social and environmental reality. The workshop agreed to: (a) give evidence with regard to a change of approach in decreasing the emissions of sulphur dioxide and nitrogen oxides in Europe, whether taxes or charges would be politically acceptable alternatives; (b) and to give advice on whether national regional or European Union (EU)-wide emissions trading would be a better alternative for land and sea areas.

6. Professor Frank Convery (University College Dublin), President of the European Association of Environmental and Resource Economists (EAERE; [www.eaere.org](http://www.eaere.org)) presented a list of criteria for success and failure of policy instruments.

## I. SUMMARY OF MAJOR DISCUSSION POINTS

### A. Regulatory instruments

7. Mr. Peter Gammeltoft (European Commission) presented lessons learned from regulatory measures in different sectors to reduce air pollution within the EU. He concluded that for new measures both regulatory and market-based instruments should be considered. The workshop agreed there needed to be more cross-fertilisation between traditional regulatory approaches and market-based instruments to reduce efficiency losses inherent in both types of instruments under real conditions. It was noted EU regulations mainly addressed large-scale industries but some felt the EU needed to go further and regulate the small and medium-size enterprise (SME) segment.

8. Richard Morgenstern (Resources for the Future - RfF) presented the main results from a comparison of different regulatory and market-based approaches to the same environmental problem for six pairs of case studies in the United States and Europe (*Choosing Environmental Policy: Comparing Instruments and Outcomes in the United States and Europe*). The studies

showed that both market-based instruments and direct regulation had worked, and that a mix of both types of instrument was more realistic than either one alone.

### **B. Voluntary instruments**

9. Experts from the Netherlands and the European Commission described the potential role of voluntary instruments in achieving air pollution reduction targets.

10. Experience in the Netherlands with “negotiated agreements” (“covenants”) with industry seemed largely positive. The agreements covered over 80% of total industrial pollution (a declining trend indicated the efficiency of the instrument). As far as success criteria for environmental agreements were concerned, experience gained in the Netherlands largely confirmed the assessment at the EC level. The workshop noted the need for robust and measurable objectives and clear rules for monitoring and reporting. Representativeness as well as regulatory threat appeared to be key criteria for agreements at all levels. For agreements at EC level, legal constraints resulting from the EC Treaty as well as institutional aspects were of equal importance. In the field of voluntary programmes, the EC Eco-label Award Scheme allowed for interesting cuts in air pollution, depending on the market penetration of labelled products.

11. The workshop concluded that, in general, voluntary instruments might play a role in combating air pollution. They were unlikely, however, to be the key element.

### **C. Market-based instruments**

12. It was noted that recent market-based instruments used by EU Member States were more varied and increasingly used in combination (policy packages). They were affected by different sets of community rules such as taxes, state aid, emission trading, and internal market. Further steps included monitoring and assessment of the EU greenhouse gas Emission Trading Scheme (ETS) which comes into effect in 2005; a new proposal to avoid double burden by industries hit by both taxation and ETS; a proposal on the greening of car taxation; a review of the State aid guidelines, and reform of environmentally harmful subsidies (based on work by OECD).

13. Preliminary results from an EEA report, available in early 2005, on the use of market-based instruments in the EU-25 and other European countries were presented, followed by the joint OECD and EEA database on market-based instruments and voluntary approaches in 42 countries. The workshop noted that environmental taxes, tax bases and applications were spreading steadily across Europe, but there were very few attempts to base tax rates on externalities. Notable exceptions included the landfill tax and aggregate tax in the UK, and the Swiss heavy vehicle charging scheme (see presentation by Ueli Balmer). The workshop

recognized tax bases were now designed more closely to environmental problems. There was little evidence of damage from environmental taxes on competitiveness and tax design was important, e.g. recycling of revenues, exemptions and cuts in exchange for good performance. Environmentally harmful subsidies should be reduced as they reverse efficiency gains and stifle innovation.

14. Issues of particular concern to the new EU Member States were illustrated by case studies from the Czech Republic. The workshop noted that in these countries, institutional conditions, e.g. housing market regulations, car dependency, growing freight road transport and social problems, should be taken into account when choosing instruments. It was important to consider the distributional effects of market-based instruments.

#### **D. Market-based instruments – Taxes, charges and subsidies**

15. Six case studies on the application of environmental taxes, charges and subsidies were presented. The Swedish NO<sub>x</sub> charge on emissions from combustion plants for energy production (heat/electricity) had successfully reduced specific NO<sub>x</sub> emissions by 60% from 1990 to 2003 using a high charge of 4.400 euro/tonne and with 99% of the charges recycled back into industry, i.e. only 1% administrative costs. Sweden was considering increasing the charge level and making other sources liable to reduce emissions further.

16. Environmental taxes were one of the few alternatives available to Spanish regional authorities to increase funding, since regional taxes could not be levied on bases already taxed by central and local authorities. Central government, however, had attempted to block regional developments. The workshop noted that the Gallician tax on SO<sub>2</sub> and NO<sub>x</sub> emissions was zero for annual emissions below 1,000 tonnes and increased to 42 euro/tonne for emissions above 80,000 tonnes/year. Only 6 out of 317 companies paid charges, which questioned the effectiveness of this market-based instrument.

17. The workshop took note of existing market-based approaches to reduce SO<sub>2</sub> and NO<sub>x</sub> emissions from ships, including case studies of the tax on sulphur content of mineral oils and the differentiated tonnage tax in Norway, both applied to domestic vessels; the differentiated dues in other countries (Swedish Fairway Dues and Port Mariehamn in Finland); and the “Green Award” certificate, started in the port of Rotterdam, for which about 50 ports worldwide offered a 5% reduction in dues. However, experts recognized these differentiated dues did not account for the distance the vessel had travelled and the “greening of vessels” was not due to monetary incentives but rather to corporate image and customer demand.

