Week, May 2

Strategies against Climate Change

Concentrations of greenhouse gases are rising rapidly. These gases, which include carbon dioxide, chlorofluorocarbons, tropospheric ozone, nitrous oxide, and methane, have in the last century raised the average temperature of the earth between 0.5 and 0.9 degrees centigrade. This rapid warming of the planet will lead to climatic instability, which could disrupt precipitation and agricultural patterns, shift the location of deserts, cause the collapse of ecological systems, increase the probability and severity of droughts, hurricanes, and floods, and raise the level of the world's oceans. Some of these effects are likely to strike nations that are least able to respond to devastating political and economic impacts. Unfortunately, past emissions have already ensured significant changes of climate and a probable further warming.

The problem will require an extraordinary level of organizational ability and leadership from politicians and industrialists, as well as individual responsibility for its solution.

At the Climate and Development Congress convened by the West German government in Hamburg last November, and attended by scientists and politicians from all over the world, NGOs including Greenpeace and Friends of the Earth issued the following statement of policies to prevent climate change.

As a means of stabilizing the concentrations of greenhouse gases and so ensuring the habitability of the planet and the well-being of humanity and the natural world, they submitted strategies for:

- Energy policy
- Forestry policy
- Policies for CFCs
- Methane, nitrous oxide, and tropospheric ozone.

Energy policy

Reducing emissions of CO_2 is the most important single measure that can be taken to arrest climate change. The key factors in CO_2 emission levels are the amount and types of fuels burned throughout the world and the relative rates of deforestation and afforestation.

Western Europe, North America, and the Eastern Bloc countries produce two-thirds of the global CO_2 emissions. As the primary sources of the present excessive atmospheric loadings of greenhouse gases, the countries in these and other industrialized parts of the world should take the initiative in reducing emissions now – and if necessary even before internationally binding agreements are reached.

In the report of a workshop held at Bellagio, Italy, in November 1987, it was said that a reduction of at least 50 per cent in CO_2 emissions would be needed to limit global warming to 0.1 degree C per decade. (This work-

Continued on page 5

No.2, May 1989

WS

27 - June 5, 1989

CLEAN AIR NOW!

zdusi 89, Reine Luft Woche 89,

Nuclear power no solution

At present about sixteen per cent of the world's electricity is generated in nuclear plants. The electricity supply industry is responsible only for about 30 per cent of the global consumption of fossil fuels. The remainder is largely used in transport. Fossil fuel consumption, however, only accounts for about two-thirds of the net flow of carbon dioxide to the atmosphere that is a result of human activity. The rest is mostly due to deforestation.

Carbon dioxide is in turn responsible for only about half of the global warming phenomenon. The balance is the result of increasing concentrations of "greenhouse gases," principal among which are methane (from agriculture), low-level ozone (from vehicle emissions), and CFCs (from refrigerants and aerosol propellants).

Even if all the world's electricity were to be produced in nuclear plants (which is in any case not possible), the consequent reduction in global warming would amount to less than 12 per cent.

In order to meet the entire world demand for electricity after it has doubled in 2020, the number of reactors would have to be increased by a factor of eighteen. This would mean the commissioning of one new nuclear plant every two-and-a-half days between now and the year 2020. It would entail a doubling of the Third World debt, and besides having grave environmental implications, greatly increase the risk of weapon proliferation.

The alternative lies in active national policies to encourage investment in efficient uses of energy. Energy efficiency in the industrially developed countries has already improved by 20 per cent since the oil crash of the early seventies, and current estimates put the potential for further improvement at 50 per cent.

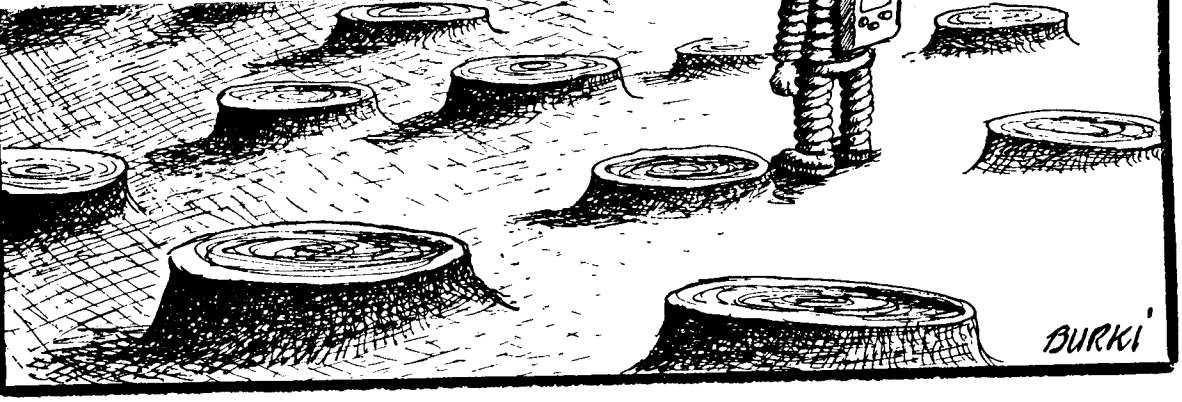
This indicates the vast potential that exists for reducing the emissions of carbon dioxide and other pollutants produced by energy industries. Furthermore, the low capital intensity and rapid lead time of energy-efficiency technologies means that they can be introduced far more swiftly than any program could be implemented for a massive supply of nuclear electricity.

Reliable figures show that every dollar, pound, or mark invested in energy efficiency will replace nearly seven times more energy than an equal amount invested in nuclear power – and thus be the substitute for seven times more fossil-fuel-burning plants producing carbon dioxide. In addition to being economically and socially beneficial, improved energy efficiency is the only way to rapidly and effectively combat global warming.

Andrew Stirling
Greenpeace International

Photo: Michiel Wijnbergh ©

The Air Pollution Action Network was set up in the Netherlands in 1985 during the International Citizen Conference on Acid Rain.



Mort des forêts.

Energy efficiency best

A major part of environmental problems in general and air pollution in particular has to do with the energy system.

The choice of energy conversion technology (for combustion and pollution control) and the choice of fuel have a great impact on the amount of pollutants released. In addition, the extraction of primary energy from the environment has certain adverse environmental effects (as e.g. coal mining or hydro-electric dams).

Investments in air pollution control technology may help to reduce emissions substantially. Some important problems, however, cannot be solved (or are indeed created) by the use of pollution control technology: the release of carbon dioxide (including climate change) and heavy metals, and storage of great volumes of contaminated ashes and scrubber deposits.

A complementary and perhaps more powerful a way to reduce air pollution (as compared to dedicated pollution control technology) is to increase the technical efficiency in the production of final energy services. This involves the whole process from, for example, mined coal to a desired indoor climate, and thereby applies to 1. devices converting secondary energy to goods and services (final energy use), 2. central energy conversion plants (district heating, electricity production etc.), and 3. systems configuration, involving e.g. cogeneration of heat and power.

Continued on page 3

Europe-wide Campaign for Clean Air

At the East-West Consultation Meeting organized by the Air Pollution Action Network last December in Hungary, it was decided to hold the 7th international action week between May 27 and June 5, 1989.

Instead of an International Acid Rain Week, it is to be an International Air Pollution Week, focusing on soil acidification and the effects of low-level ozone, as well as on the alarming depletion of ozone in the upper atmosphere, and on global warming.

So it is to be International Air Pollution Week. News has come from many places about preparations for public activities: There will be a car-free day campaign in Poland, a "Europe's 100 biggest polluters" campaign will be announced in Czechoslovakia, a Conference on the Ecological Crisis in Krakow, Environment Week in the Netherlands, a campaign for public transportation in Sweden, forest meets in Sweden and Yugoslavia, and so forth.

You too could join in with other activities: organize forest alerts, bicycle demonstrations, symbolic activities highlighting the protection of monuments, postcard protest campaigns, public lectures and debates, information booths in the streets, exhibitions, money collections for the support of environmental groups in Eastern Europe, and anything else you might think of.

You could also find out whether your government has signed and ratified the various international conventions for air protection, and whether it will be actually carrying out the measures that these conventions imply.

Reinhold Pape

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, Tiszta levegö hete 89, Tyden cistoty o

czystego powie trza 89, Ren luft

Critical loads remain m

How much pollution can the environment take? The question is central to the debate on environmental matters, because from the answer one can see how much the emissions of pollutant will have to be reduced.

Last spring fresh scientific data on the subject emerged as a result of two meetings of international experts. Both represented work that is being carried on within the Convention on Long-Range Transboundary Air Pollution set up by the UN Economic Commission for Europe. The findings are intended to form a basis for continued negotiations to limit emissions.

Sulphur

For forest soils the critical load was defined as the highest deposition that would not cause chemical changes in the soil, which in turn would lead to long-term harmful effects on the ecosystem.

Any overstepping of the critical load would mean that the soil could no longer neutralize additions of acidifying substance. Subsequent leaching of mineral nutrients (in particular potassium, calcium, and magnesium) may then cause nutrient deficiency. Moreover the liberation of aluminium and other metals from the soil water can poison the trees' root systems.

The weathering rate of minerals in the soil is what determines its ability to neutralize acid input. Table 1 shows critical loads for soils with differing weathering rates – the limits being given as total acid input, expressed both as hydrogen ion equivalents (keq/km^2/yr) and as sulphur depositions in kilograms of sulphur per hectare per annum (kg S/ha/yr). A kiloequivalent of hydrogen ions per square kilometre corresponds to 0.16 kg of sulphur per hectare.

Soils in classes 1 and 2 are composed of slowly weathering minerals from parent rocks such as granite and gneiss, in 3 and 4 from rocks such as gabbro and basalt, and in class 5 from limestone which weathers very easily.

The figures in the table should be set against the actual depositions of sulphur on forest land in various parts of Europe. In southern Sweden for instance the deposition is 15-30 kg/ha/yr, and in parts of West Germany 50-80 kilograms. In the worst affected areas of Central Europe it is more than 100 kilograms.

As regards the groundwater and freshwater ecosystems (lakes and streams) in sensitive areas the critical limits for acid input and sulphur deposition are 10-50 keq H^+/km^2/yr and 2-8 kg S/ha/yr.

Nitrogen

On account of a deficiency in relation to other plant nutrients, nitrogen has traditionally been a growth-restricting factor in most forest ecosystems in Europe. Extra inputs in the form either of fertilizer or airborne depositions have consequently brought about increased growth. If there should be a greater input than the vegetation can absorb the soil will sooner or later become saturated, thus increasing the risk of adverse effects, such as:

- Increased leaching of nutrients (acidification).
- Nutrient imbalances in the vegetation.
- Reduced frost resistance.
- Greater leakage of nitrogen in the form of nitrate to groundwater, freshwater ecosystems, and the sea.
- Changes in the flora. More than two-thirds of Central European vascular plants can only compete on nitrogen-poor soils.

For various reasons, it is not possible to set general critical loads for nitrogen as one can for sulphur. In the case of nitrogen they will depend on the productivity of the ecosystems, the activity of certain microorganisms in the soil, and the composition of the vegetation. It has still not been possible to determine the limits for several types of ecosystem.

It may however be said that in many cases the critical load will be 3-15 kg N/ha/yr
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Table 1. Critical loads for acid and sulphur in relation to the weathering capacity of the soil in forest land.

Class	Acid input (keq H^+/km^2/yr)	Sulphur deposition (kg S/ha/yr)
1. Very slow weathering	< 20	< 3
2. Slow weathering	20—50	3—8
3. Moderate weathering	50—100	8—16
4. Rapid weathering	100—200	16—32
5. Very rapid weathering	> 200	> 32

Damaged forest in Harz mountains, West Germany. Photo. Chr

most important factor

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ant to bear in mind ons of nitrogen also the acidification of r. In areas that are ated this applies in winter, when active and not tak- utrients. On satu- itrogen acidifies in as sulphur. Conse-

quently the deposition of nitrogen on saturated soils will mean that they can withstand lesser amounts of sulphur than appears from Table 1.

