

Acid News



© DAN RAPP

AIR QUALITY

Concerns more than health

AIR QUALITY STANDARDS are useful instruments for the protection of human health and lessening stress on the natural environment – if only they are properly formulated. Ill-thought-out, improperly formulated standards can on the other hand be turned to advantage by those who want to delay moves towards better air quality.

As reported in the last number of *Acid News* (pp 1-4), a revision of the World Health Organization's guidelines for air quality is now under way. This will also affect regulations within the European Union.

The outcome of the World Health Organization's undertaking will thus be of great consequence for the quality of air in Europe. As matters stand, neither the EU standards nor

the WHO guidelines come up to the requirements of an effective system.

The standards (limit values, guide values, guidelines) are often interpreted as long-term, final goals, although they are in fact no more than steps on the way towards achievement of a satisfactory state of the environment. Unfortunately the structure of the system and the terminology can easily lead to misunderstandings while at the same time lulling into a false sense of security. Although it may not be apparent, the limit values represent a compromise between the requirements of the environment and health and economic considerations.

Seen in the light of current scientific knowledge, the standards are, from the point of view of health, far

too lenient. Even if the perception of the risk should remain unchanged, the number of cases of asthma and allergic symptoms is alone a sufficient reason for stricter requirements.

Although officially the standards are said to take the ecological as well as the health aspects into consideration, actually it is only the health aspects that count. If consideration were to be taken to biological diversity, the economy of farming and forestry, and the cultural value of historic monuments, there would often be a case for much more strict requirements than are dictated by health alone.

The voluntary guide values that are at present operative within the European Union do not seem to act

Continued on page 3

Acid News

is a newsletter from the Swedish NGO Secretariat on Acid Rain, whose aim is to provide information on the subjects of acid rain and the acidification of the environment.

Anyone interested in these problems is invited to contact the secretariat. All requests for information or material will be dealt with to the best of our ability. Acid News is distributed free of charge.

In order to fulfill the purpose of Acid News, we need information from everywhere – so if you have read or heard about something that might be of general interest, please write or send a copy to:

The Swedish NGO Secretariat on Acid Rain
Box 245

S-401 24 Göteborg, Sweden

Telephone: +46-(0)31-15 39 55

Telefax: +46-(0)31-15 09 33

Editor: Christer Ågren

Published by: The Swedish Society for Nature Conservation

Printed by: Williamssons Offset, Solna, on paper not bleached with chlorine.

ISSN 0281-5087

THE SECRETARIAT

The Swedish NGO Secretariat on Acid Rain was formed in 1982 with a board now comprising one representative from each of the following organizations: Friends of the Earth Sweden, the Swedish Anglers' National Association, the Swedish Society for Nature Conservation, the Swedish Youth Association for Environmental Studies and Conservation, and the World Wide Fund for Nature Sweden.

The essential aim of the secretariat is to promote awareness of the problems associated with air pollution, and thus, in part as a result of public pressure, to bring about the required reduction of the emissions of air pollutants. The eventual aim is to have those emissions brought down to levels – the so-called critical loads – that the environment can tolerate without suffering damage.

In furtherance of these aims, the secretariat operates as follows, by

- Keeping under observation political trends and scientific developments.
- Acting as an information centre, primarily for European environmentalist organizations, but also for the media, authorities, and researchers.
- Producing and distributing information material.
- Supporting environmentalist bodies in other countries by various means, both financial and other, in their work towards common ends.
- Acting as coordinator of the international activities, including lobbying, of European environmentalist organizations, as for instance in connection with the meetings of the bodies responsible for international conventions, such as the United Nations Convention on Long Range Transboundary Air Pollution.
- Acting as an observer at the proceedings involving international agreements for reducing the emissions of greenhouse gases.

EDITORIAL

Action should mean it

THE FIFTH of the European Union's programs for the environment, *Towards sustainability*, is about to be revised. Adopted in 1993, it set forth its aims as long term-term objectives, intermediate goals, and actions. The long-term objective as regards acidifying air pollutants was to ensure that critical loads would never be exceeded – a sentiment that European environmentalists could only approve.

As regards intermediate goals – in effect targets that are to be attained within a specified time up to the year 2000 – several were set for acidifying pollutants. Emissions of sulphur dioxide, for instance, were to be reduced by 35 per cent between 1985 and 2000. How that should be done was told under actions, where a “non-exhaustive list” is given of measures to be taken in order to “realize targets set for the period up to 2000.” The only specific move named for the reduction of sulphur emissions was that proposals for product standards for coal, fuel oils, and residuals should be put forward before 1995. In general, attention was called to energy saving, energy efficiency, and fuel substitution – measures aimed mainly to reduce emissions of the greenhouse gas, carbon dioxide.

The intentions of the program are extremely vague, and a general tightening up will be necessary if the EU is to do anything about stopping acidification.

No proposal has yet been forthcoming for a directive to limit the sulphur content of fuels. Nor has the Commission put forward any suggestions for a revision of the directive of 1988 concerning reduction of the emissions of SO₂ and NO_x from large combustion plants. According to the original directive, both an evaluation of the effects and a proposal for a tightening of the requirements were to have been presented before July 1, 1995. But there was nothing of that on the Commission's agenda for this very year.

There were two intermediate goals for nitrogen oxides, the first calling for a stabilization at the 1990 level by 1994, and the other a 30-per-cent reduction by 2000 (although no base

year was mentioned, presumably it was the same). Neither goal comes anywhere near to what is required if the problems of acidification, eutrophication, low-level ozone, and effects on health are to be met.

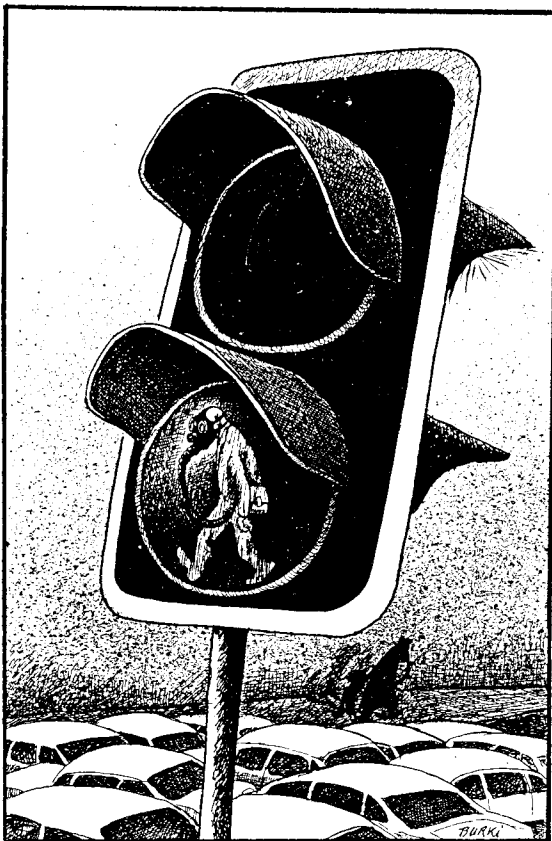
Remarkably, “action” does not seem to mean that anything particular should be done. Reference is simply made to broadly outlined measures against emissions of carbon dioxide of the kind set down for sulphur. The reduction of NO_x emissions will require yet more measures directed to the transport sector, which accounts for far the greater part of such emissions. The Commission is, it is true, engaged in working out proposals for measures, but with the idea of their coming into force only after 2000. Measures against emissions from combustion plants are also needed, most of which could be incorporated in the revision of the LCP directive.

There are no intermediate goals whatsoever for ammonia. It is merely said that an inventory will be made, and that standards for new farm buildings are to be introduced before 1996. But no proposal for a directive has yet been presented.

For this account it must be evident that there is a real, indeed acute, need for a revision of the EU environment program, and following urgings from Sweden, the Council of Environment Ministers did decide last March that the Commission should put forward an integrated program for attacking acidification during the coming autumn.

The result may after all be a well thought-out program for the whole of the European Union to deal with acidifying and eutrophying air pollutants – such as environmentalists have been awaiting for a long time. Last April representatives of environmentalist groups from all over Europe again joined in issuing a common statement of needs and priorities for attacking emissions, the text of which will be found on later pages of this number of Acid News.

CHRISTER ÅGREN



Continued from front page

effectively as indicators of aims and thereby encourage improvements. The EU "threshold values" for ozone, for example, only require member countries to inform the Union and their own populations if the guide values are being overstepped within their own boundaries.

The system for measuring air pollution has considerable weakness

which often makes the evaluation of developments difficult. And as regards particulates, the methods of measurement are outdated and probably for the most part irrelevant.