18. Experiences from introducing the GBP 5 (7 euro) congestion charge in Central London in February 2003 were presented. The scheme aimed at reducing traffic delays by 10-20% and circulation in the charging zone by 15% . The workshop noted that the scheme had more than fulfilled its aims. It had led to a 12 % reduction in NO<sub>x</sub> and Particulate matter (PM<sub>10</sub>) emissions but the direct effects on ambient air quality were unlikely to be detectable in the short to medium term.

19. The workshop noted that the design of the Swiss heavy vehicle charging scheme was based on careful analysis of externalities. It had had positive impacts in terms of reduced mileage and emissions of NO<sub>x</sub>, PM<sub>10</sub> and CO<sub>2</sub>.

20. The workshop was provided with an overview of subsidies for cleaner transport. It concluded that subsidies could be defended when they supported technological change and that environmentally harmful subsidies should be reduced. A success story was the French natural gas buses, constituting 8% of the fleet and 30% of the market for new buses.

#### **E. Market-based instruments – Emission trading**

21. The experiences from the United States SO<sub>2</sub> and NO<sub>x</sub> ETS and the Netherlands NO<sub>x</sub> ETS were presented. The workshop noted that experience from the United States Cap and Trade Programmes on SO<sub>2</sub> and NO<sub>x</sub> showed trading was recommended for regional problems, measurable emissions, different abatement costs (i.e. where there was potential for gains from trade), sufficient numbers of emission sources and where there were institutions that could run the market. Government focus was important to (a) define the environmental objective; (b) ensure the integrity of the allowance, and (c) minimize administrative costs. Making the source responsible for meeting the environmental goal was a very important feature of the cap and trade regimes; therefore, responsibility for compliance shifted from the regulator to the sources.

22. The Netherlands planned to integrate trading in NO<sub>x</sub> and CO<sub>2</sub>, which respectively involved 250 and 350 industrial facilities larger than 20 MW. The workshop noted the main lessons learned from the Dutch experience were that involvement of national industry through comprehensive dialogue and large-scale demonstration projects were important. In addition, clarity of monitoring structure and requirements, and communicating strict enforcement were essential for success.

#### **F. Policy mixes**

23. The Danish experiences in combining quotas and taxes on SO<sub>2</sub> and NO<sub>x</sub> were presented. First environmental agreements on quotas for large combustion plants were negotiated in 1989. In

1996 an SO<sub>2</sub> tax speeded up the investment in abatement equipment, since the polluters could pay a reduced tax of 1.33 instead of 2.67 euro per kg SO<sub>2</sub>. The workshop noted the results of an OECD study of more than 4,000 facilities (with 50 employees or more) in all manufacturing sectors of seven OECD countries (Canada, France, Germany, Hungary, Japan, Norway and the United States), on the effectiveness of policy mixes in reducing emissions. The study had concluded that there were few cases in which single policy measures were actually applied. Thus, policy mixes were the rule rather than the exception and policy instruments were often introduced one after the other with little thought of potential interactions. The environmental effectiveness of the policy mixes depended on policy stringency and frequency of inspections. Performance standards were important and technical assistance with flexible instruments worked well. Subsidies did not have an effect on environmental effectiveness.

24. The lessons learned from the Swedish NO<sub>x</sub> tax were presented. The workshop noted that a very high tax coupled with a refund to the emitters had led to a rapid reduction in NO<sub>x</sub> emissions. The refund mechanism had made the tax high and thus large emission reductions (40%) were feasible.

25. The workshop recognized that emission trading imposed a price on emissions and thus provided an incentive for decentralized solutions that would be effective and inexpensive. Emission taxes could do the same, but only with compensation to the polluters as in the Swedish NO<sub>x</sub> tax case. The policy mix was seen as an evolution of policy instruments. It was agreed that there were five main reasons for the move towards tradeable permits: (a) more recent environmental problems were more subtle; (b) the more subtle nature of the problem made good information far more important and the potential for informational asymmetry bigger; (c) availability of enabling technology, i.e. monitoring and datahandling, that was not possible before; (d) easier and more effective implementation, since allowances in trading schemes made initial agreement easier; and (e) more faith in markets in general.

## II. CONCLUSIONS AND RECOMMENDATIONS

26. The workshop agreed on the following main conclusions:

(a) Both traditional direct regulation and market-based instruments had been applied successfully to reduce emissions of NO<sub>x</sub> and SO<sub>2</sub> in the past, and there were plans for the future. In practice, market-based instruments were often built on a legislative basis and were used together with direct regulation;

(b) Since market-based instruments were still in the pilot stage and were not applied routinely, experimentation with instruments and policy mixes should be encouraged. However,

more ex-post evaluations of the instruments currently used should be made;

(c) Several excellent programmes had been designed to reduce emissions, e.g. the Swiss heavy vehicle charging scheme, the Swedish NO<sub>x</sub> charge, the Danish SO<sub>2</sub> tax, the Netherlands NO<sub>x</sub> trading scheme and the United States SO<sub>2</sub> and NO<sub>x</sub> trading schemes. The challenge was to expand either the sectoral coverage or geographical scope of these programmes, in particular in Europe;

(d) NEBEI and the European Association of Environmental and Resource Economists (EAERE) should organize a specific thematic session on market-based instruments at the EAERE conference to be held in Bremen from 23 to 26 June 2005, and seek to monitor the implementation of the greenhouse gas ETS and the Netherlands NO<sub>x</sub> trading scheme during 2005.