Critical levels

These were defined by the working group as concentrations of pollutants in the atmosphere which if exceeded may cause direct adverse effects, for instance on plants, ecosystems, or materials.

As concerns sulphur dioxide (SO_2), the critical levels are put at 20-30 micrograms per cubic metre ($\mu g/m^3$) for a yearly average, with 70 $\mu g/m^3$ as a peak value (daily mean level).

Crops are considered to be particularly sensitive to ozone (O_3). The most sensitive forest trees are Scots pine and European larch. The proposed critical levels are shown in Table 2.

Nitrogen oxides are generally regarded as less toxic to plants than SO_2 and O_3, while nitrogen dioxide (NO_2) is considered to be definitely more phytotoxic than the monoxide (NO). Because of its relatively low toxicity, no critical levels have been set for NO_2 alone, but only in combination with O_3 and SO_2. The maximum annual mean level would then be 30 $\mu g/m^3$ and the peak level 90 $\mu g/m^3$ (average for 4-hour exposure).

Table 2. Critical levels of ozone for sensitive plants, plant communities, and ecosystems.

Exposure (hours)	Ozone concentration ($\mu g/m^3$)
0.5	300
1.0	150
2.0	110
4.0	80
8.0	60
Vegetation period*	50

* Daily mean value during the summer half-year.

It should also be borne in mind that these gases seldom occur alone in the atmosphere, and that their toxic effects will be intensified when they occur in combination. Consequently the critical levels figures, especially for SO_2 and O_3, must be regarded as maximum concentrations, and if the synergic effects are taken into consideration, the maximum levels should be lower.

Looking back, too, it can be seen that the proposed levels have always tended to be put lower as research methods have improved and more data have become available. It is therefore not improbable that today's critical levels will also have to be reduced after a few years.

Needed reductions

After a careful study and evaluation of the available scientific data, in April this year the European environmental organizations agreed on the following objectives for overall reductions of te emissions of air pollutants in Europe.

Emissions of sulphur and nitrogen oxides to be reduced by at least 90 per cent, and concentrations of ozone by at least 75 per cent (the latter to be achieved as a result of the reduction of nitrogen-oxide emissions by the said amount, combined with an adequate reduction of the emissions of VOCs, volatile organic compounds). Emissions of ammonia will also have to be reduced – in some parts of Europe by up to 90 per cent.

These objectives imply reductions from the 1980 levels.

Since the critical loads have already been exceeded for several decades, the need to bring about the above reductions is urgent.

Christer Ågren

. Christer Ågren ©

Photo: Dan Rapp ©

Damaged forest in Harz mountains, West Germany. Photo: Christer A

Best standards everywh

Motor vehicles, using petrochemical fuels, emit significant quantities of nitrogen oxides, hydrocarbons, carbon monoxide, carbon dioxide, fine particles, and lead, each of which can have adverse effects on health and the environment. Because of the growing vehicle population and the high emission rates, serious air pollution problems have become increasingly common phenomena in modern life. In an effort to minimize the problem, emission rates from cars in the US have been limited by legislation since the 1968 model year.

With passage of the Clean Air Act Amendments in 1970 and amendments in 1977, the Congress knowingly imposed standards which could not then be achieved. To comply with the law, auto manufacturers were required to develop and commercialize technologies which existed only in research laboratories or on prototypes. The adoption of these "technology forcing" standards was complemented by a comprehensive regulatory structure for assuring compliance. Standards adopted to date for automobiles (converted to 1975 Federal Emission Test Procedure equivalents) are shown in the tables.

The technology necessary to meet the standards has been so developed that all 1983 and later model cars fuelled by gasoline have been "certified" to the most stringent levels. Without exception, all new gasoline automobiles sold in the US today and for the last several years are equipped with catalytic converters and require the use of lead free fuel.

Emission reductions

The tables show the automobile exhaust emission standards for HC, CO and NO_x, respectively, along with the average in-use performance of these same model-year cars. These data indicate several important facts:

1. Automobile standards have been tightened significantly over the last 20 years, especially for HC and CO and to a lesser extent for NO_x.

2. As a general matter, tighter standards have resulted in lower in-use emissions performance.

3. Average in-use emissions have generally been higher than the respective standards, especially for CO and HC. In-use NO_x performace is much closer to the standards.

4. In absolute terms, the shortfall between the standards and the in-use vehicle performance has tended to be narrowed as the standards have been tightened.

The overall reductions in emissions from **all** transportation sources in the US during the last decade were 88 per cent for lead, 25 per cent for CO, and 30 per cent for HC. These reductions occurred despite a 26 per cent increase in vehicle miles travelled during this same time period. However, because standards for other pollutants have been more lenient or implemented later, overall reductions have been only 1 per cent for NO_x and there has been no reduction in particulate.

In effect, growth in vehicle miles travelled and less stringent controls on mobile sources other than cars (especially trucks) are reducing the overall gains. Significant additional reductions of these pollutants from mobile sources therefore have the potential for substantial additional improvements.

Fuel economy gains

Attainment of the emission standards has been accompanied by improvements in fuel economy, from an average of 14.9 miles per gallon (mpg) in 1967 (15.5 liters per 100 kilometers) to 28.0 mpg (8.6 l/100 km) in 1987 - an improvement of 79 per cent. Corrected for reductions in vehicle weight, the improvements are still about 44 per cent in comparison with pre-controlled cars. These data show that it has been possible to achieve simultaneously the dual national goals of lower emissions and better fuel economy.

A divided Europe

In Europe, several non-Common Market countries continue to outpace their Community neighbours in the introduction of state-of-the-art controls, while within the Community Denmark and the Netherlands are still reaching beyond the Community

Table 1

Model year	Standards (grams per mile) HC	CO	NOx
Pre-1968	8.2	90.0	3.5
1968–71	4.1(50)	34.0(62)	–
1972–74	3.0(63)	28.0(69)	3.1(9)
1975–76	1.5(82)	15.0(83)	3.1(9)
1977–79	1.5(82)	15.0(83)	2.0(41)
1980	0.41(96)	7.0(92)	2.0(41)
1981+	0.41(96)	3.4(96)	1.0(76)

Pre-1968 does not give standards, but approximate levels prior to adoption of standards. Figures in brackets shows per cent reduction from uncontrolled levels.

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New requirements

Several areas are looking to strengthen their emissions requirements still further. In North America, the State of California, still plagued by severe smog conditions in Los Angeles, continues its leadership in extending pollution control requirements for vehicles. While it already has the most stringent NO_x requirements in the world (0.4 g/mile beginning in 1989), it has indicated its intention of also adopting more stringent hydrocarbon levels as well as extending the mileage over which the standards apply. Several other states in the Northeast US have also indicated their intention of adopting the complete California program. Some members of the Stockholm Group are also considering standards equivalent to the Californian.

Global effects

There is increasing concern that the tremendous worldwide growth in vehicle and other emission sources may be increasing the buildup of "greenhouse gases" which can alter the global climate. Since 1950, the global vehicle population has increased tenfold, and it is still increasing. In 1988, the planet reached the milestone of 500 million motor vehicles. Evidence is accumulating that carbon oxides, hydrocarbons, and nitrogen oxides from vehicles join with the emissions of pollutants from other sources in contributing to the warming of the planet. As a result, pressures continue to expand controls to more vehicles and to bring down emissions from already controlled vehicles to even lower levels. Adopting current state-of-the-art requirements for all cars around the world could substantially improve the pollution burden on the atmosphere arising from vehicles. Further, the technology to reduce vehicle emissions continues to evolve and develop.

The recent signing by twelve European countries of the NO_x Declaration committing them to a 30 per cent reduction, as well as the signing by 25 countries of the UN ECE NO_x Protocol committing to a freeze of NO_x emissions, will undoubtedly increase interest in NO_x control technologies. The emissions of carbon dioxide will however remain as long as the vehicles are using fossil fuels.

In the short term, that is over the next two decades, as the search for a long- term fossil fuel alternative is pursued, CO_2 emissions could be restrained or even reduced by improving vehicle efficiency. On a global basis, about a three per cent annual improvement in vehicle efficiency would be necessary merely to keep pace with anticipated growth. As noted above, experience in the US indicates that such efficiency gains are compatible with improvements to reduce CO, HC and NO_x as well.

Michael Walsh

Drawing: Burki, © 24 Heures

Limits set for la combustion pla

Early in December last year the official text was published of the EEC Directive on emissions from large combustion plants – having been finally adopted by Environmental Ministers on November 24, almost five years after it was proposed by the European Commission as one of the main planks of the EEC's strategy for the abatement of acid rain.The legislation applies to combustion plants with a thermal input of 50 MW or more, regardless of the type of fuel used, except for units in which the products of combustion are used directly in manufacturing processes.

The directive has two main parts. First, it obliges member states to draw up programs to reduce emissions of sulphur dioxide and nitrogen oxides in phases by specified amounts, using the figures for 1980 as the baseline (see table).

The reduction targets vary from country to country, the brunt of the program being borne by the northern European states. In absolute terms, the UK will remain the largest source for emissions both of NO_x and SO_2 from existing plants once the targets are met.

Overall, the effect of the directive will be to reduce SO_2 emissions from existing large combustion installations within the EEC from 14.43 million tons in 1980 to 6.14 million by 2003 – a drop of 58 per cent. Originally the Commission had sought to achieve a 60 per cent reduction by 1995.

For NO_x, the reduction will be 30 per cent between 1980 and 1998, with EEC-wide emissions falling from 3.68 to 2.58 million tons in that period. The Commission had wanted a stiffer target of 40 per cent by 1995.

When the programs are completed, the emissions of both SO_2 and NO_x may actually be higher, since the figures apply only to existing plant.

Working in the other direction, however, are provisions in the directive which require the Commission to submit a report to the Council in 1994 on the progress achieved in implementing the reduction programs, "accompanied where necessary" by proposals to amend the last stages of the reduction targets for SO_2 and NO_x and/or the deadlines for achieving them. These proposals can only be agreed unanimously.

Member states have until July 1, 1990, to draw up their reduction programs, and must inform the Commission of these by the end of 1990. From 1990 annual emission inventories for SO_2 and NO_x must also be compiled for existing plants and submitted to Brussels. Progress reports on implementations of programs will also have to be sent to the Commission, which must organize "regular comparisons," "take particular care to ensure that the implementation of the programs produces the expected results" and, where necessary, make appropriate legislative proposals.

Procedures are built into the directive for a modification of the reduction targets laid down, "if a substantial and unexpected change in energy demand or in the availability of certain fuels or certain generating installations creates serious technical difficulties" for compliance. The Commission must "take a decision to modify" a member state's targets on request, although it is not obliged to comply with the precise terms of such a request. The Council may also take a different decision, on a qualified majority vote, if the matter is referred to it by a member state.

These procedures make no provision, however, for shutting down a flue-gas desulphurization (FGD) plant in the circumstances which local authorities in Britain may specify in planning agreements with the electricity industry for power stations that are to be retro with FGD. For the first suc tion, Drax, the North York County Council has impos requirement that the FGD "shall not continue to opera sale or disposal outlets ar available for by-product gyp

Countries are also allow delay until 1995 the fulfill of their Stage 1 reduction grams for NO_x, provided notify the Commission of intention to do so by Decer 24, 1988.

The second main part of th rective sets emission limit SC_2, NO_x and particulates i spect of new plant – in o words, any plant granted a struction licence after Jul 1987. For units burning soli liquid fuels, the SO_2 limits set on a sliding scale, depen on boiler capacity.