A number of proposals for improvements in the WHO and EU systems have now been put forward in a report that is being published by the Swedish NGO Secretariat on Acid Rain. Among them are the following:

LIMIT VALUE. This concept should not be allowed to be devaluated. While the aim is said to be to eliminate serious risks to health and the environment, the values as set are essentially the result of a compromise between environmental and economic claims. This is particularly so in the case of the European

Union, but also to some extent of WHO. Many countries now regard limit values as a final goal, and the long-term aim of providing full protection for humans and the environment has become lost to sight. The expression "limit value" should be reserved exclusively for indicating the levels to be striven for in the long term.

PROVISIONAL LIMIT VALUES. Since the attainment of long-term aims may

The effects of bad air on health

IN A RECENT review of the health situation in Europe (Concern for Europe Tomorrow, 1995), the World Health Organization's European office notes that the guideline values for air quality that were adopted in 1987 are being regularly exceeded over a large part of Europe (cf Acid News 2/95, pp 1-4). B. Lübkert-Alcamo and M. Krzyzanowski, both working at WHO's European office, have also attempted to calculate the effects in terms of sickness and mortality. The following figures, which are for Europe only and are preliminary, probably with a considerable margin of error, nevertheless give some idea of the extent of the problem.

SULPHUR DIOXIDE. Exceeding the WHO 24-hour guide value ($125 \mu\text{g}/\text{m}^3$) is calculated to be responsible for 6000 to 13,000 extra deaths per annum among the over sixty-fives. Between 89,000 and 203,000 people suffer intensified chronic respiratory trouble. Long-re-

maining concentrations of sulphur dioxide of more than $100 \mu\text{g}/\text{m}^3$ are moreover calculated to be the cause of an average reduction of lung capacity of 5 per cent among 9.7 million people, mostly living in eastern Europe.

NITROGEN DIOXIDE. Between 58,000 and 99,000 extra cases a year of disease in the lower respiratory organs of children are estimated to be the result of the WHO 24-hour guide value of $150 \mu\text{g}/\text{m}^3$ being overstepped. Every year 60 million people are estimated to have their lung function lowered by 2-5 per cent owing to the average concentrations of nitrogen oxides exceeding $60 \mu\text{g}/\text{m}^3$.

OZONE. Depending on the weather situation, every year between 220,000 and 1.9 million children can suffer from coughs and eye irritation as a result of short episodes with high concentrations of ozone. Worst affected are those living in the Benelux countries and adjoining parts of France and Germany.

ON THE FOLLOWING PAGES

Cars in cities 4

In Athens, cars have been banned in a large part of the city centre. To Parisians, living with notorious traffic problems, this seems like a model.

Acidification 5

On Swedish urging the EU Council of Ministers has agreed an immediate start should be made on developing a comprehensive strategy for dealing with this problem.

Emissions trading 6

The US program has been slow in taking off. Few utilities have so far bought or sold allowances, and the limited trading is ascribed to a variety of factors.

Eastern Europe 9

High energy use has resulted in widespread air-quality problems, but greater energy efficiency would provide a nearly emissions-free alternative to additional generating capacity.

Poland 12

The great hope for environmental protection may lie in rising prices for coal, of which huge quantities have been consumed since the last war.

In the air, on land 14

A stop to state aid for airlines and a tax on aviation fuel are among the measures proposed by T&E for cleaning the skies. It would also like to see higher taxes on motor fuels.

Vanishing sink 15

Almost all of the carbon released by deforestation has been reabsorbed by other forests, but now this is changing, and instead of being a sink, forests are becoming a source.

Climate 16

Little came out of the Berlin conference except an agreement to go on conferring. Nevertheless it will be difficult for the developed countries to avoid reducing emissions after 2000.

Seminar. The full text of the statement from the Fourth European NGO Strategy Seminar on Air Pollution appears on pages 7 and 8.

sometimes take a considerable time, it may be well to set a clearly defined half-way value too. The provisional limit values now being debated within the European Union should for instance be made compulsory as from the year 2000, while the "proper" limit values should apply from 2005 or 2010. A similar arrangement is already in force in Switzerland.

CLEAN-AIR AREAS. In some parts of Europe the quality of the air is often better than it has to be in order to meet the proposed limit values. This should not be taken to mean that the pollution can be allowed to increase in those areas. It may therefore be necessary to set up special air-quality standards in such cases.

DESIRABLE LEVELS. The principal goal should be to bring all pollutants down to the natural background levels. The concept can be illustrated by ozone, which (although carcinogenic) is naturally present in the air.

If the health and environmental aspects should lead to differing limit values, the lower value should always be the one that applies. The values set for health reasons should be no higher than 20-50 per cent of the levels that have been found to disturb especially sensitive persons. There is no reason to have separate values for urban and rural areas (cf clean-air areas).

The limits for carcinogenic substances should be set according to some uniform principle, say, at concentrations where there is the highest lifetime cancer risk of one in a million after continuous exposure.

Some substances that affect health can also have a considerable ecological effect not directly connected with their atmospheric concentrations (such as oxides of sulphur and nitrogen that cause acidification and eutrophication). In such cases an extra long-term factor should be inserted, which should also take into account the total volume of emissions. The important value would then be the arithmetical long-term average.

MAGNUS NILSSON

The above mentioned report, written by Magnus Nilsson, can be obtained free of charge from the secretariat. Contains extensive background material in addition to its concrete proposals.

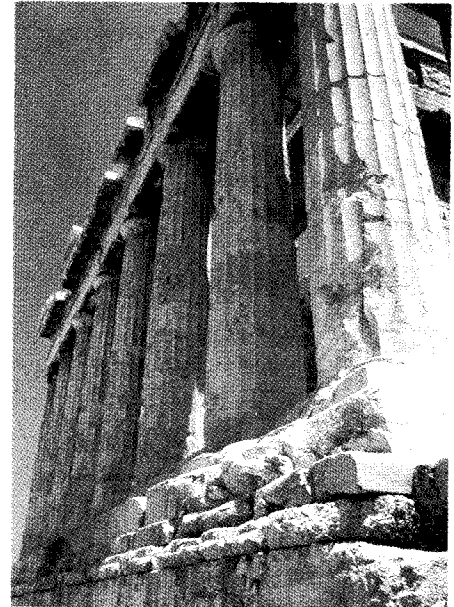
CITY AIR

Car(e)free Athens

ATHENS IS A CITY that has long been plagued by the exhaust gases and noise from motor vehicles. Then suddenly on April 10 the noise had subsided, traffic lights had been switched off, and the streets were practically empty of traffic. The ban on cars and motorcycles in the 2.5 square kilometres of the city centre has cost some 5 million drachmas. Streets have been made into pedestrian areas, traffic redirected, and no-fare buses started. The only other vehicles that are allowed in are delivery vans and residents' cars. After a three-month trial, the effects of this innovation will be evaluated, but almost everything points to it being made permanent, and eventually extended.

To Parisians the Greek move seems like a model. Their city is notorious for its traffic problems, and during windless periods of high pressure the concentrations of air pollutants can rise to very high levels.

A special problem for France is the large proportion of diesel vehicles, which emit much greater amounts of particulate matter than petrol-driven types. The particles, which are a result of incomplete burning of the fuel, measure less than 2.5 micrometres across and can penetrate deep into the lungs. They are in fact linked to an increase in mortality from respiratory and heart diseases. Moreover they carry carcinogens such as benzopyrene and



© LARS ARNESSON

other hydrocarbons, and according to the International Agency for Research on Cancer, the exhaust from diesel engines is one probable cause of cancer.

A main reason for the popularity of diesels in France is the price of the fuel. The filling-station price is 3.80 francs per litre, whereas four-star petrol costs 5.80 francs. One reason for the difference is that diesel fuel is taxed at a lower rate than petrol. A carmaker with a special interest in this state of affairs is Peugeot, the leading world manufacturer of diesel-driven cars.

Sources: **Dagens Nyheter**, April 11, 1995, **New Scientist**, April 22, 1995.

Extending the idea to more cities

SOME FORTY European cities have joined together in an effort to set up carfree zones in vulnerable and historically valuable parts. Arising from an initiative of the environmental directorate of the European Commission, the Car Free Cities Club was started in 1994.

The club does not only concern itself with carfree zones. It is also working for pedestrian ways and cycle tracks, as well as more efficient moving of goods and mass transportation. A principal aim is to "give back the city to the people" and start a dialogue between all the various interests. Also of importance however is to bring about a

regular exchange of information between cities that want to promote more environmentally benign modes of transportation, both for passengers and freight.

Membership of the club is open to cities of any size – on condition that they have either a council or local transportation authority that is actively engaged in promoting systems that are adapted to environmental needs.

More information about the Car Free Cities Club can be obtained from Eleni Marianou, coordinator, Eurocities, Boulevard de Waterloo 27, 1000 Brussels, Belgium. Fax: +32-2 513 43 22.