At the UK's insistence, h ever, no emission limits have been set for new plant in the 100 MW range. These will fixed in 1990, "on the basis

	Sulphur Dioxide							Nitrogen Oxides				
	Emissions,	Emission ceilings			% red'n over 1980			Emissions,	Emission ceilings		% red'n over	
	1980	1993	1998	2003	1993	1998	2003	1980	1993	1998	1993	1998
	(000 tons/year)							(000 tons/year)				
Belgium	530	318	212	159	-40	-60	-70	110	88	66	-20	-40
Denmark	323	213	141	106	-34	-56	-67	124	121	81	-3	-35
Germany	2225	1335	890	668	-40	-60	-70	870	696	522	-20	-40
Greece	303	320	320	320	+6	+6	+6	36	70	70	+94	+94
Spain	2290	2290	1730	1440	0	-24	-37	366	368	277	+1	-24
France	1910	1146	764	573	-40	-60	-70	400	320	240	-20	-40
Ireland	99	124	124	124	+25	+25	+25	28	50	50	+79	+79
Italy	2450	1800	1500	900	-27	-39	-63	580	570	428	-2	-26
Luxembourg	3	1.8	1.5	1.5	-40	-50	-60	3	2.4	1.8	-20	-40
Netherlands	299	180	120	90	-40	-60	-70	122	98	73	-20	-40
Portugal	115	232	270	206	+102	+135	+79	23	59	64	+157	+178
UK	3883	3106	2330	1553	-20	-40	-60	1016	864	711	-15	-3
EEC	14430	11065	8402	6140	-23	-42	-58	3678	3306	2583	-10	-30

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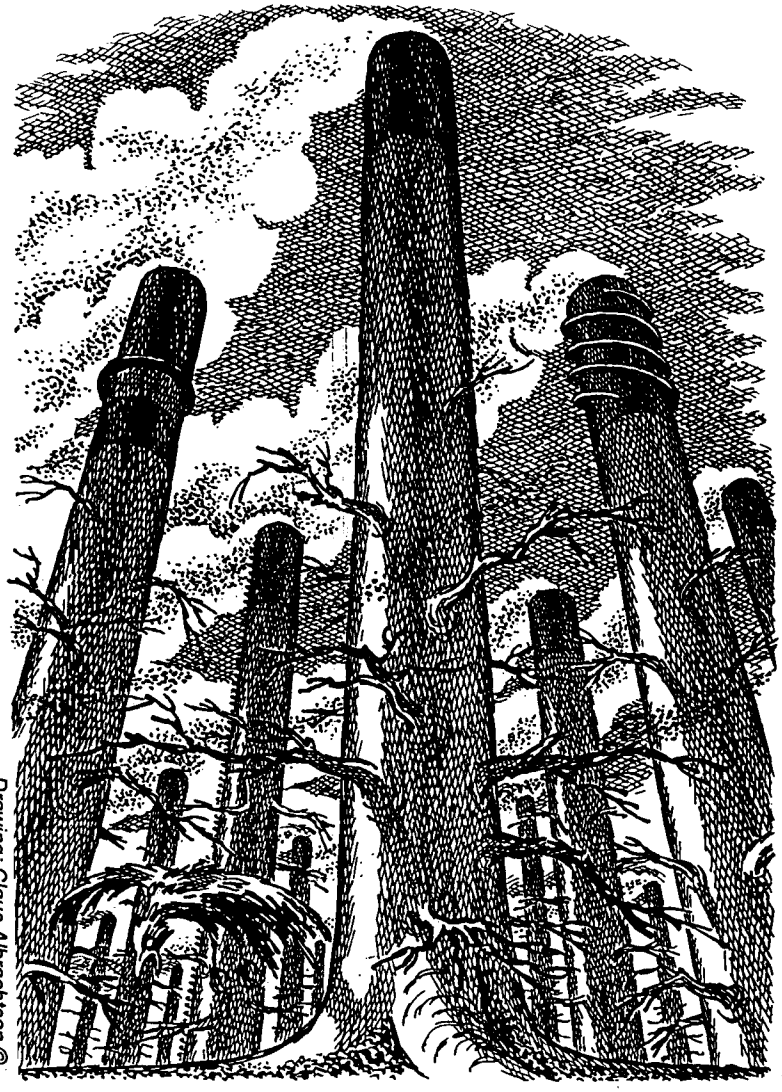
	-3	-35
	-20	-40
	+94	+94
	+1	-24
	-20	-40
	+79	+79
	-2	-26
	-20	-40
	-20	-40
	+157	+178
	-15	-3
	-10	-30

Commission report on the availability of low-sulphur fuel and relevant Commission proposal."

The emission limits will also be subject to revision, because the directive obliges the Commission to submit proposals to amend them before July 1, 1995, "in the light of the state of technology and environmental requirements." The proposals may only be adopted unanimously.

A large number of derogations from the emission limits are provided. Spain, which burns indigenous high-sulphur fuels, has been allowed until the end of the century to authorize plants larger than 500 MW which do not comply in full with the SO_2 emission limits.

More generally, plants burning indigenous solid fuel which cannot, "owing to the particular nature of the fuel," comply with the SO_2 limits without using "excessively expensive" technology will instead have to achieve specified rates of desulphurization. Other derogations are provided for plants burning indigenous lignite, and for instances where supplies of low-sulphur fuel are interrupted.



Drawing: Claus Albrechtsen ©

Equally, combustion units which fail to meet the NO_x emission limits will have up to a year to achieve compliance. The Commission must immediately be informed of such cases. This derogation is also to be reviewed, on the basis of Commission proposals submitted before July 1, 1995.

The directive moreover lays down general procedures to be followed in cases where abatement equipment malfunctions or breaks down. The authorities are to order the operator to "reduce or close down" the combustion unit "as soon as practicable," or to switch to "low polluting fuels," unless there is "an overriding need" to maintain electricity supplies.

Special procedures are laid down for calculating the emission limits applicable to plants burning more than one type of fuel. These will apply in particular to oil refineries.

Other provisions define the way in which compliance with the limit values is to be calculated. Monitoring procedures are spelled out in an annex.

A general requirement is that all monitoring and associated equipment must "correspond to the best industrial measurement technology," and provide "reproducible and comparable" results. Monitoring methods must be approved by the authorities, and the performance criteria which they specify for measuring, calibration, and data-handling equipment must be notified to Brussels.

Countries have eighteen months in which to draw up their emission reduction programs. In the UK, two major policy decisions are awaited – whether the electricity industry alone, or other operators of large combustion plant as well, will be required to contribute to the UK program, and whether and how the costs of achieving it are to be shared out among the various emission sources.

Ends Report, 7 December 1988.

Published with permission. Ends Environmental Data Services, Finsbury Business Centre, 40 Bowling Green Lane, London EC1R ONE.

Fifteen major SO_2 polluters in Europe with more than 200 000 tons SO_2 emissions per year.

Emitter	Country	Capacity (MW)	Emissions (tons SO_2)
1. Puentes	Spain	1400	632.000
2. Boxberg	German Democratic Republic	3250	459.000
3. Andorra	Spain	1050	407.000
4. Balti/Eesti	USSR (Estonian SSR)	3100	386.000
5. Drax	United Kingdom	3960	337.000
6. Petsamo	USSR (Kola peninsula)		337.000
7. Schwarze Pumpe	German Democratic Republic	1050	320.000
8. Prunerov	Czechoslovakia	1710	280.000
9. Hagenwerder	German Democratic Republic	1700	263.000
10. Melnik	Czechoslovakia	1270	260.000
11. Balchatow	Poland		254.000
12. Tusinice	Czecholslovakia	1460	230.000
13. Turow	Poland		227.000
14. Jänschwalde	German Democratic Republic	2500	208.000
15. Severo	USSR (Kola peninsula)		200.000

The above list is an extract from a quick survey of the hundred largest sulphur dioxide emitters in Europe. M
exact figures from official sources are difficult to obtain. Informations on this matter would be gladly accept

Spanish evashion of rules

Not all countries have to comply exactly with the EEC Directive on emissions from large combustion plants. Many of the member states claim derogations on account of on-going industrialization, which allows no present reduction of emissions but rather an increase. Others refuse to accept the necessity of reductions, arguing that they are suffering no damage themselves and are not affecting others.

Both arguments have been employed in the negotiations by Spain. This country will therefore not be fulfilling the requirements of the Directive, but has committed itself instead to the following reductions:

	1993	1998	2003
SO_2	0	-24	-37 per cent
NO_x	+1	-24	–

Otherwise the Commission has unanimously adopted the principle of emission limits for new plants, thus setting a limit for emissions at the source for all member states of 400 mg/m^3.

The limits will be less strict when domestic coal is burnt. This possibility for exception was again taken by Spain, which also managed, alone among the members of the Community, to gain an allowance of 800 mg SO_2/m^3 for imported coal as well. Moreover only a 60-per-cent desulphurization is required for power plants of up to 2,000 MW capacity that burn domestic coal, and the same allowance is made for plants up to 500 MW when the fuel is imported.

Spanish brown coal may contain as much as 6 per cent sulphur. A 60 per cent reduction permits the emission of 4,800 mg SO_2/m^3, which for a plant of 2,000 MW would mean 300,000 tons of sulphur dioxide per annum. That is more than was emitted from power plants in the whole of the Netherlands in 1980.

When these derogations were agreed, it was assumed in the EEC that given the climatic conditions in Spain, such high emissions would have no appreciable ecological effects. But it was made quite clear at a recent EEB seminar that considerable damage had already been caused in Spain by emissions from the Andorra (Teruel) and Cerqs plants.

Emissions from Andorra amount to 400,000 tons of sulphur dioxide a year. This is reflected in the 220,000 hectares of forest that were found to be damaged in a survey carried out by the environmentalist organization ICONA. By using an indicator gas injected into the Andorra flue gases, Norwegian scientists have shown that the damaged area is just where the flue gases fall.

In the case of Cerqs there is a court judgment associating forest damage with the emissions from the plant.

The question is whether Spain, where every year there is great destruction of forests by fire, can afford additional damage through emissions from power plants, not to mention the secondary effects of erosion and desertification.

Karola Taschner
European Environmental Bureau

Drawing: Claus Albrechtsen ©

ns per

SO_2)

Europe. More
dly accepted.

Energy efficiency best

Continued from page 1

Efforts in these three areas may substantially decrease the volumes of primary energy used. Specifically, it may reduce **fuel** use, which has particular importance with regard to air quality.

General aspects

People do not ask for or buy energy in itself. It is what energy may produce, or help produce, that we want. Some of the most important energy services are indoor climate, food preparation, lighting, hygiene (washing, drying) and transportation. How these are produced are of little interest to us. However, we are concerned about total economic costs and environment or other external effects associated with the production. The theoretical (thermodynamic) limits for what may be achieved by using energy more efficiently are very far away. Limits are set, instead, by technical/economical considerations. These are, however, strongly dynamic, and depend on the development of energy prices and technology.

Technological development and changes in relative prices have led to the introduction of technologies which are cost-effective and have a higher technical efficiency. This means that the "iron law of energy-GDP" is broken.

Making energy use more efficient brings about many positive side-effects (that not always are measurable in economic terms), e.g. a decrease in the dependence on international markets and the mitigation of regional, transnational and global environmental problems.

The difference in energy efficiency between the average stock of energy-using equipment for final energy use and new, competitive, technology on the market is often great. Up to a 50 per cent decrease in energy use for specific tasks is common. This shows the **possibilities** to reduce the need for primary energy, when investment decisions are made (at any level in the society). Whether such a development is going to be the case or not is a function of,i.a., the institutional and organizational framework and the information available to single actors.

Reducing pollution by employing new technology for final energy use does not necessarily have to bring about extra costs, if appropriate technologies are chosen when new investments are made. It is of great importance to analyze the energy efficiency performance at such occasions.

Energy use in **buildings**, particularly for the providing of a good indoor climate (comfort heat or cooling), accounts for a major part of the total final energy use in most industrialized countries. Thermodynamically, the theoretical need for high quality energy as fuel or electricity is minimal for maintaining a good indoor climate. The main strategy here is to control and minimize thermal losses (transmission and ventilation). New buildings can be made very energy-efficient. Households use of electricity can be reduced by 30-50 per cent over fifteen years (the normal lifespan for appliances) if consumer choose the best available technology when repurchasing.

Industry

Energy use in industry is very unevenly distributed over different activities. In general, materials producing industry has a very high energy intensity in its production, counted as energy per value-added in production. Finishing and assembling, on the other hand, has a far lower intensity.

It may be pointed out here some general observations, valid for most industrialized countries:

- there is a shift in consumption (in economic terms) away from material intensive goods and towards more services and sophisticated products. These are much less energy-intensive to produce.
- processes in industry become more efficient with regard to raw materials and energy (as a function of price changes and technological development).