Smallest are worst

RESEARCH IS LEADING more and more to the conclusion that small airborne particles constitute a serious risk to health. An American epidemiological study has recently traced a link between particulates coming from the burning of fuel and an increased incidence of premature deaths from heart and lung diseases. This study, which is the largest so far to see such a link, can only strengthen the case for air-quality standards and the monitoring of fine particles.

More than half a million persons aged forty-five and over were studied in 151 towns and cities in the United States. Attention focused particularly on the concentrations of so-called PM_{2.5} – particles with a diameter of less than 2.5 micrometres – which are considered to be especially dangerous to health since they can force their way deep down into the lungs.

The study noted the known cause of all deaths among adults between 1982 and 1989 and linked this to national data on PM_{2.5} levels. Statistical analysis showed, after correction for various life-style factors,

ACIDIFICATION

Now on EU agenda

FOLLOWING a proposal from Sweden, the European Commission has decided to develop a strategy for reducing emissions of the air pollutants that cause acidification – meaning mainly sulphur and nitrogen oxides, but also ammonia.

In Sweden acidification is considered to be one of the country's worst environmental problems, and because more than half of the pollution that falls over Sweden emanates from other countries within the European Union, the government decided to take up the matter with the EU. In a memorandum addressed to the meeting of the ministers of environment on March 9 it emphasized the extent of the problem, and pointed to a number of associated matters that were awaiting decision.

Among the matters mentioned was the revision of the 1988 directive on large combustion plants, which is not even on the Commission's pro-

gram for this year, although a proposal for revision should have been presented at mid-year. Other matters of importance that were brought up in the memorandum included the question of stricter requirements for car emissions after 2000 – for which a proposal should have been ready by the end of last year – and regulations limiting the sulphur content of fuels.

As a result of the Swedish initiative the environmental ministers decided that an immediate start should be made on the development of a comprehensive strategy for dealing with acidification, and that a proposal should be ready for presentation to the Council of Ministers this autumn. Sweden's minister of environment says that her Spanish counterpart has agreed to include the matter among the priorities under Spain's chairmanship of the Union.

PER ELVINGSON

that the relative risk of dying was distinctly greater in places with high levels of airborne particles. The risk for adults in cities with the highest levels of fine particulates was found to be 17 per cent higher than in the least polluted areas. There was an evident association between deaths from cardiovascular disease and lung cancer and particulate air pollution, but not from any other diseases. Mortality was also found to be significantly correlated with sulphate particulates, although with a slightly lower increase in risk (15 per cent) between the most and the least polluted areas. Since sulphate particulates and PM_{2.5} are themselves strongly correlated, the findings are not surprising. It may however be worth noting that mortality from lung cancer was found to be more strongly linked to sulphate particulates than to PM_{2.5}.

Source: ENDS Report No. 242, March 1995. The study here referred to appeared in the American Journal of Respiratory and Critical Care Medicine, Volume 151, pp. 669-674.

Both are bad

Demands have been raised in Britain for a return of leaded petrol, the reason given being that unleaded contains large amounts of benzene, which is a carcinogenic. They were in any case rejected by the House of Commons Environment Committee, which in a report on volatile organic compounds in April stated that "both lead and benzene are undesirable pollutants and their concentrations in the air should be reduced as far as is reasonably achievable." Arguing that both leaded four-star and super unleaded petrol are environmentally undesirable fuels, the committee called for a phase-out of the super-unleaded petrol by 2004, and for car manufacturers to stop making cars which operate best on this type of fuel.

New Scientist, April 29, 1995.

Better than diesel

Diesel-driven vehicles could be made much cleaner if the conventional diesel fuel was replaced by dimethyl ether (DME), according to the Danish firm Halldor Topsoe A/S. The proposed fuel, made from natural gas, only requires slight adjustments of the ordinary diesel engine to enable it to function. The emissions of sulphur, nitrogen oxides, and particulates are said to be markedly lower. DME is transformable from gas into a liquid, like methanol, and can be stored in condensed form and transported in gas bottles.

Europe Environment, March 7, 1995.

Environmentally most benign

The environmental costs of vehicles running on natural gas are markedly lower than those of diesel and petrol-driven ones, according to a British study led by David Pearce, the environmental economist. The study took into account the external costs due to emissions of greenhouse gases, acidifying air pollutants, and substances dangerous to health. From the results it appeared that the health and pollution costs of emissions from diesel engines in towns are 2.5 times greater than those of emissions from petrol-fueled vehicles and 13 times greater than the cost of damage caused by vehicles running on natural gas. In urban surroundings the external costs for diesel amount to 2.6 pence per kilometre, as against 1 penny for unleaded petrol, and 0.2 pence for natural gas. The costs were less in the open country, although there were still differences between the different types of fuel.

Environment Watch: Western Europe, March 3, 1995.

Slow in getting going

THE U.S. Environmental Protection Agency's emissions trading program – an initiative of the 1990 Clean Air Act – has thus far failed to control pollution through the use of economic incentives.

Combining environmental initiatives with market incentives, the allowance program affects all of the country's 110 coal-burning power plants. Basically, the government sets a limit on the amount of sulphur dioxide that may be released into the air by issuing a fixed number of permits – each worth one ton of pollution. A utility may then find ways to curb its pollution to a level below its allowable limit and so have permits left over that may be sold, traded, or saved. One company may sell its allowances to pay for pollution control devices; another may buy additional permits instead of switching to cleaner fuels; and yet another company might hold all of its emissions permits in the hope that their market value will increase.

The creators of the Clean Air Act did not however establish the emissions trading program so that brokers and speculators could earn money. The scheme is designed to restrict the amount of allowable emissions permits over time, resulting in a reduction of 10 million tons a year in acid-rain pollution by the year 2010. Carol Browner, the EPA administrator, explained to a Congressional subcommittee on February 9, 1995, that the Act's market-based program for the control of acid rain should "protect lakes, streams, and visibility through a 50-per-cent cut in power-plant emissions of sulphur dioxide and ...save utilities approximately \$2 billion per year in implementation costs over traditional command-and-control measures."

Although Browner's report sounded promising, few utilities have actually bought or traded allowances, choosing instead more costly pollution-control options. This lack of interest has lowered the value of the average emission permit from \$700 (as priced before the first EPA auction in 1993) to \$150 (today's value).



ANDRÉ MASLENNIKOV

In December 1994 a government report credited the limited trading to a variety of factors: utilities have received little guidance from state and federal regulators as to whether the costs of buying sulphur-dioxide allowances can be passed on to ratepayers; the EPA's allowance auctions have produced unexpectedly low prices for the permits, and potential sellers of allowances have been re-

Lack of interest has lowered the value of the average permit

luctant to trade; and many potential buyers do not have to reduce emissions until the 2000 deadline (as mandated by Phase Two of the Clean Air Act of 1990).

Efforts have been made to increase participation in the allowance-trading program. On January 15, 1995, the Environmental Protection Agency announced that a pool of 300,000 SO₂ allowances would be set aside by Congress to reward energy-efficient utilities. These allowances may be banked, sold, or used for compliance with requirements for the abatement of acid rain. To date, fifteen utilities have been awarded 2,832 bonus allowances for

measures such as using landfill gas as a renewable energy source.

Others believe that the federal program may be boosted by aggressive speculators – the same investors who trade pork bellies or soybean futures. Carlton Bartels, director of environmental brokerage services for Cantor Fitzgerald in New York, supports this view: "We have not yet seen the entry of speculators in any grand fashion...we're waiting for them." It seems however that Fitzgerald will be waiting for a long time. Most speculators, like John Benjamin of Smith Barney (Chicago), are not impressed with the market in emissions trading: "We had so little call for it, we decided not to go into it at this particular time...but we're keeping an eye on it."

Regardless of initial negative reactions, more study is required to determine whether the market-based control program can effectively deter emitters of pollutants that cause acid rain. An EPA report is scheduled for the fall of 1995. Meanwhile, the trading continues.

ALEXANDER TIGER

The writer is project coordinator at the Pacific Environment and Resources Center, Fort Cronkhite, Building 1055, Sausalito, California 94965, USA.

For previous articles on emissions trading see Acid News 5/93, pp. 11-13, and 5/94, p. 13.

The Fourth European NGO Strategy Seminar on Air Pollution Göteborg, April 28-30, 1995

This seminar was, like its predecessors, convened to discuss with representatives of environmentalist organizations both from western and eastern Europe the measures and strategies needed for bringing about an abatement of the European emissions of air pollutants. Also considered were the priorities for international action to be taken by these organizations and ways of coordinating them.

The meeting culminated in a statement, addressed particularly to the governments of the European countries, reaffirming the objectives set forth at the previous seminar in 1992. These objectives concern the reductions that are needed in order to bring the concentrations and depositions of pollutants down to such levels that the scientifically agreed critical loads will not be exceeded.

Papers were presented on what was taking place internationally – especially within the European Union and the UN ECE Convention on Long Range Transboundary Air Pollution – to reduce emissions, and also on the critical loads and ecological effects of nitrogen depositions and low-level ozone. These will form a special issue in the Secretariat's Air Pollution and Climate Series, to be published later this summer.

The meeting was preceded by a two-day workshop on transportation and air pollution, with the participation especially of representatives from NGOs in eastern Europe.

It was agreed that pressure should continue to be exercised both on national governments and on the European Union and the UN Economic Commission for Europe to hasten the application of measures for reducing emissions of air pollutants. The full text of the final statement appears below.

STATEMENT

AIR POLLUTANTS from power plants, land, sea and air traffic, industry and farming all contribute to the heavy environmental stress that is affecting human health, ecosystems and materials throughout Europe. It is estimated that sulphur for instance is being deposited in amounts that are damaging to the environment over almost a third of Europe. In some of the central and northwestern parts of the continent the depositions are twenty or more times higher than the critical loads. Forests, soils, groundwaters and surface waters will inevitably be affected.

Furthermore, more than half of Europeans are exposed to concentrations of tropospheric ozone that exceed the World Health Organization's guide value.

Drastic reductions in emissions of air pollutants are urgently needed to protect human health, as well as the natural and man-made environment. To stop the progressive deterioration of the environment, it will be necessary to reduce the concentrations and depositions of air pollutants to below the critical loads.

Critical loads can be defined as estimates of the exposure to one or more pollutants above which adverse effects on receptors, such as plants, ecosystems or materials, may occur. Expressed more simply, critical loads are the maximum amount of pollutants that ecosystems can tolerate without suffering change or damage.

Necessary reductions

Taking as a basis up-to-date and internationally agreed scientific data on critical loads, we at this seminar reaffirm the need to achieve the following objectives, concerning total European emissions of air pollutants, which were first agreed upon by environmentalist organizations in 1992:

at least a 90 per cent reduction in emissions of sulphur dioxide (SO₂) and nitrogen oxides (NO_x);

at least a 75 per cent reduction in emissions of volatile organic compounds (VOCs) and ammonia (NH₃);

at least a 75 per cent reduction in concentrations of tropospheric ozone, to be achieved by meeting the objectives for NO_x and VOCs as above.

The reductions refer to the emission levels of the early 1980s and apply both to western and eastern Europe, including the European part of Russia.

These are minimum demands, but they do not necessarily imply that every country or region must achieve equal reductions. In areas with very high emissions, greater reductions will be necessary, while in others the reductions, while still necessary, may be lower.

With improved methods of scientific research and increased knowledge, it is likely that the data on critical loads will have to be continually reviewed and revised. The degrees of reduction will, in consequence, also have to be reconsidered.

The critical loads concept must not be taken as an excuse for allowing an increase in the concentrations and depositions of pollutants in areas now receiving pollutants in amounts that are already below the critical loads.

Timeframe

Hitherto the response of governments to the damage caused by air pollutants has been totally inadequate, although progress has been made in some countries, especially in reducing sulphur emissions. Together with international agreements such as the 1985 Sulphur Protocol to the UN ECE Convention on Long Range Transboundary Air Pollution (CLRTAP), this has resulted in a reduction of 37 per cent in European emissions of sulphur dioxide between 1980 and 1992.

As regards nitrogen oxides, volatile organic compounds and ammonia, on the other hand, only limited commitments have been made to control emissions, although evidence confirms

THIS SEMINAR IS ONE OF A SERIES ARRANGED BY THE SWEDISH NGO SECRETARIAT ON ACID RAIN

that drastic reductions of these pollutants, too, will be required in order to safeguard human health, forests and other sensitive ecosystems over large areas of eastern and western Europe.

Since critical loads are now being widely exceeded, and have been for several decades, the need for action to curb emissions is becoming increasingly urgent. From an environmental point of view, the above reductions should be carried out without delay.

For achieving reductions

Bilateral, multilateral, and international agreements and arrangements should be used to achieve reductions as a matter of urgency. To make faster progress than international measures may require, nations should take unilateral action.

Priority must be given to the prevention of pollution at source, by establishing this as a central criterion both in energy planning and economic development.

A main aim should be to change the present energy system, based on fossil sources, to one based on renewable sources of energy.

It should be noted that the strategy here proposed for reducing emissions of sulphur dioxide, nitrogen oxides and volatile organic compounds (including methane) has significant implications for energy use, and thus will also lower the atmospheric concentrations of greenhouse gases such as low-level ozone and carbon monoxide, as well as lowering emissions of carbon dioxide, which is the main pollutant contributing to global warming.

The urgency of meeting the reduction targets demands that a range of measures be adopted, including:

- increasing the conservation of energy;
- using renewable energy sources;
- increasing the efficiency of energy production, distribution, and use;
- switching to less polluting fuels;
- applying best available techniques in the energy, transportation, industrial and agricultural sectors.

The price of fuel and electricity should more readily reflect the real cost to society of the social and environmental effects (so-called externalities) of air pollution and the inefficient use of energy and other resources.

The European countries as well as the European Union should base their transport policies primarily on environmental criteria. Priority should be given to the development of modes of transportation that have the least effect on the environment.

Measures to reduce emissions of air pollutants from the transport sector include:

- the implementation of volume control, including for example no building of new major roads, improved land-use planning to prevent urban sprawl, and increased investment in public transportation and railway freight systems;
- the adoption of plans and timetables to significantly reduce the total European volume of road and air traffic;
- in urban areas, priority should be given to cyclists, pedestrians and public transportation;
- the adoption of standards or other mechanisms for increasing the fuel efficiency of all new motor vehicles, as well as of aircraft and ships;
- the adoption of properly regulated emission standards for all new motor vehicles, including off-road vehicles, as well as for aircraft and ships;
- the adoption of a maximum speed limit for road traffic of 100 kph.

Progressive environmental standards should not be held to be trade barriers. Any harmonization that affects environmental standards should be at the most stringent current level.

Financial incentives and dis-incentives, such as levies on petrol, diesel and kerosene, are useful tools in reducing air

pollution. Taxing of resources and pollution could be used for lowering taxes on employment – a so-called tax shift.

Relations between West and East

The proposed reductions and the measures to achieve them should apply equally to western and eastern Europe. In the case of eastern Europe, some specific strategies should be taken into account:

- Western European countries should undertake, bilaterally or jointly, concrete projects to assist eastern European countries in their implementation of programs for the prevention of pollution. Training and demonstration programs for clean technologies and environmental policies should be followed up by actual implementation;
- The introduction and application of environmental standards, based on the best examples of European environmental policy and legislation, should be accelerated;
- Multilateral development banks and financial assistance programs should give priority to projects that will discourage energy wastage and instead focus on improving energy efficiency within the energy and industrial sectors, and require assessments of the environmental impact, the outcome of which should be decisive for the further development of the projects.

Access to information and consultation

All data held by authorities in European states as well as by the European Commission concerning the emission, transport, concentration, and deposition of pollutants should be made publicly available.

In the development of environmental legislation, full consultation should take place both with the public and with non-governmental environmentalist organizations.

Participants

Convened by the Swedish NGO Secretariat on Acid Rain, the seminar was attended by representatives from twenty non-governmental environmentalist organizations from twelve European countries.

INTERNATIONAL ORGANIZATIONS:

- European Environmental Bureau
- European Federation for Transport and Environment
- International Institute for Energy Conservation Europe

NATIONAL ORGANIZATIONS:

- Bond Beter Leefmilieu, Belgium
- Clean Air Action Group, Hungary
- Community Atgaja, Lithuania
- Estonian Green Movement/FoE Estonia
- The Finnish Society for Nature Conservation
- The Finnish Society for Nature and Environment
- Foundation for Alternative Energy, Slovakia
- Friends of the Earth Sweden
- Greenpeace in Czech and Slovak Republics
- Hungarian Traffic Club
- Lithuanian Green Movement/FoE Lithuania
- The Norwegian Society for Nature Conservation/FoE Norway
- Polish Ecological Club/FoE Poland
- Slunicko Foundation, Czech Republic
- Sustainable Energy Information Office, Latvia
- The Swedish NGO Secretariat on Acid Rain
- Traffic League Finland

ALSO ENDORSING THE STATEMENT:

- Friends of the Earth International
- Greenpeace International
- WWF International



© ANDRÉ MASLENNIKOV

EASTERN EUROPE

The need for energy efficiency

DISREGARD for the efficient use of energy in Central and Eastern Europe (CEE) and the former Soviet Union (FSU) has resulted in extensive waste and gross pollution. It has also led to an energy supply and distribution network that is poorly maintained and lacks adequate investment.

As these countries transform to market economies, price reform is exposing current energy practices as unsustainable. Many businesses are being forced to close. Householders are finding that energy bills are now consuming a significant proportion of their income. Energy expenditure now accounts for 15 per cent of the average Hungarian and Polish household income, for instance, and 19 per cent of the Romanian, whereas the UK average is no more than 5 per cent.