These trends mean that future consumption will be less energy-intensive than it has been over the last decades of strong material growth. A continued economic growth will thus not necessarily be followed by a corresponding increase in energy use.

Transportation

Environmental and other problems associated with transport may be attacked in at least two ways: structural changes (as transferring road transports to railways) or changes within the current structure (as emission control on vehicles.

The prospects of being able to make vehicles that are much more economical of fuel are good. An increased energy efficiency in itself brings down pollution from road transport. This do not exclude, however, the use of catalytic converters or other forms of pollution control. The effect produced by efficient cars, however, remains essentially intact over the lifetime and at most driving conditions. This is not necessarily the case for dedicated pollution control technology.

At system level

System considerations involve the organisation of heat and power production on a national level. In particular the use and production of electricity is strategic. Production of electricity from fuels has with current technologies a poor efficiency and thereby generally large emissions per unit of useful energy produced. Exploiting the possibilities of cogeneration of heat and power brings down energy losses and thereby pollution.

What electricity is used for and with what technology is of great importance. Many activities are "electricity-specific", in the sense that other energy carriers are obviously impractical or impossible (lighting, engine drives, electronics, etc.).

On the other hand, the production of low temperature heat with electricity but without the use of heat pumps is an obvious waste of energy quality. The use of fuel directly would cut the fuel use by 50 per cent or more.

Conclusion

Air pollution nay be reduced by means of strategies aiming at a higher technical efficiency in the production of energy services. The main mechanism is the reduction of the use of primary energy. In particular, **fuel** use generates material flows that end up as emissions to air or as solid wastes (ashes etc.). Pollution control at the chimneys is not the only strategy to attack these problems. It is equally important to use energy effectively.

Per Svenningsson

Air pollution costing We

According to a study by two West German economists, Werner Schulz and Lutz Wicke, published in Die Zeitschrift für Umweltpolitik und Umweltrecht 2/87, environmental damage is costing their country more than 100 billion DM per annum. That is twice as much as the annual FRG defence budget. Clearly, they say, it would pay to clean up.

Of that total cost, about 48 billions are attributable to air pollution, and the authors of the study have on the one hand calculated the costs for damage to health, materials, animal life, and vegetation, and on the other polled people for willingness to pay for cleaner air.

Health effects

By studying the statistics from public and private health insurance and medical records, Schulz and Wicke have worked out the cost of working days lost through respiratory complaints. Days off, premature death, early retirement, hospital care and rehabilitation together cost West Germany more than 11 billion DM every year.

The extent to which respiratory diseases are due to air pollution is however difficult to determine. One American study says it is 20 per cent, another 50 per cent. Applied to West Germany this would mean a cost of either 2.3 or 5.8 billion DM a year (Table 1). But it would be a distinct underestimate if all the effects of air pollution were taken into consideration. The figures refer only to diseases of the respiratory tract, omitting coronary illness. Moreover they derive only from registered cases of sickness, no attempt having been made to assess the effects of pain and mental stress.

Damage to materials

The fabric of buildings and other objects deteriorates more rapidly in an aggressive atmosphere. Schulz and Wicke have therefore calculated the cost of damage due to air pollution as the difference in the costs of maintenance and restoration in a polluted and an unpolluted area, multiplied by the number of buildings or objects in the polluted areas.

Building exteriors have for instance to be repainted twice as often in polluted areas, and gutters replaced three times as often. Damage to buildings and steel structures, plus the extra cleaning of windows, costs West Germans more than 2.3 billion DM every year. This is however not all, since many forms of damage, such as that to works of art and monuments, are not included. Maintenance of the priceless stained-glass windows of Cologne Cathedral alone costs about 5 million DM a year.

Animal life

Not much research has been done in regard to the effects of air pollution on domestic animals. A study in East Germany has shown however that a concentration of 0.15 mg/m^3 of sulphur dioxide will cause milk production to drop and the cows to lose weight, and miscarriages to increase. As early as 1964 it was calculated that losses in milk and meat production in Nordrhein-Westfalen alone amounted to 17 million DM per annum.

Schulz and Wicke estimate the total damage to domestic animals to be at least 100 billion DM a year, to which should be added the losses and eventual extinction of wild fauna.

Vegetation

The calculated reduction of 5-10 per cent in various crops would mean a cost to the nation of 125 million DM a year. This again however is an underestimate. For one thing the damage is not confined to the worst affected areas: the extensive forest dieback in particular shows that pollution is widespread. For another the figures only include quantitative damage, not qualitative. Moreover, losses in the form of extinction of species are completely left out. Schulz and Wicke estimate the total yearly crop losses in West Germany to be in reality at least one billion DM.

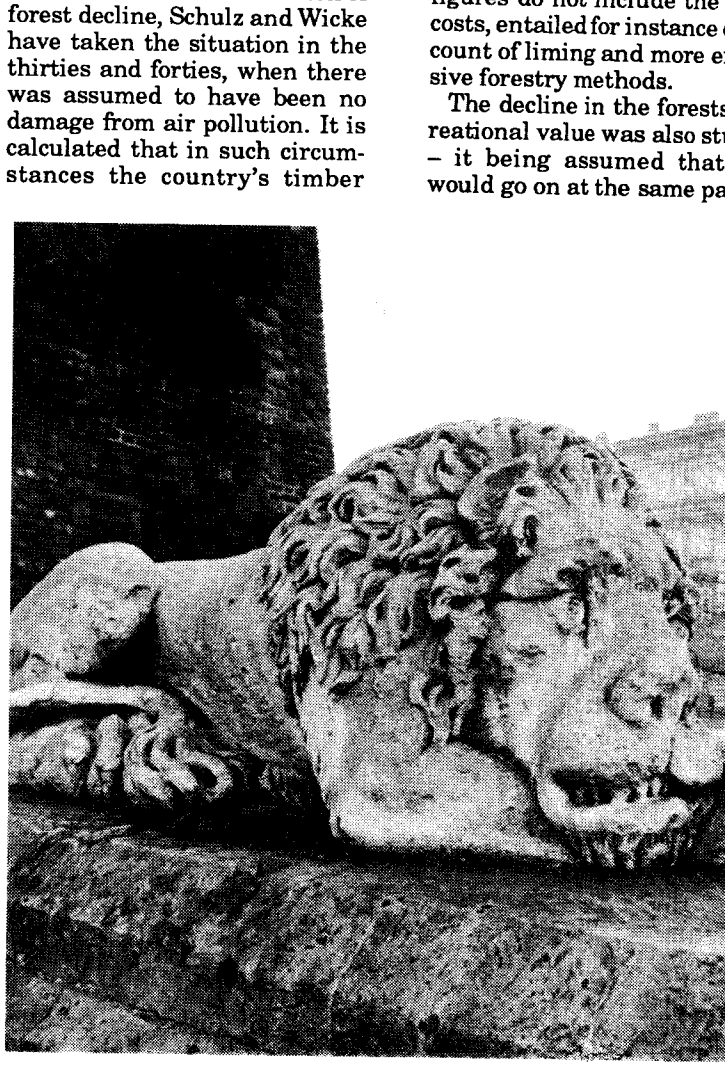
Forest damage

As baseline for the calculation of forest decline, Schulz and Wicke have taken the situation in the thirties and forties, when there was assumed to have been no damage from air pollution. It is calculated that in such circumstances the country's timber stock would be increasing million cubic metres, measure, every fifty years

In making a forecast f period from 1984 to 206 scenarios were employed for a status quo, involv freezing of emissions at 1980 levels, the other base trend in accordance with t itical aims of the federal g ment. The increases i timber stock would then spectively 100 and 350 m cubic metres, as compared 650 million with clean air.

The consequent losses forest industries are estir to be either 2.3 or 2.9 billio per annum (Table 2). T figures do not include the costs, entailed for instance count of liming and more e sive forestry methods.

The decline in the forests reational value was also st – it being assumed that would go on at the same pa



Eroded stone sculpture in Krakow, Poland.

Vest-Germany billions

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the physical dieback. With items such as tourism included, the total annual loss of income due to air pollution becomes 2.9 and 5.4 billion DM.

There is also the matter of the effects of forest dieback on soil and water – seen in worsened water quality and increased liability to avalanches and erosion. This adds a further 0.3 or 0.5 billion DM to the annual costs.

It should be borne in mind, when considering the aggregate costs of forest damage, that the above figures are also on the low side. They do not take into account, for instance, the losses to the wood-processing industries, or the effects on climate. Many of the effects of forest decline will in any case only appear in the long term.

All in all, the losses to the national economy during the period of the forecast (1984-2060) are estimated to be at least 211 billion DM (in the case of the trend scenario), or 344 billion assuming status quo. This means that a reduction of forest decline alone would justify an investment of 100 billion DM in measures to clean the air.

Willingness to pay

By polling a sample of 450 persons in West Berlin, an attempt was made to determine people's willingness to pay for varying degrees of atmospheric improvement. The results indicated that willingness increased with education and income, but diminished with age. The willingness of a well informed individual was about 70 per cent higher than the average, and that of an 18-year-old three times greater than a 75-year-old's.

In the scale of assessment, smog was accounted as zero. The persons interviewed thought it would be worth 53 billion DM per annum to maintain current air quality, but as much as 84 billion to obtain practically clean air. The poll also showed that people would be more willing to pay if they were better informed. Effective information would raise the price from 30 billion DM, which is now thought reasonable, to about 45 billion DM.

There is thus a marked difference between the cost to the nation of damage from air pollution (11.2-18 billion DM per annum) and people's willingness to pay (30-48 billion) for remedying it. This is probably due to the non-inclusion of such items as psychosocial effects, the destruction of objects of historical and cultural value, the extinction of plant and animal species, and the impoverishment of ecosystems generally.

In the view of Professor Wicke, there is no investment likely to yield a greater return today than a large sum allotted to protection of the environment. The present West German figure of 20 billion DM a year needs to be multiplied many times over. When the man in the street, business leaders, and politicians realize how they can profit from a cleaner environment, the solutions will come of themselves, says Professor Wicke.

Per Elvingson

Photo: Andre Maslennikov ©

Table 1. Calulated costs for diseases of the respiratory tract due to air pollution in West Germany. Billions of DM, based on statistics for 1983.

Proportion of all such diseases attributable to air pollution	Cost for temporary absence from work	Cost for permanent withdrawal due to Death	Early retirement	Cost of rehabilitation	Total
20 per cent	0.8	0.6	0.7	0.2	2.3
50 per cent	2.1	1.4	1.7	0.6	5.8

Table 2. Calculated costs of damage to West German forests. Billions of DM, based on statistics for 1984.

Affected sectors	Cost in favourable circumstances (trend scenario)	Cost in unfavourable circumstances (status quo)
Forest-based industries	2.3	2.9
Recreation	2.9	5.4
Soil and water	0.3	0.5
Total	**5.5**	**8.8**

calculated the cost of damage due to air pollution as the dif-

The calculated reduction of 5-10 per cent in various crops would

Eroded stone sculpture in Krakow, Poland.

How East-West cooperation c

If one regards Europe as a whole, the environmental problems are especially severe in central Europe. Some 70 per cent of all European emissions of SO_2, and about 40 per cent of the NO_2 emissions emanate from West Germany, Czechoslovakia, Poland, and the German Democratic Republic. These four countries are also responsible in high degree for the pollution of the North Sea, the Baltic, and, via the Danube, the Black Sea.

It should be noted that the figures do not include emissions from the Soviet Union, and the question in any case is how to arrange environmental cooperation between the West and the socialist countries of eastern and central Europe. The basic problem that should be kept in mind is that the four eastern European countries are to a differing extent in economic difficulties. They lack the financial and technological means for introducing and implementing environmental policies in the same way as most western European countries. Shall the West – in one way or the other – finance and/or supplement environmental improvements in the East? And if it does, what happens to the "polluter pays principle"?

Europe as a whole, and in particular eastern Europe, is undergoing a period of drastic change. Through the developments initiated by Gorbachov in the Soviet Union dramatic shifts towards more democratic systems seem, for the first time, to be possible in the whole of eastern Europe. On the eastern side a proposal has been made for uniting eastern and western Europe in a "Common European House" in the long term.