High energy use, combined with the weak enforcement of environmental standards, has resulted in widespread air-quality problems in the region. Effects caused by air pollutants, such as damage to forests

and human health, are extensive and significantly worse than in western Europe.

The largest producers of air pollution are power stations. A recent study has shown that of the hundred largest emission sources of sulphur dioxide in all of Europe, ninety-

High energy use has resulted in widespread air-quality problems

three were power stations. Of that hundred, fifty-four are in CEE and the FSU, and forty-seven of them are power stations. Overall, energy production accounts for more than 70 per cent of the emissions of sulphur dioxide in this region.

A study by the International Energy Agency (IEA) has projected that in the absence of additional measures to promote energy efficiency, the annual primary energy

consumption in central and eastern Europe could rise from its 1991 level of 294 million ton oil equivalents (mtoe) to 375 mtoe by the year 2010. This rise would be accompanied by emissions of harmful acidifying air pollutants, and the IEA estimates an increase in the emissions of carbon dioxide from 930 to 1138 million tons over the same period of time.

Air pollution is one of the key problems associated with the inefficient use of energy in central and eastern Europe and the former Soviet Union. For example, the average annual emission of particulates across selected CEE and FSU countries is 78 kilograms per capita, compared with 24 kg/capita in the United States and 8.2 kg/capita in Britain. The figures for sulphur dioxide show similar patterns: the average CEE and FSU emissions are 129 kg/capita compared with 85 kg/capita in the United States and 66 kg/capita in Britain. Although emission levels have fallen in the past four years as a result of economic recession and the closure of industrial plants,

these levels remain high in relation to those of OECD countries.

Energy efficiency measures provide a nearly emissions-free alternative to additional generating capacity and non-electric energy production. They can also allow rapid closure of the most-polluting plants. Through the use of presently available technology and approaches, substantial and rapid energy savings could be made that would ease current shortages and reduce future energy demand. Given the high energy intensities (energy consumed per unit of gross national product) in the CEE and FSU countries (they are between two and seven times higher than in western Europe) many opportunities exist for improving energy efficiency. Heating one square meter of apartment space to a given temperature requires 20 to 50 per cent more energy in CEE countries than in Scandinavia, for instance, even after adjustment for differences in climate.

In Poland, a study has shown that the current energy demand could be reduced by 40 per cent by the year

2005. To achieve this, Poland would need to invest 1.25 per cent of gross domestic product annually in energy-efficiency measures, but these savings would amount to less than the cost of adding new capacity to energy supply. The same study also reports that a comprehensive but more modest program for energy efficiency could hold energy demand

Energy demand could be reduced by 40 per cent by the year 2005

at the current annual level through 2025. Without such a program, energy demand could rise by 70 per cent.

The potential market for energy-efficient technologies in these countries has been conservatively estimated by the International Institute for Energy Conservation (IIEC) to be worth £26 billion. The payback period

for these investments is estimated to be less than three years. A study of the industrial sector of CEE countries has estimated the potential market for energy-efficient products to be £13 billion. The energy efficiency unit at the European Bank for Reconstruction and Development (EBRD) estimates that it is worth at least £35 billion, requiring an investment of around £4 billion per year.

Energy efficiency thus not only represents a means of reducing environmental pollution. It also offers significant business opportunities and great scope for a transfer of technology and skills between western and eastern Europe. As eastern energy prices begin to converge towards OECD levels, the extent of this potential market can only grow.

Despite the large potential for investments in energy efficiency in the region, very little has so far been captured. Less than 3 per cent of the EBRD's total energy investments, for example, have been towards demand-side energy efficiency. (The total

European Investment Bank

The European Investment Bank (EIB) is a major financial institution in Europe, funding projects both in eastern and western Europe. In 1994, its total activities amounted to Ecu 19.9 billion, of which 957 million was spent on central and eastern Europe. The four major shareholders in the EIB are France, Germany, Italy, and the United Kingdom. Each of these countries has a 12 per cent voice on the board, which decides on projects. The EIB has projects in CEE and the Baltic states, but has not, with the exception of one project, to date invested in Russia and the other FSU states.

An evaluation of the 1993 and 1994 projects in CEE and the Baltic states, shows that little of the investment went towards environmental projects. Of the total EIB portfolio for this region in 1993 and 1994 (Ecu 2.92 billion), just 2.7 per cent was spent on environmental projects, while road projects and auto manufacturing claimed 26.6 per cent of the budget. Of the ten energy-related projects during those two years, just one had a focus on demand-side energy efficiency. This project was an upgrade of the district-heating systems in Tallinn and Pärnu in Estonia, for 7 million ecus. To its credit, the EIB had on the other hand supported five large railway projects during those two years, which comprised 21.6 per cent of its portfolio.

European Union

In the European Union, the largest programs focusing on energy and environment are PHARE, TACIS, and THERMIE. In the energy sector, one priority is to improve the efficiency with which energy is used, and thereby stabilize national energy economies and reduce pollution.

PHARE has made Ecu 4.8 billion available to eleven partner countries, including all the countries in CEE, exclusive of the former Yugoslavia. Spending on environmental programs amounts currently to about 11 per cent of the total budget.

There has however been a call from the recipient countries for increased spending on environmental projects, particularly from Poland, Hungary, Slovakia, and the Czech Republic. One of PHARE's priority objectives is to promote energy efficiency.

TACIS (Technical Assistance to the CIS) was launched in 1991, and had a budget approaching Ecu 2 billion for the period from 1991 to 1994. Within TACIS high importance is given to the field of non-nuclear energy, which accounted for Ecu 145 million during 1991-1993. Energy efficiency has a high priority, Ecu 47 million (or 32 per cent) having been allocated to it. TACIS activities cover a wide range, from quick industrial-plant audits and district-heating improvements to the establishment of regional energy centres that advise government and industry on energy-saving plans and legislation.

THERMIE is a program for the promotion of energy technologies throughout Europe and the FSU. For the first time in 1992, EC energy centres were established in countries outside the member states. Fourteen centres serve to coordinate the THERMIE program, including the implementation of innovative and efficient energy technology. The main aim of these centres is to stimulate market penetration of EU energy-efficient technologies, in accordance with the Union's policy as regards energy objectives. However, THERMIE is unable to finance the actual installation of hardware. In this context the energy centres work closely with international financial institutions such as the EBRD, EIB, and the World Bank.

An example of the cost effectiveness of energy-efficiency measures can be seen at the EC energy centre in Moscow, where to date 14 specific actions have been completed. It is estimated that these actions will produce energy savings of 2.8 gigajoules over the next five years, at a cost of only Ecu 318,000. This represents a payback of under ten weeks. Funding for THERMIE and the EC centres is however under review and may be reduced.

sum invested by EBRD in the energy sector during 1992-94 was Ecu 2.87 billion.) Less than 5 per cent of the World Bank's energy lending in the past four years has been for demand-side energy efficiency.

The bulk of the transport-sector lending from the World Bank, EBRD, and the European Investment Bank (EIB) – which over the last five years amounted to Ecu 2.5 billion – has gone towards road building, road rehabilitation, and automobile and bicycle manufacturing. Much less investment has gone towards more energy-efficient options such as public passenger transportation and railways.

There are a number of reasons for the discrepancy between the potential for energy efficiency and the actual levels of technical cooperation and investment. Among them are:

- The "unknown" or perceived risk of energy efficiency investments made by multilateral, bilateral and local financial institutions – due to the lack of experience of such investments in comparison with those in energy supply-side projects.
- The smaller scale of many efficiency projects, making them less attractive to multilateral and bilateral lending institutions.
- The lack of a clear revenue stream from demand-side efficiency projects to payback loans, in contrast to power stations, for example.
- The lack of suitably qualified finance and technical personnel both for preparing and operating efficiency projects.
- The lack of accurate data on energy consumption and energy-saving technologies at individual plant, energy-sector, and national levels.
- The lack of locally available energy-saving equipment.
- Poor consumer information with which to make investment decisions.
- National energy policies that inhibit energy conservation. These include tariff structures and laws which prevent or discourage utilities from making profits from energy savings.

The solutions to these problems are numerous. They include seven key policies and activities:

- Energy audits and data collection in order to assess the potential and

the cost-benefits of energy efficiency options.

- Financial and technical training, including exchanges between personnel from East and West.

- Technical cooperation specifically focused on preparing projects for implementation and funding.

- Innovative approaches to financing. These include revolving funds

which allow investment funds to be disbursed to smaller projects at local level; utilizing energy service and third-party financing companies in order to apply specialist technical skills and finance access to

companies and municipalities that do not have these advantages; and guarantee funds to cut the costs of loans.

- Introducing legislation which, for example, encourages so-called integrated resource planning (IRP), provides incentives for utilities to invest in energy efficiency, and sets minimum standards for buildings, appliances, lighting, and industrial drive motors.

- Information campaigns for energy users.

- The provision of grants or low-cost loans to consumers.

Recently the EBRD has revised its Energy Operations Policy Paper to highlight the role of energy efficiency and to emphasize specific areas of investment as priority areas for the future. The separate Energy Efficiency Unit that has been set up at the bank is building up a team of experienced professionals and already has a wide range of potential projects under assessment for future investment. A number of innovative financing approaches – such as revolving funds, the creative use of guarantee funds, and support for energy service companies – are being utilized here to overcome some of the barriers to successful investments in energy efficiency. It would be helpful if similar initiatives were to be taken by the World Bank and EIB boards.

STEWART BOYLE

Executive director, International Institute for Energy Conservation, 1-2 Purley Place, London, England N1 1QA.

Acknowledgements: Angelika Rubens, Euronature and Jim Barnes, Friends of the Earth International.

Recent publications

Economic instruments for air pollution control (1994)

Edited by G. Klaassen and F. Forsund. A comprehensive review of economic theory, simulation models, and practical experience with the use of economic instruments, mainly for control of air pollution.

308 pp. £73.50. Available from Kluwer Academic Publishers, Distribution Center, P.O. Box 322, 3300 AH Dordrecht, the Netherlands.

Economic policies for sustainable development (1994)

Edited by T. Sterner. Describes the use of economic instruments for policy making throughout the world. Intended to bridge the gap, not just between economic theory and environmental issues, but also that to practical policy making. Describes and discusses the successes and difficulties encountered in various countries.

344 pp. £76.00. Obtainable from Kluwer Academic Publishers, address as above.

Joint implementation to curb climate change: Legal and economic aspects

Edited by O.J. Kuik, P. Peters and N. Schrijver. Analyzes the aims of the joint implementation provisions of the Climate Convention and the controversies that have subsequently arisen. Combines a comprehensive study of legal aspects with an economic analysis and a report on the possibilities of joint implementation between the Netherlands and Poland.

228 pp. £56.50. Can be ordered from Kluwer Academic Publishers, address as above.

Critical loads of acidity for forest soils and alpine lakes (1994)

By B. Rihm. Report on mapping critical loads of acidity for Switzerland. Shows that the present (1990) loads are exceeding the critical loads at 63 per cent of the forest sites and for 100 per cent of the selected sensitive alpine lake catchments.

68 pp. Environmental series No. 234. Published by Federal Office of Environment, Forests and Landscape, CH-3003 Berne, Switzerland.

EU Basics Guide (1995)

An up-to-date guide to the European Union: Explains how the various institutions and agencies work, and describes the legal instruments, legislative procedures, and means of enforcement. With special focus in the development of EU environmental policy.

35 pp. \$35.00. Can be ordered from Cutter Information Corp., 37 Broadway, Suite 1, Arlington, MA 02174-5552, USA.

Positive trends now appearing

THAT THE EMISSIONS of air pollutants are high in Poland is probably well known. According to data from EMEP, the European Monitoring and Evaluation Programme, Poland comes fourth among European countries in emissions of sulphur dioxide, and sixth for nitrogen oxides. This is because coal has mostly had to be used for the production of energy. The share of coal in world fuel consumption is around 27 per cent, and in the European OECD countries 20 per cent. But in Poland it is 80 per cent, and it seems likely to stay so until well into the next century. About 90 per cent of the 1.5 million tons of dust comes, too, from the burning of coal.

There are nevertheless signs of a possible change. During the forty-five years following the second World War, more than 6 billion tons of coal were mined in Poland, or twice as much as the total in the 150-year period preceding the war. Now however it appears that there is less coal that can profitably be mined.

The costs of mining have sometimes become higher than the export prices, which are held back by competition from South America and the United States, where coal can often be mined by opencast methods.

An ecological factor is also coming into play, especially as regards high-sulphur coal that yields large quantities of ash. A decrease in the demand for such coal was first observed early in the 1990s, when four of the Silesian mines were forced to reduce output to 60 per cent of the normal.

Ecological problems also face those mines that discharge saline water into the Vistula and Odra rivers, for which 1995 may be a decisive year, depending on the determination of the minister for environmental protection to implement decisions to clean the country's two largest rivers of excess salinity.

Rising coal prices may also tend to curb wasteful consumption, and even hasten the replacement of coal by



© ANDRÉ MASLENNIKOV

cleaner sources of energy. The great hope for environmental protection in Poland may in fact lie in the price of coal. It may also be noted that the alternative sources produce less pollution per unit of energy output.

With less dust in the air the concentrations of heavy metals will probably also subside, since dust is generally regarded as their best carrier. From data compiled by the writer it can be

*It seems the chances
for reducing air pollution
are getting better*

seen that 75 per cent of Poland's emissions of cadmium, arsenic, mercury, and nickel comes from burning coal.

As regards lead, the big source besides coal firing is road traffic. In 1980 24 per cent of the total emissions was traceable to the combustion of petrol and diesel. By 1992 that share had increased to 30 per cent. Fortunately, however, this increase in the share of road traffic was not accompanied by an increase in total emissions, but on the contrary by a decrease.

Petrol with a lowered lead content (to 0.53 g Pb/kg) was put on the market in 1987, and the content was reduced twice again in 1992. According to my own calculations, emissions would have been three times higher than they are today if these reductions had not taken place. The move to unleaded fuel has been all the more necessary in view of the fact that the number of cars on the roads is predicted to have risen to more than 15 million by 2010. The lifting of restrictions on imports of fuel in 1997, as a result of Poland's agreement of association with the EU, will probably also contribute to an improvement in air quality.

What then are the chances for reducing air pollution in Poland? It seems they are getting better. With the exception of those of gaseous pollutants from road traffic, emissions have substantially decreased since the early nineties. The decrease in the emissions of dust is due partly to economic recession and partly to the installation of control equipment. A good deal of run-down industrial plant has also been closed. In Katowice province alone some 200 heating installations were, for instance, withdrawn from operation between 1990 and 1992.

It should be noted that in these cases the economic aspects were decisive. This has been especially so in the case of plants that have had to be closed down on account of the penalties for exceeding emission limits and the environmental charges that are part of the costs of operation.

Environmental charges are constant and apply per unit of emitted pollutant. The revenue accrues to the state and the Provincial Environmental Protection and Water Management Fund and is subsequently apportioned out to projects for environmental improvement. The total sum is now considerable, amounting to about \$1 billion – which in 1993 sufficed to pay for almost half of all the country's projects of this kind.

The Paris Club, with sixteen members that are the country's creditors, agreed to cut the Polish debt by 50 per cent on condition that the remainder would be paid by 2010. Poland asked for a further 10-per-cent reduction, to be used as a part of a debt-for-environment swap. So far, however, only the United States and Switzerland have agreed to a 10-per-cent reduction for such purpose.

Money acquired through debt-for-environment swaps comes under the control of Ecofund, a non-profit foundation with an international board of management. The fund will have at its disposition \$500 million, to be portioned out successively between now and 2010. According to Maciej Nowicki, minister of environmental protection between 1992 and 1994, and now Ecofund president, \$40 million have already been allocated to sixty projects.

While it is difficult to name any figures to show just how air quality

has improved, measurements made by the IETU prove that in Katowice the concentrations of dust had decreased by more than half between 1992 and 1994, and those of sulphur dioxide by more than 40 per cent. Although the levels of most pollutants are still unacceptably high, there has been a considerable improvement in air quality. The task will now be to maintain momentum.

One question is how much of the improvement may be due to active measures, and how much to economic recession. The ministry for environmental protection claims that 70 per cent of the change can be ascribed to remedial measures. The director of the ecological department in the Katowice *voivod* estimated on the other hand that 60 per cent of the reductions of air pollutants in Silesia were a result of lower industrial output, and only 40 per cent a result of the program for improving air quality.

The changeover from a socialist economy, to a free economy that also takes into account the costs of environmental losses, has doubtless improved the chances of getting a better quality of air. Poland's environmental problems stem basically from negligence, so the reversal of a previous non-policy should soon show positive effects. But the opportunity must be seized now, any delay would be disastrous.

STANISLAW HLAWICZKA

Dr Stanislaw Hlawiczka, Atmospheric Research Dept., the Institute for Ecology of Industrial Areas (IETU), 6 Koszutha Str., 40-832 Katowice, Poland.

To save one of India's jewels

Air pollution from industry, households, and traffic is threatening the marble of one of India's most magnificent monuments, the Taj Mahal mausoleum at Agra, in Uttar Pradesh state. After an 11-year legal battle, the Indian government has now put forward a plan for cleaning the air throughout the surroundings. This will involve, besides Agra, the towns of Mathura, Firozabad, and Bharatpur.