The West should take up this idea not only to help the reforms to succeed in the Soviet Union and all the socialist countries, but also to ensure a better future for the whole of Europe. The first and most important steps in the field of disarmament have now been taken, and these efforts must go on. It is now the time to start efforts in other areas, and environmental protection provides an excellent means for improving East-West relations generally.

Both sides have an interest in improving the environment. In contrast to other questions such as human rights, there are no major political differences here in regard to aims. After Chernobyl the East seems to be ready to accept the transboundary problems of environmental pollution to much greater extent than before, and to be willing to start major initiatives, as seen in the conclusions of the Warsaw Summit of the Warsaw Pact countries in 1988, where environmental protection for the first time assumed major importance.

One of the strongest arguments in favour of western assistance to the East is based on the geographical situation. Europe is a small continent with small countries, where transboundary problems are prominent. A European environmental policy cannot be successful unless there is a reduction of pollution levels in the East. It is not favourable for the environment in the long run, when, as in the case of West Germany, high-tech environmental technology reduces the waste-air SO_2 content of big power stations by 98 per cent, while a few kilometres away there is no reduction at all. What is true for West Germany and its eastern neighbours is true for Europe as a whole.

Environmental protection is a growing economic sector. Cooperation in this field could help both to intensify East-West economic relations and to strengthen the western European environmental protection industry, which in several respects is still not as strong as the corresponding industries in Japan and the United States. Moreover, the East is interested in high technology from the West, environmental technology seems to be an area where western technology interests are not so extremely affected as in other fields and thus there should be no major political problems.

In West Germany and many other western European countries FGDs have lately been extensively installed, and it is becoming ever more costly in these countries to go further with the reduction of emissions. The marginal costs rise as an exponential function. In other words, it is more expensive to increase reductions from 95 to 98 per cent than from 0 to 50 per cent. A concrete case can be observed in Berlin-West: according to estimates, the reductions achieveable with a given amount of money are up to twelve times higher in Berlin-East (or the surrounding GDR) than in Berlin-West. In this special case it would be more advantageous from an economic standpoint for the western side to invest in the East instead of in the West, because the resulting reductions could be greater. There is a similar situation along the East-West German border and the border between West Germany and Czechoslovakia.

Two recent studies by the US Environmental Protection Agency show that the existing monitoring facilities in Poland are inadequate, and this probably also applies to other eastern European countries. New western technology is not available, and equipment being used is often 10 to 20 years behind western standards.

The basis for any successful environmental policy is the analysis of the existing situation. Without such a diagnosis it seems to be impossible to set up a strategy. It is therefore very important to improve the existing monitoring equipment in these countries.

Both the Netherlands and the US governments, and perhaps also the Swedish, as well as some western NGOs, are planning to give Poland funds to update its monitoring equipment. Polish experts are also starting to cooperate with West German institutions in this respect. It seems however that non these activities are interrela and that there is no real coo ation even in the West.

Other possible fields of sc tific cooperation might be coo nated research projects on e ronmental problems and c parative research on stand and laws.

Poland once proposed that UN Economic Commission Europe should set up an E pean Environmental Fund. West was to give environme technologies and/or mone that fund and the means so vided would then be used by socialist countries for impro environmental protection. proposal came to nothing. arguments against it were it would create new bure cracies; it would not be poss to buy technologies from in try without knowing how o they would be used; and it wo be difficult to control the flo money and/or technologi Western countries prefer to financial means for well def and elaborated projects.

Power station at Gliwice, Poland,

Total	5.5	8.8

Photo: Andre Maslennikov ©

on can be made practical

ever that none of es are interrelated, re is no real cooper- the West.
ible fields of scien- ion might be coordi- ch projects on envi- roblems and com- earch on standards

e proposed that the ic Commission for ld set up an Euro- nmental Fund. The give environmental and/or money to d the means so pro- then be used by the ntries for improving al protection. This ne to nothing. The gainst it were that eate new bureau- ould not be possible ologies from indus- knowing how often e used; and it would o control the flow of /or technologies. ntries prefer to give ans for well defined ed projects.

A global, "unconditional" environmental fund as proposed by Poland, and subsequently by Bulgaria and the Soviet Union, does not seem to be the right way to bring about a reduction of environmental pollution in the socialist countries. There are additional arguments against such a fund:

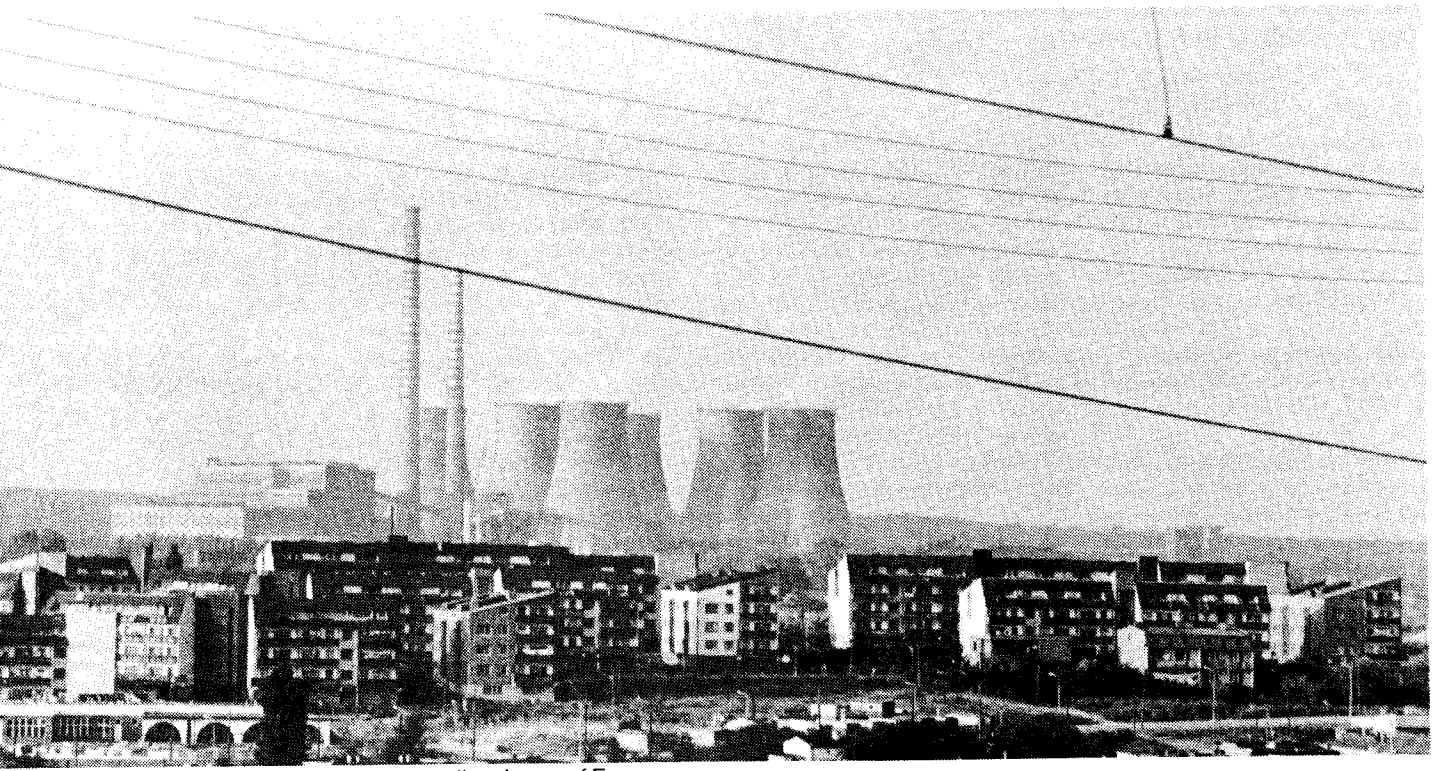
- For 40 years or more the socialist countries have been heavily polluting the environment. In contrast to most western European countries, they have never been able to establish strong environmental policy instruments. Even today they are wasting their resources (in particular in the energy sector). To give "unconditional" money to these countries would mean to reward a policy that is violating basic environmental laws.
- The prospect of this kind of international assistance would probably lead to a cutback in environmental funds and a reduction of environmental activities in these countries. The lack of international assistance (there will never be enough money to solve all environmental problems in the socialist countries) might provide an excuse for any failure of their domestic policies.
- It would be initiated, financed, and administered by governments. Given the tight budgets in nearly all western European countries, it is difficult to see how the necessary amounts of money would be forthcoming.
- EC member states in southern Europe would be cool to the idea of northern member states giving money to the East. There would be pressure from these countries within the Community.
- It might take years before the countries that finance the fund were able to agree on a structure for it and on ways for distributing the money, and time thus be lost for improving the environment.

In short it would seem that bilateral and/or multilateral East-West cooperation aiming at improvements in specified problem areas and problem cases would be superior to an environmental fund. In case such a fund should be set up it ought to comply with the following requirements:

- Only projects that have not otherwise been budgeted should be financed through an environmental fund. Domestic environmental funds should not be cut back.
- The "Matching-Fund" principle should be introduced. Only projects that are financed by at least 50 per cent by the recipient country should be financed with money from the fund.
- Only such parts of environmental technologies that require hard currency should be paid for out of the fund. All other parts should be financed by local currency.

Helmut Schreiber
Institute for European Environmental Policy, Aloys-Schulte-Strasse 6, D-5300 Bonn 1, FRG

A continuation of the above, dealing with technology transfer and debt-for-nature swapping, will be published in Acid News 3/89.



at Gliwice, Poland, in one of the most heavily polluted parts of Europe.

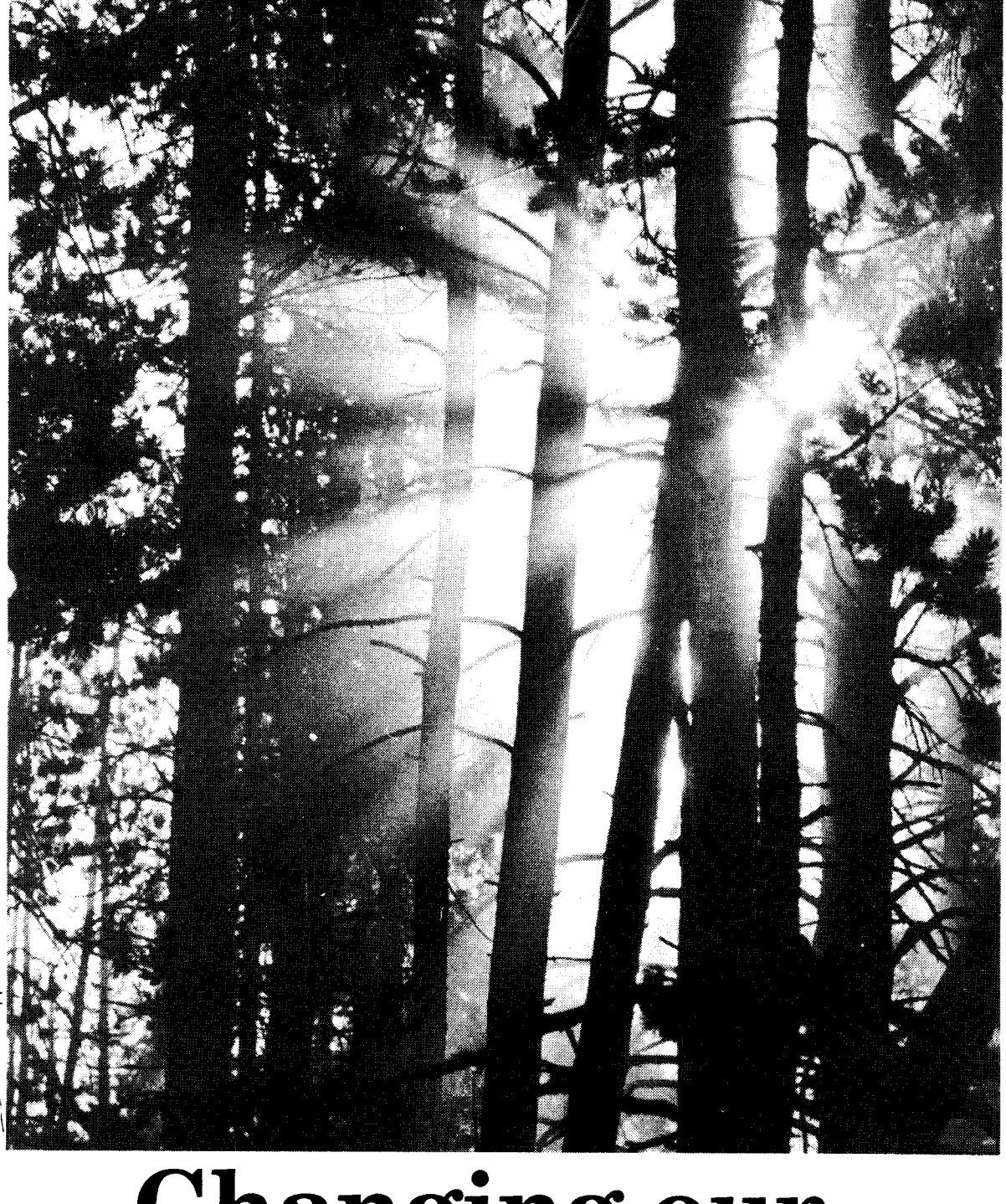


Photo: Dan Rapp ©

Changing our lifestyle

If we are to have any chance of avoiding the greenhouse effect, we shall have to start reducing emissions of the gases

methane (a very optimistic assumption);
2. that the atmosphere (life on earth) can "tolerate" a CO_2 concentration of 400 ppmv.