The most important item in the plan is a new pipeline for natural gas, which, it is hoped, will lead to reduced use of coal and oil by the 2000-odd industries in the area. Although the demand for gas is greater than the supply in India,

the Agra project is to be given priority. With natural gas available, it should also be possible for households to abandon polluting fuels. As a means of curbing emissions from traffic, the plan envisages an increased use of low-sulphur diesel fuel.

Critics however consider the government's plan to be totally inadequate. Mahesh Chander Mehta, the lawyer who headed the instigation to the government to make the move, would like to see the whole area around Agra made into a pollution-free zone, which would mean moving away all polluting industry.

Source: *New Scientist*, March 18, 1995.

Further publications

Motor Vehicle Pollution Reduction Strategies Beyond 2010 (1995)

Report seeking to determine the impact that stricter, more comprehensive control programs could have on motor vehicle emissions over the next thirty to forty years. It examines the substantial potential for reducing emissions offered by state-of-the-art control technology, but also underlines the crucial importance of preventive approaches for any long term strategy.

134 pp. Obtainable from OECD, Publications Service, 2 rue André-Pascal, 75775 Paris Cedex 16, France.

OECD environmental performance reviews: United Kingdom (1994)

Part of the OECD environmental performance review program, which conducts peer reviews of environmental conditions and progress in each member country. The analyses presented are supported by a broad range of economic and environmental data. Reviews of Germany, Iceland, Norway, Portugal, Japan, and Italy have already been published.

210 pp. Obtainable from OECD, address as above.

Rebuilding Romania – energy efficiency and the economic transition (1994)

By W. Patterson. Describes and analyzes the opportunities and priorities for improving Romania's energy systems, with particular attention to energy efficiency. It looks towards international interaction and cooperation, and examines aspects of the Romanian experience that may be of wider relevance.

200 pp. £12.95. Can be ordered from the Royal Institute of International Affairs, Publications Department, Chatham House, 10 St James's Square, London, England SW1Y 4LE.

Sustainable energy guide (1995)

Published by the International Institute for Energy Conservation. Summarizes US based energy-efficiency and renewable energy programs that offer funding, information and technical assistance to developing countries.

Obtainable from Daniel Silver, IIEC, 750 First St., NE, Suite 940, Washington, D.C. 20002, USA.

What choice of fuel? (1995)

Leaflet from the European Federation for Transport and Environment (T&E) summarizing the environmental aspects on alternative fuels for transportation.

Available from T&E, Rue de la Victoire 26, B-1060 Brussels, Belgium.

No more favours

Valley sold piecemeal

Greenpeace and WWF are trying a new tactic to save the Vallée d'Aspe in the Pyrenees from being partly destroyed by a new road. The two organizations have bought up a stretch of the valley along which the road is due to be built and are selling it in lots of little pieces to various buyers, some of them high-profile names like the French cosmetics entrepreneur Yves Rocher. The move is a delaying tactic, so that when the French and Spanish governments come to the compulsory purchase of the land, there will be administrative chaos. All groups campaigning against the cross-border motorway say it makes neither economic nor ecological sense.

T&E Bulletin, April 1995.

Advantage of location

To minimize energy use for transport, employment should be located in the inner city or at other public transport junctions. A study of six different companies in Oslo, Norway, showed employees to be using as much as three times more energy to get to work in low-density suburbs as those living in the city centre or near transport junctions.

In the Netherlands, the Ministry of Housing, Physical Planning and Environment moved its administration from a suburb to the central railway station in the city centre. Employees have to pay more than 700 ecus per year to use a car parking space, while those going by public transport are subsidized by the ministry. Before the relocation, 40 per cent went by car. No only 4 per cent use a car, 20-30 per cent use bicycles, and 65-70 per cent go by public transport.

Land use planning, factsheet No. 8 from the T&E project "Greening urban transport."

Announcing ultra low emission vehicle

Honda has been the first manufacturer to develop a production-based petrol-fueled engine that has been tested and verified by the California Air Resources Board as meeting the Ultra Low Emission Vehicle Standards. The 2.2 litre four-cylinder engine is based on the one in the current Honda Accord EX. It uses Honda's close coupled, fast warm-up catalytic converter in addition to its normal underbody converter and an advanced, precise computer-controlled air fuel management system. It produces about the same horsepower as the current engine and has the same or a slightly improved fuel economy.

Car Lines, M.P. Walsh, January 1995.

IN PURSUIT of its course for environmentally adapted transportation, the European Federation for Transport and Environment has proposed the following four measures for curbing the growth of air transport:

□ A banning of all state aid to airlines – in other words a stop to public funding of this, the most polluting transport mode, which would be fully in line with the aim of liberalizing the European market for air transportation.

□ A value-added tax on intra-EU air transport. The present zero-rated VAT on air travel is in any case an exception to normal EU financial policy.

□ Tightening of the standards for aircraft emissions and noise. The guiding principle should be to promote maximum use of the best available technology.

□ A tax on kerosene. It is unthinkable that petrol and diesel should be exempt from fuel taxes, and it ought to be equally unthinkable in the case of aviation fuel. The tax level should relate to the amount of air pollution caused during flights.

These proposals have come as a reaction to a report from the European Commission entitled *The way forward for civil aviation in Europe*

FUEL TAXES

Need to be raised

THERE IS NO REASON for taxing diesel fuel at a lower rate than unleaded petrol. On the contrary the rate should be the same for both, and moreover be gradually raised. So says the T&E in a report comparing the effects of both these fuels on health and the environment.

The report has been made in response to the revision of the EU directive on common minimum fuel tax levels that is now taking place. Historically, diesel has always been taxed at a lower rate than unleaded petrol, and for this the T&E can see no grounds. Diesel is certainly slightly better than petrol as regards emissions of gases affecting the climate, but its emissions of acidifying pollutants are a whole 62 per cent higher. Diesel exhaust gases carry

and another called *Expanding horizons* that had influenced it and came from the so-called "Committee of Wise Men."

Both of these reports are in the T&E view defective, since they take no account of the effects of air transport on the environment. As the T&E points out, the aviation sector is now responsible for 3 per cent of the global emissions of carbon dioxide, a figure that is likely to rise to about 8 per cent by 2025. Emissions of nitrogen oxides and water vapour at flight altitude also constitute a significant risk to the earth's climate. Furthermore, air traffic causes various kinds of local nuisance around airports.

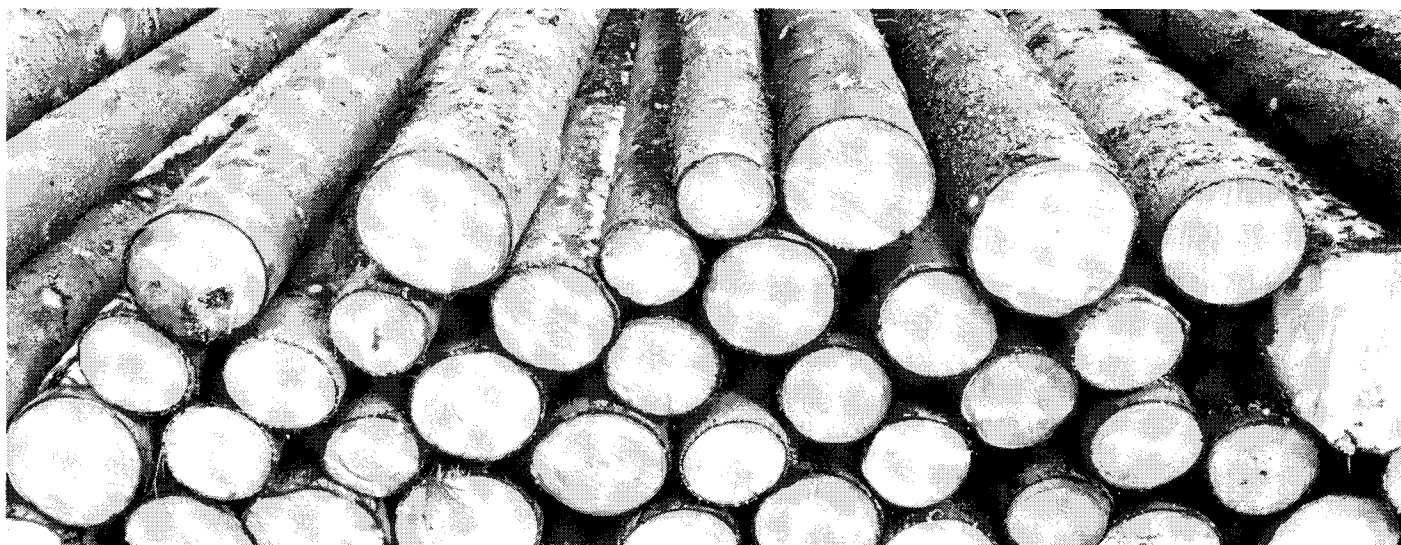
The Federation claims that taking away the tax reliefs from air transport, as proposed, will make the business "greener" and help to create the equality of competition between the various modes of transportation that the European Union is said to want.