Models show that 400 ppmv

our use of fossil fuels by 70 per cent (from 20 Pg to 6). But such an equal cut would not be reasonable, considering all the countries that are not yet as developed as for example those in

Strategi Climate

Continued from page 1

shop, initiated by the E titute, Stockholm, the E mental Defense Fun York, and the Woods H search Center, Massac was an outcome of the tional conference at Villa tria, in October 1985 t sponsored by the World ological Organization the United Nations E ment Programme (UNE the International Cou Scientific Unions, ICS World Conference on the ing Atmosphere at Toro nada, in June 1988 re consensus that such an e reduction, or a larger o ultimately stabilize the C tent of the atmosphere a global warming. A rece lysis by an environment mission of the German stag indicates however even larger reduction needed. An almost con closed carbon cycle mus goal of the 21st century.

The major, wealthy, C ducing nations should themselves to reducin emissions by at least 30 by the year 2000, and 60 by the year 2015, from 1 els. Policies to attain thi tive should be judged by t ciple of achieving the emission reductions w least overall environmen pact. Least-cost energy p should be instituted to this result.

The cornerstone of pol attain the objective of a tion of CO_2 should be ene servation, including dr cally increased efficiency use of energy. A worldwid of studies has confirm technical feasibility of a s tial increase over the p cade's improvement of en ficiency. Studies for th have shown that it is tech possible to improve ener ciency by more than 50 p

Increased efficiency is r the single most importa most cost-effective policy ducing CO_2 emissions. provides the key for encou rapid and sustainable d ment in the developing tries, reducing costs for c ers and also other forms pollution.

ıtegies against ıate Change

from page 1

ated by the Beijer In- kholm, the Environ- efense Fund, New the Woods Hole Re- ter, Massachusetts, come of the interna- rence at Villach, Aus- ober 1985 that was y the World Meteor- ganization (WMO), Nations Environ- amme (UNEP), and ational Council of Unions, ICSU). The erence on the Chang- here at Toronto, Ca- ne 1988 reached a at such an emission r a larger one, may tabilize the CO_2 con- tmosphere and halt ning. A recent ana- environmental com- he German Bunde- es however that an reduction may be almost completely n cycle must be the 1st century.

, wealthy, CO_2-pro- ons should commit to reducing their at least 30 per cent 000, and 60 per cent 2015, from 1986 lev- to attain this objec- e judged by the prin- ieving the desired ductions with the environmental im- ost energy planning stituted to ensure

stone of policies to bjective of a reduc- ould be energy con- ncluding dramati- ed efficiency in the A worldwide range as confirmed the ibility of a substan- over the past de- ement of energy ef- dies for the FRG hat it is technically nprove energy effi- e than 50 per cent. fficiency is not only ost important and ctive policy for re- emissions. It also ey for encouraging stainable develop- developing coun- g costs for consum- other forms of air

power is not a viable option for combating climate change. According to the World Commission for Environment and Development, current nuclear technology brings a range of environmental, social, economic, and political problems, including catastrophic accidents, weapons proliferation, and waste disposal.

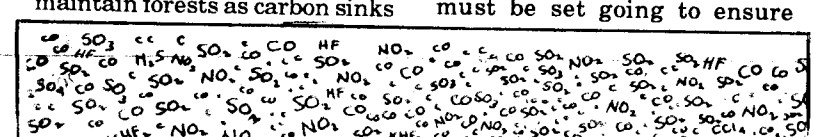
Without measures to promote energy efficiency, even a twenty-fold worldwide expansion of nuclear power would not reduce CO_2 emissions. Nuclear power is in any case the least economic option, both for industrialized and developing countries, for reducing emissions of CO_2. Time scales of many decades would be needed for it to have even a marginal effect.

Forestry policy

Worldwide deforestation is currently proceeding at about ten times the rate of afforestation and renewal. The imbalance is particularly acute in the case of tropical forests, which at present rates of destruction will disappear by about 2010. Last year over 200,000 square kilometres – an area larger than Austria – were burned in Brazil alone. The need for strict measures to preserve the remaining forests is now imperative.

As a result of this imbalance the build-up of CO_2 and other greenhouse gases is being augmented through an increase of CO_2 emissions, a decrease of CO_2 uptake by the forests, and the increase of methane levels due to intensive agricultural practices, such as cattle ranching, on former forest land.

The relative rate of deforestation and new forestation must be reversed as soon as possible, and by 2000 at the latest. A range of options, including debt swapping and major changes in overseas aid policies, should be applied for the obtainment of this objective. Nations should moreover be encouraged to enter into international agreements to maintain forests as carbon sinks



would be required to stabilize the concentrations of chlorine. Thus even before the Protocol enters into force, its proposed measures are being overtaken by scientific and technical developments. Evidence to the German Enquete Kommission stated that a 95 per cent reduction of consumption in 1989 would lead to chlorine decreases that would begin almost immediately.

Technical developments in introducing substitutes and alternatives for CFCs and halons were outlined at a meeting in The Hague hosted by UNEP and the Dutch government in October 1988. It is clear that the steps taken in the last year towards the replacement and reduction in use of fully-halogenated substances mean that the goals of the Montreal Protocol are already being exceeded in many sectors.

As examples, CFCs can be entirely eliminated in spray cans, without any delay or economic impact; by improved management emissions from metal cleaning can be reduced by 80-90 per cent; and major reductions in halon emissions can follow from restricting use to likely sources of fire in preference to room-flooding systems, and by eliminating releases during testing.

There is a need to strengthen the Protocol in 1989 so as to eliminate production of the following at the latest by 1995:

Controlled substances (CFC-11, -12, -113, -114, -115, and halons-1211, -1301).

All other substances that have been shown to deplete the ozone layer, including methyl chloroform, carbon tetrachloride, and HCFC-22.

The Swedish government have already announced the following program for the reduction of CFCs and halons:

A 50 per cent reduction from 1986 levels by 1991.

Complete phase-out by 1995.

The Enquete Kommission accepted this program for reducing the production of CFCs and halons as realistic for the Federal Republic:

A reduction of at least 50 per cent from 1986 levels by 1991.

A minimum of 75 per cent reduction by 1993.

A minimum of 95 per cent reduction by 1996.

Vigorous diplomatic activity must be set going to ensure

diaries of German companies increasing production in other countries.

Methane, nitrous oxide, and tropospheric ozone

Methane (CH_4), ozone (O_3), and nitrous oxide (N_2O) together account for about 25 per cent of the current global warming effect. Understanding of the sources of these emissions and their growth is less complete than for carbon dioxide (CO_2) and chlorofluorocarbons (CFCs). It is known however that the concentrations of each of these gases have been rising steadily in recent years: methane and tropospheric ozone at a rate of 1 per cent per annum and nitrous oxide at 0.25 per cent.

It is essential to start aggressive monitoring and research immediately in order to arrive at a reliable assessment of the sources and interrelationships of these greenhouse gases. Despite the need for more information, enough is known about these trace gases to recommend immediate steps to reduce emissions. This can be done by

- Improving energy efficiency
- Reducing emissions, and
- Putting emphasis on the solution of linked problems.

IMPROVING ENERGY EFFICIENCY

- Improved energy efficiency will mean less combustion, lowering emissions of hydrocarbons, carbon monoxide, and nitrous oxides and thus slowing the formation of tropospheric ozone and the emission of methane from fossil fuels.

REDUCING EMISSIONS

- Through the immediate adoption everywhere of existing and commercially viable automobile standards, requiring the use for instance of catalytic converters. In combination with a reduced use of vehicles, this would result in significant reductions in the formation of tropospheric ozone and methane.
- By ending of deforestation and thus slowing the build-up of nitrous oxide from biomass burning and forest decay, and methane from termites.
- Halting the flaring of natural gas and recycling solid waste. This could make modest contributions towards slowing methane emissions.

PUTTING EMPHASIS ON THE

greenhouse effect, we shall have to start reducing emissions of the gases that cause it right away.

So says Henning Rodhe, professor of meteorology at Stockholm University and internationally acknowledged expert on climate change, writing in the Swedish national daily, Dagens Nyheter, earlier this year. Even if the emissions should remain at today's levels, their concentrations in the atmosphere will continue to increase for at least a hundred years.

Since it would be unrealistic to think of cleaning the flue gases of CO_2, it will be necessary, says Professor Rodhe, to reduce the burning of fossil fuels. Reforestation can only marginally improve the CO_2 situation.

To give some idea of the changes in lifestyle that will be necessary, Professor Rodhe proceeds from two assumptions:
1. that all emissions of CFCs will have ceased, as well as the "extra" emissions of N_2O and
2. that the atmosphere (life on earth) can "tolerate" a CO_2 concentration of 400 ppmv.

Models show that 400 ppmv would mean an increase in the earth's average temperature of about 1 degree C or more. This would probably cause serious changes of climate in some regions.

In order to keep the CO_2 concentration below 400 ppmv in the coming century, the emissions due to human activities will have to be limited to about 9 Pg CO_2 per year (1 Pg, Petagram = 1,000,000,000,000,000 g). Today's emissions from the use of fossil fuels amount to about 20 Pg, and from deforestation, etc, to about 5 Pg (although this is a very uncertain figure). Assuming that 9 Pg is acceptable in the long term, and also that 3 Pg of this is being "used up" by deforestation and the input of other greenhouse gases, there remains 6 Pg from the burning of fossil fuels. The question then is what this would mean for you and me in our daily life.

The first idea that comes to mind is that we must all reduce an equal cut would not be reasonable, considering all the countries that are not yet as developed as for example those in western Europe.

It would be more fair to share out the 6 Pg equally among the world's population. An acceptable per capita emission would then be about 1,200 kg CO_2 per year. This might be compared with the emission of the average Swede, which today amounts to about 8,000 kg per year. Consequently Swedish emissions would have to be cut by about 86 per cent.

It may be interesting to compare these figures with the emissions presently being caused by specific activities in Sweden:
- Production and distribution of food: about 600 kg CO_2 per person per year.
- Heating of an average house (by oil): 10,000 kg CO_2/year.
- A passenger car driven 15,000 km/year: 4,000 kg CO_2/year.
- One flight Stockholm/Mallorca return: 500 kg CO_2/year.

rapid and sustainable
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pollution.

The following specific
should form part of
policies intended to redu
sions of greenhouse gas

- Establishment of exp
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country within an inter
framework of agreemen
- A major rationalizati
ergy pricing, subsidies,
policies, such as carbon
permits, to ensure that
cost of energy production
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- Policies to encoura
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be important to impose
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- New standards to ma
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- New efficiency standa
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choices favourable to th
ronment.
- Implementation of infor
schemes concerning the
efficiency of buildings th
for sale, such as propose
current draft EC Directiv
- Policies to encourage m
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such as cogeneration and
heating.
- Redirection of research a
velopment budgets away
conventional energy supp
tions and towards energ
cient technologies and r
able energy sources.
- Support of measures by
cial institutions, such a
World Bank, to increas
ciency in the use of energ
reduce emissions of CO_2
developing world by
example:

Redirecting the priorities
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agencies;

Funding research and
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courage technological in
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of energy that will be appl
in the developing nations.

The expansion of nu

Think of the ozone layer

The manufacturers and users of chlorofluorocarbons have been inclined to maintain that these ozone-destroying chemicals are irreplacable.

The ever expanding worldwide computer industry is for instance among those that are guilty of their increasing use, on account of its preference for CFC-based solvents as a means of cleaning soldered chips.

More environmentally favourable cleaning methods are nevertheless available, such as those that use alcohol or water and detergent. Besides making CFCs superfluous, alcohol is both 70 per cent cheaper and can be recycled, thus easily offsetting the extra cost it entails for fire insurance.

It is not only as solvents however that CFCs can be relatively easily replaced. In the mid-seventies more than 200,000 tons of freon were being used annually as aerosol propellant in the United States. After the introduction of federal restrictions, the industry found it could manage with 7,000 tons.

In Europe an alternative gas developed by Du Pont has not been marketed, the manufacturer claiming lack of demand. With the exception of the Scandinavians, no European government had prohibited the use of CFCs in spray flasks. Although the existence of alternative propellants has been well enough known in Europe, many manufacturers have stuck to CFCs as a means of avoiding the expense of re-equipping their plant.

As a guide for those who, as consumers, may wish to make their opinion felt in the marketplace, we cannot do better than reproduce the exhortation issued by Friends of the Earth.

Be an Ozone Protector!

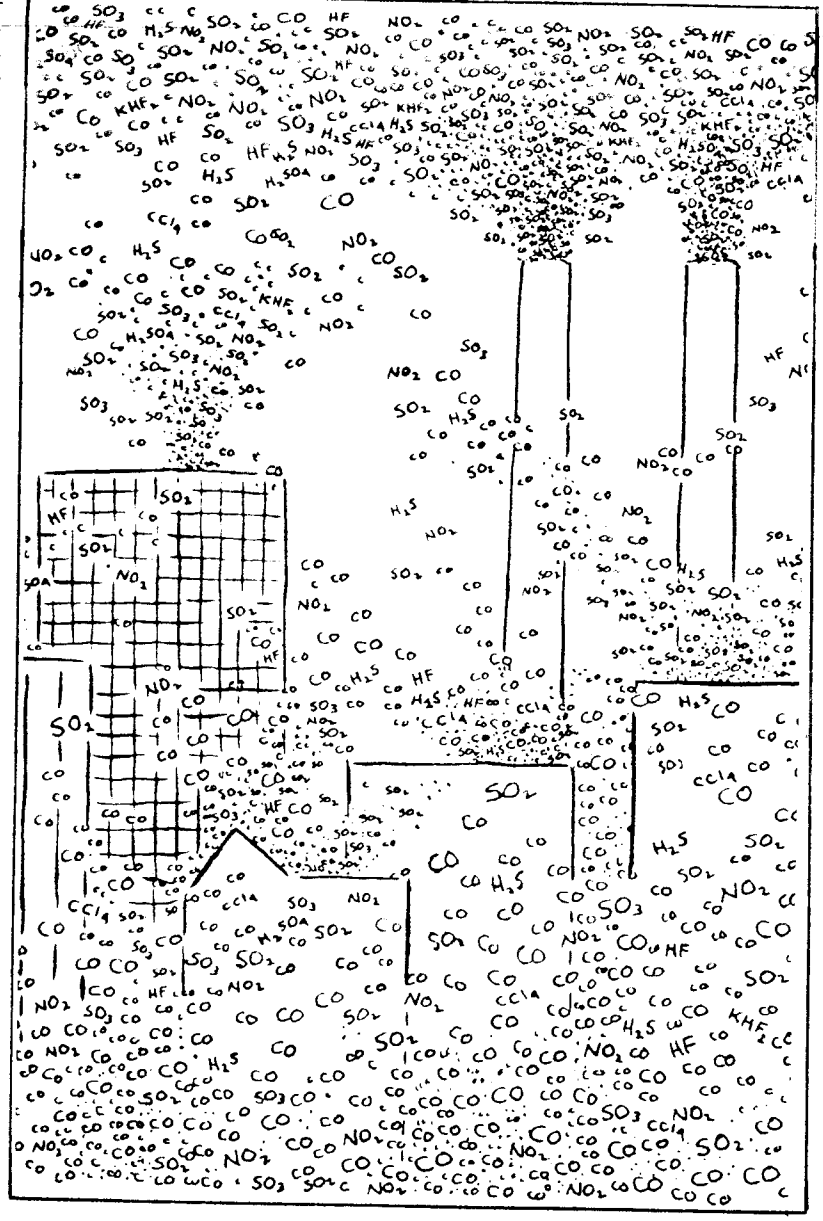
For the sake of the ozone layer, some products must be banned, starting with CFC-based aerosols and food packaging. Also, careful manufacturing, repair, recycling, and disposal practices must be put into place to increase recovery and re-use of CFCs.

There are Alternatives – Let's Use Them!

Consumers and producers can make choices to help protect the ozone layer. For instance, we can use:
- recycled paper egg cartons and food packaging
- fiberglass or cellulose insulation
- spring or fibre mattresses, cushions, car seats, rug underpadding
- alternative blowing agents such as carbon dioxide, nitrogen, and various hydrocarbons
- commercial cooling systems using ammonia or other gases
- new coolants for refrigerators and home air-conditioners which are being developed and tested
- fashionable ceiling fans
- steam, water-based and biodegradable solvents to clean electronic components.

REJECT and replace ozone-damaging products. Let friends, neighbours, industry, shopkeepers, and government know that CFC products are undesirable.

Friends of the Earth



and enable them to comply with national carbon budgets.

Chlorofluorocarbons

A quarter of the projected global warming up to 2030 will be due to chlorofluorocarbons and ozone depletion. The deterioration of the ozone layer is threatening the ability of the planet to continue to support life. Although there had been scientific warnings, the loss of ozone later revealed over Antarctica clearly demonstrates the limits of current scientific ability to predict completely atmospheric change. Because this phenomenon proved beyond worst-case projections, it should serve as a warning that global climate change may exceed today's predictions.

A precedent for world action was set by the Montreal Protocol which was a result of UNEP's Vienna Convention on Protection of the Ozone Layer. It was immediately followed by scientific evidence that an 85 per cent reduction in emissions of CFCs worldwide action and encourage the support of a revised Protocol. The transfer of ozone-depleting substances, or their manufacturing technologies, to countries that have not signed the Montreal Protocol must be prevented. It is also essential that the manufacturing know-how for alternatives with zero ozone-depletion potential and zero greenhouse effect be passed on to developing countries.

Unilateral action should be taken by governments of countries that are large producers of CFCs to minimize the production and emissions of these gases. The Federal Republic of Germany, France, Italy, the United Kingdom, the United States have a special responsibility to end production even earlier than 1995.

The NGO's have urged the FRG to take the lead by announcing that it will end all production of fully halogenated CFCs before the end of 1989. This must not be offset by subsi-

contributions towards slowing methane emissions.

PUTTING EMPHASIS ON THE SOLUTION OF LINKED PROBLEMS

- The slowing of ozone depletion requires the phase-out of emissions of substances causing it. This would provide the additional benefit of reducing the formation of tropospheric ozone.
- Benefits would also result from addressing acid deposition by reducing volatile organic compounds and further controlling nitrogen oxides – in the reduction of tropospheric ozone precursors and formation. A Protocol to the Geneva Convention on Long-Range Transboundary Air Pollution to control emissions of volatile organic compounds should be formulated and adopted as a matter of urgency.
- Energy policies for the management of other greenhouse gases would also tend to reduce the emissions of methane and nitrous oxide, and the formation of tropospheric ozone.
- With the rapid worldwide increase in urbanization, the volume of urban traffic is becoming enormous. Among the solutions to this problem are improved public transportation and cars running on low-carbon fuels.

Conclusions

1. There is an urgent need for political and scientific leadership at the highest level, as well as action by consumers and industry, in order to reduce the emissions of greenhouse gases.

2. The countries that are leading economically as well as in the production of CO_2 should act unilaterally to reduce their emissions by at least 30 per cent by the year 2000 and by 60 per cent by 2015.

3. There should be a global ban on production and use of ozone-depleting substances at the latest by 1995.

4. A global Convention and Protocol to protect the earth's climate by stabilizing the concentrations of greenhouse gases should be negotiated by 1992.

Protocols to the Geneva Convention on Long-Range Transboundary Air Pollution, to control emissions of carbon dioxide and volatile organic compounds, should be formulated urgently.

5. Mechanisms for reversing the rate of deforestation should be given high priority.

Convention on Long-Range Transboundary Air Pollution

The Convention on Long-Range Transboundary Air Pollution was adopted at the High-level Meeting within the Framework of the ECE on the Protection of the Environment in Geneva November 13-15, 1979.

The Convention elaborates fundamental principles for protecting people and the environment against air pollution. It includes detailed provisions on such matters as the exchange of information, consultations, research and monitoring. Under the Convention, the Contracting Parties undertake to develop, without undue delay, policies and strategies for combating the discharge of air pollutants, using the best available technology. It emphasizes the implementation and further development of the Co-operative Programme for the Monitoring and Evaluation of the Long-Range Transmission of Air Pollutants in Europe (EMEP). The Convention entered into force on March 16, 1983.

In July 1985 21 parties to the Convention signed the so-called Sulphur Protocol. This is the first binding treaty containing specific targets for the abatement of air pollution. It obliges signatories to cut back their national emissions of sulphur or their transboundary fluxes by at least 30 per cent, as soon as possible and at the latest by 1993, based on 1980 levels. This Sulphur Protocol came into force on September 2, 1987, after having been ratified by sixteen states.

An NO_x Protocol that followed, October 1988, was signed by 25 countries. The agreement does not, however, prescribe any actual reduction of emissions, but only a freeze. In effect it means that after 1994 emissions of nitrogen oxides shall not exceed 1987 levels.

Also in October 1988 twelve like-minded countries that considered the Protocol too weak underwrote a separate NO_x Declaration, in which they commit themselves to reducing their national NO_x emissions by an order of 30 per cent "as soon as possible and at the latest by 1998, using the levels of any year between 1980 and 1986 as a basis for the calculation of the reduction."

As from 1989 there will be two new Working Groups operating under the Executive Body of the Convention. That on volatile organic compounds is to prepare a new protocol aimed at the reduction of VOC emissions. The other, the Working Group on Abatement Strategies, is to develop proposals for strategies based on the critical loads approach.

Signatory	Date of ratification	Date of accession to the 30-per-cent club	Promised reductions of SO_2, from 1980
Austria	Dec 1982	June 1983	50% by 1995
Belgium	July 1982	June 1984	50% by 1995
Bulgaria	June 1981	June 1984	30% by 1993
Byelorussian SSR	June 1980	June 1984	30% by 1993
Canada	Dec 1981	June 1983	50% by 1994
Czechoslovakia	Dec 1983	Sept 1984	30% by 1993
Denmark	June 1982	June 1983	50% by 1995
Fed. Rep. Germany	July 1982	June 1983	60% by 1993
Finland	April 1981	June 1983	50% by 1995
France	Nov 1981	March 1984	50% by 1990
German Dem. Rep.	June 1982	June 1984	30% by 1993
Greece	Aug 1983		
Holy See			
Hungary	Sept 1980	April 1985	30% by 1993
Iceland	May 1983		
Ireland	July 1982		
Italy	July 1982	Sept 1984	30% by 1993
Liechtenstein	Nov 1983	June 1984	30% by 1993
Luxembourg	July 1982	June 1984	30% by 1993
Netherlands	July 1982	March 1984	40% by 1995
Norway	Feb 1981	June 1983	50% by 1994
Poland	March 1985		
Portugal	Sept 1980		
Romania			
San Marino			
Spain	June 1982		
Sweden	Féb 1981	June 1983	65% by 1995
Switzerland	May 1983	June 1983	30% by 1995
Turkey	April 1983		
Ukrainian SSR	June 1980	June 1984	30% by 1993
USSR	May 1980	June 1984	30% by 1993
United Kingdom	July 1982		
USA	Nov 1981		
Yugoslavia			
EEC	July 1982		

New

Converg

This summer the E
Youth Forest Action
again organizing a nu
bus tours for propaga
publicity. There will be
between July 7 and Aug
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which is being held fro
to the 21st of August
Jugend-Zeltplatz at
West Germany.