Aviation and the environment. By Arie Bleijenberg and Chris Bowers. Can be obtained free of charge from the European Federation for Transport and Environment, Rue de la Victoire 26, 1060 Brussels, Belgium.

moreover a very much greater threat to health – even with the use of the best available cleaning technology – partly because of a great release of particles.

The EU ruling on minimum excise duty is also critically examined. If road users are to bear the costs for air pollution, noise, and accidents, as well as certain parts of the infrastructure, the tax on motor fuels should, at a conservative estimate, be raised to at least 700 ecus per 1000 litres – as against the present 287 ecus for unleaded petrol and 245 ecus for diesel fuel.

Taxing diesel and petrol – contemplations on environmental, health and social aspects. By Tom Sledsens. Can be ordered free of charge from the T&E, address as above.



© DAN RAPP

FORESTS

Rise and fall of carbon sink

A VAST AMOUNT of carbon is locked up in the world's forests. While the atmosphere contains about 750 billion tons of carbon, in the form of carbon dioxide, there are about 2000 billion tons contained in the world's forests. Roughly 500 billion tons are stored in trees and shrubs and 1500 billion tons in forest litter, soil and peat bogs.

Each year, about 5 per cent of this latter amount, or 100 billion tons, is cycled through the atmosphere. The cycle is in rough balance, with about 100 billion tons being absorbed through photosynthesis, while 60 billion tons is released by decomposition, and 40 billion by respiration.

Human activity has profoundly disturbed this natural carbon balance. Since 1850, about 320 billion tons of carbon have been dumped into the atmosphere – about 200 billion tons coming from the burning of fossil fuels and 120 billion tons from deforestation. About 130 billion tons of carbon have remained in the atmosphere. The most recent research suggests that 90 billion tons was absorbed by the oceans and about 100 billion tons by the forests.

Almost all of the carbon released by deforestation has been reabsorbed by forests elsewhere. How has this happened? And will it continue to happen in the future?

There are three major possible reasons for this forest carbon "sink":
□ Carbon dioxide fertilization. Carbon dioxide can act as a natural fertilizer, speeding up plant growth.

However, this process only works if trees have an adequate supply of other nutrients, including nitrogen. Hence, carbon dioxide fertilization, if it is happening at all, is only affecting tropical and temperate forests, not nitrogen-deficient boreal forests.
□ Nitrogen fertilization. Some scientists have concluded that nitrogen from acid rain, although giving rise

*Forces for its creation
now appear responsible
for its demise*

to many negative effects on trees, may be having a temporary fertilizing effect, especially in boreal forests.

□ Logging and other forest management practices. Monoculture tree plantations have replaced the natural temperate forests that were extensively logged in the early decades of the twentieth century. These plantations have absorbed billions of tons of carbon – including much, but not all, of the carbon released when these forests were first logged.

In addition, large-scale suppression of fire and insect damage has created forests and plantations that are artificially old and contain more carbon than natural forests.

Despite a common misconception, forests are not natural carbon sinks. Under normal conditions, forests are neither sinks nor sources, but are in

rough balance with the atmosphere. The forest carbon sink created during the 20th century is an artificial human creation – just as artificial as the huge carbon emissions from the burning of fossil fuels.

Moreover, there are growing signs that the forest sink is shrinking rapidly. Direct measurements show that less of the carbon released after the mid-1970s is being reabsorbed. In fact, a recent detailed analysis of the carbon budget of the Canadian forest, described during last fall's conference of the International Boreal Forest Research Association, concluded that the forest is now a carbon source, rather than a carbon sink. Allan Auclair, a Washington-based forest scientist, has drawn the same conclusion for all boreal forests.

Ironically, the same forces responsible for the creation of the forest carbon sink now appear to be responsible for its demise. Increased levels of carbon dioxide now appear to be causing significant climate change, thus increasing the frequency of fires, storms, and insect outbreaks and releasing still more carbon dioxide from dying forests. Increased levels of acid rain will cause forest die-back rather than fertilization through nitrogen.

It is as though human beings have been stockpiling gunpowder in a forest "warehouse" and then struck a match. The carbon bomb is about to explode.

KEVIN JARDINE
Greenpeace Canada

CLIMATE

Decisions postponed

BY THE TIME THE UN climate conference had come to an end on April 7 in Berlin, about all the 2000-odd delegates had managed to agree upon was a brief document prescribing continued conferring. After two years of preparation and almost ten days of tough arguing...

The Berlin meeting was the first Conference of the Parties to the framework Convention on Climate Change that was adopted at Rio de Janeiro in 1992. Its so-called Berlin Mandate, which was taken by consensus, is a call to negotiate a protocol or "other legal instrument" involving measures to come into force after 2000 – the year by which the industrialized countries have committed themselves to stabilizing their emissions of greenhouse gases. The renewed negotiations are to start "without delay" and be brought to a conclusion as early as possible in 1997, so as to have the outcome available for the third Conference of the Parties in that same year.

At Berlin several countries – including the United States, Canada, Australia, and the OPEC states – made strenuous efforts to head off any decision for a material reduction of emissions. The text of the Berlin Mandate is therefore very cautiously worded, saying that the negotiations that are about to start shall "aim to elaborate policies and measures, as well as to set quantified limitation and reduction objectives within specified time frames."

Despite all this vagueness, it is thought that the process that has now been set going will make it difficult for the Annex I countries – the members of the OECD plus the states of central and eastern Europe – to avoid the call for a real reduction of their emissions after 2000.

The role of the developing countries was extensively debated in Berlin. In particular the United States and Australia, fearing trade compe-

tion from Asia, wanted the emission requirements to apply to countries like China and South Korea as well. The meeting agreed however that it was too early to make such demands – seeing that the developing countries' emissions are still low, per capita, in relation to those of the industrialized nations. And the imbalance is still greater if the past pollution remaining in the air is included.

But a start is to be made on joint implementation, which means that one country can finance measures for climate improvement – such as tree planting or making more efficient use of energy – in some other country. Entering on any such scheme will however be voluntary, and the financing country will not be able to claim any results as the equivalent of a similar reduction of its own emissions. There is to be an evaluation of the results in 1999.

One clear outcome of the Berlin meeting was a decision to locate the permanent secretariat of the Climate Convention in Bonn. The proceedings are considered in general to have resulted in victory for the line pursued by the European Union. Several of the developing countries, as well as those environmentalist organizations that attended the meeting, expressed on the other hand great dissatisfaction. No support had been forthcoming for a proposal of the Alliance of Small Island States (AOSIS), which, together with the environmentalists, wanted to see a reduction of the emissions from the Annex I countries of 20 per cent between 1990 and 2005. The mandate merely says that this "should be included for consideration in the process."

PER ELVINGSON

Sources: *New Scientist*, April 15, 1995.
Environment Watch: Western Europe, April 7, 1995. *Göteborgs Posten*, April 7, 1995.

Coming events

Urban Transport and the Environment. Southampton, United Kingdom, July 4-6, 1995.

Inquiries: Conference secretariat, Wessex Institute of Technology, Ashurst Lodge, Ashurst, Southampton, England SO4 2AA. Fax +44-703-292853.

Freight Transport and the Environment. Manchester, England, July 10-11, 1995.

Inquiries: Chris Kaighin, Lancaster University, fax +44 1524 849499.

Caring for the Forest: Research in a Changing World. Tampere, Finland, August 6-12, 1995.

IUFRO '95; International Union of Forestry Research Organization.

Inquiries: Finnish Forest Research Institute. Phone +358-0-857051. Fax +358-0-625308.

Greenhouse Gases: Mitigation Options. London, England, August 22-25, 1995.

Inquiries: Dr. P. Reimer, IEA Greenhouse Gas R&D Programme, CRB, Stoke Orchard, Cheltenham, England GL52 4RZ. Fax +44-1242-680758.

Ecology '95: Environmental Fair and Conference. Göteborg, Sweden, August 28-31, 1995.

Inquiries: Svenska Mässan, Box 5222, 402 24 Göteborg, Sweden.

Third International Conference Air Pollution '95. Porto Carras, Greece, September 26-28, 1995.

Inquiries: Liz Kerr, Wessex Institute of Technology, Ashurst Lodge, Ashurst, Southampton, England SO4 2AA. Fax +44-703-292853.

Fourth International Energy Efficiency and DSM Conference. Berlin, Germany, October 9-12, 1995.

Inquiries: SRC International, 111 President Blvd, Suite 127, Bala Cynwyd, PA 19004, USA.

Spatial and Temporal Assessment of Air Pollution Impacts on Ecosystems. Vienna, November 22-24, 1995.

Inquiries: Dr. Gerhard Soja, Research Centre Seibersdorf, Dept. of Agricultural Research/LA, A-2444 Siebersdorf, Austria.