This will be an inter
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Their goal: the great th
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First big

**The first big event i
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take place June 1-4
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ıer the European st Action group is izing a number of or propaganda and ere will be five tours 7 and August 1. All the Ecotopia Camp ıg held from the 1st of August on the platz at Cologne, ny.

e an international r on ecological mat- for alternative en- ous methods for re- terials will be d there will be sev- ps on the subjects of k and atmospheric

Tour North starts from the Environment and Peace Festival in Murmansk and proceeds via Finland and Sweden to Germany.

Tour Northeast from Moscow takes its way through the Baltic States.

Tour Southeast will be starting in Ljubljana, Yugoslavia, and after visiting damaged forests in Slovenia will continue to Budapest, Hungary, and Bratislava, Czechoslovakia, and so north to the southern part of Poland and possibly East Germany.

Tour South, from Barcelona, will visit coal-fired power plants in central Spain, and then travel through the Bilbao region, France, and Switzerland to the Ecotopia Camp.

Tour West's route will be from Glasgow to London, and thence to the Netherlands, northern Belgium, the Ruhr, and so Cologne.

Altogether there will be places on these tours for 150 young people from all over Europe. The main objects of study will be damaged forest areas and the sources of particularly large emissions of pollution to the air.

Applications to join one of the tours should be addressed to EYFA, Postbus 566, NL-6130 AN Sittard, Netherlands.

he way to Murmansk

f July some 2000 ans will be con- he area in the far e Norway, Fin- ıssia meet – using ans of transport- canoes to bi-

he great three-day eace, environment, ıent at Murmansk, rst however there days of preparation on the Norwegian rder.

On the Kola peninsula, where Murmansk lies, are some of Europe's worst polluters (see Acid News 1/89). The town of Nickel, for instance, alone spews out more sulphur dioxide than the whole of Norway.

At Kirkenäs there will be seminars on the area's history, the matter of defence, the situation of the boundary-straddling Lapps, glasnost and perstroika in practice, and the environment up there in the far North.

Murmansk, which has become a symbol for armaments and heavy exploitation of the environment, is also a city of 500,000 quite ordinary people. On three afternoons the themes of the festival will be considered as to they affect the Barents Sea, the land region, and Murmansk itself.

Lars Holmgren
The Swedish Environmental Federation, Box 7048, S-402 31 Göteborg, Sweden

big Czech event

g event in Cze- concerning en- l matters is to June 1-4 at Vim- all town in the rt of the country.

itle of Bohemian gical and Peace 9, it is being or- e Czechoslovak So- of Youth and its

clude discussions on global environmental problems, the Bruntland report, and international cooperation. There will be excursions to the Bohemian Forest Landscape Protected Area, which adjoins a Bavarian national park, as well as some cultural and sports events. Those who wish will also be able to stay on until June 5 for the celebra-

only environmental organizations are expected, but also various groups of other kinds, both from East and West.

Further information may be obtained from International Dept., UV SSM, Gorkeho nam. 24. 116 Praha 1, or Brontosaurus, Simona Bouzkova, Bubenska 6, 170 00 Praha 7, Czechoslovakia. Tel. +42 2 802908, fax

Acid News

A newsletter from the Swedish and Norwegian NGO secretariats on acid rain.

ACID NEWS is a joint publication of the two secretariats, 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 secretariats at either of the addresses below. All requests for information or material will be dealt with to the best of our ability.

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
Miljövård
Box 33031
S-400 33 Göteborg, Sweden
Telephone: 031-82 24 33

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Printed by: Williamssons Offset, Solna
ISSN 0281-5087

THE SECRETARIATS

The Swedish NGO Secretariat on Acid Rain is supported by the following environmental organizations:

- The Environmental Federation (Miljöförbundet)
- The Swedish Anglers' National Association (Sportfiskarna)
- The Swedish Society for the Conservation of Nature (Svenska Naturskyddsföreningen)
- The Swedish Youth Association for Environmental Studies and Conservation (Fältbiologerna)

Address and telephone: see above.

The Norwegian secretariat, "**The Stop Acid Rain Campaign/Norway,**" is organized by six non-governmental organizations concerned with the environment:

- Nature and Youth (Natur og Ungdom)
- The Norwegian Forestry Society (Det Norske Skogselskap)
- World Wildlife Fund/Norway (Verdens Villmarksfond)
- The Norwegian Association of Anglers and Hunters (Norges Jeger- og Fiskeforbund)
- The Norwegian Society for Conservation of Nature (Norges Naturvernforbund)
- The Norwegian Mountain Touring Association (Den Norske Turistforening)

The Stop Acid Rain Campaign/Norway
Det Norske Skogselskap
Wergelandsv. 23 B,
N-0167 OSLO 1, Norway
Telephone: 02-46 98 57

Backing this special issue are also

- **Friends of the Earth International,**
- **European Environmental Bureau,**
- **Greenway,**
- **Air Pollution Action Network,**

Many of southern Norway's beautiful lakes are highly acidified. Photo: Christer Ågren ©

Reviewing the future

A conference that is to be held in Bergen, Norway, on May 8-16, 1990, will review the report of the UN World Commission on Environment and Development – the so-called Brundtland report entitled "Our Common Future".

This will be a regional follow-up conference arranged by the Norwegian government in co-operation with the Economic Commission for Europe, also a UN body. The aim, under the heading "Action for a Common Future," will be to translate the concept of sustainable development into a plan of action in a regional context.

The intention is that the conference shall: **1.** Define a response to the World Commission's call for a change in the nature of growth, and **2.** for integrating environmental objectives in social and economic planning and policies. It shall: **3.** Respond to the call for a change in human attitudes "through a vast campaign of education, debate, and public participation," and **4.** for the development of low-energy paths based on renewable sources, and for increased integration of resources and environmental considerations into industrial planning and decision making.

Among the matters to be considered will also be

- Institutional changes to make government agencies accountable for the environmental impact of their policies and decisions.
- Extended application of the polluter-pays principle in a transboundary concept.
- Institutional changes to ensure access to information concerning and influencing major decisions taken by government and industry affecting health and the environment.
- Formulation of strategies for limiting energy consumption.
- Extended use of financial incentives and disincentives for promoting a switch to renewable energy.
- Development of agreed strategies for reducing emissions of causative gases, in particular CO_2, within a given timetable.
- Extended cooperation with industry for the development of technologies to improve energy efficiency, and for the setting of targets in this respect.
- Introduction of a system for calculating energy input in products, and for energy labelling.

It is expected that the conference will be attended by high-level government representatives, including environment ministers, as well as by representatives of intergovernmental and nongovernmental organizations and the scientific community. Concurrently taking place will also be an international NGO conference, an international youth meeting, and a trade and technology fair for the promotion of environmentally sound technology.

As part of the preparations for the official conference, the ECE countries have been invited to produce national statements concerning its main topics. These shall contain reviews of measures already taken, as well as future-oriented proposals for further action, both at the national and regional level. They are to be submitted to the ECE secretariat by June 1, 1989.

Environmental groups should closely follow the preparations being made by their governments both for these statements and for the conference itself.

Reinhold Pape

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Meeting 1989, it is b
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Brontosaurus (youth ec
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The ecological part of
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Forest Action (EYFA). I

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Sued for

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tional park, as well as some cultural and sports events. Those who wish will also be able to stay on until June 5 for the celebration of World Environmental Day.

It is expected that the meeting will be attended by some 1500 people, of whom about a third will be coming from abroad. Not

24. 116 Praha 1, or Brontosaurus, Simona Bouzkova, Bubenska 6, 170 00 Praha 7, Czechoslovakia. Tel. +42 2 802908, fax 802906.

Simona Bouzkova

- **Greenway,**
- **Air Pollution Action Network,**
- **European Youth Forest Action**

o clean the air in Cracow

0,000 kronor (16,000
ed by private collec-
eden has enabled gas
e installed in central
placing old coal-fired
0 apartment houses.
y came partly from a
edish-Polish environ-

mental collection, and partly from a joint effort by Swedish youth organisations to raise an amount in one year equivalent to one second's worldwide military expenditure.

The total of 250,000 kronor is intended for various projects for peace, the environment, and international solidarity.

The Swedish Environmental Federation, Box 7048, S-402 31 Göteborg, Sweden

d for bad air

ndred inhabitants in
Amagasaki are suing
se state and various
npanies for damages
nt of 11.7 billion yen
f polluted air. This is
air pollution case yet
ht up in Japan.

The companies include the Hanshin construction company, which builds motorways, and two large steelworks. The construction company and the state are being held responsible for the pollution caused by exhaust gases from cars, especially those using the motorway between Kobe and Osaka. They are accused of permitting the emission of nitrogen oxides and other dangerous substances despite better knowledge.

The plaintiffs, numbering 483, point out that the town's 100,365 asthmatics, 1420 have died since March 1987.

sh call for car-free day

c constitutes a threat
vironment and to
ealth, in Poland as
The exhaust gases
les contain several
fferent chemical com-
t are toxic and can
nutagenic or carci-
ects.
al emissions of such
unt to 850,000 tons
nger cars alone in Po-
verage car emits 114
of carbon monoxide,
ns of hydrocarbons,
grams of nitrogen ox-
are naturally worse,
g CO, 58 kg HC, and
One bus on the other
ake as many passen-
ars in an urban area,
ne country.
fic accounts for 25-33
the emissions of ni-
les in Poland, 24-43
arbon monoxide, and
nt of the emissions of
ns. Half of the ve-
o, emit excessive
carbon monoxide and
es. In city streets the

level of pollution is far above acceptable air quality standards.

Poland, in other words, could well do with a car-free day – and one is planned to coincide with World Environmental Day, June 5. It is being organized by the Polish Ecological Club, which is also sending open letters to the government, members of parliament, local authorities, and people in the automobile business with demands for curbing some of the excesses of private motorized transport.

Accepting that many people are dependent on their cars, and that few are aware of the threat they pose, the Ecological Club says it does not expect any instant results, but is proposing:

More and better public transportation, outlawing cars in the central parts of cities, in residential and recreational areas, providing better conditions for cyclists, and allowing only unleaded petrol. It also urges the introduction of US standards for cars throughout Europe.

Leaflets exposing the threat from road traffic are being widely distributed, both to the public and to the press, radio, and TV. On June 5 cyclists wearing gas masks and carrying banners with ecological slogans will demonstrate against pollution from cars and environmentally unfriendly lifestyles. The important thing, the Club says, is to make public think.

Tadeusz Kopta

USEFUL CONTACTS

Some addresses of organizations/international networks active on air pollution problems and east-west cooperation:

Friends of the Earth International (FoE-I)
26-28 Underwood Street
GB-London
England N1 7JQ

Air Pollution Action Network (AIRPLAN)
Box 5627
NL-1007 AP Amsterdam
Netherlands

European Youth Forest Action (EYFA)
Postbox 566
NL-6130 AN Sittard
Netherlands

European Environmental Bureau
Rue du Luxembourg, 20
B-1040 Bruxelles
Belgium

Greenway
ELTE Nature Conservation Club
Egyetem tér 1-3
H-1053 Budapest
Hungary

World Wide Fund for Nature (WWF)
Avenue du Mont Blanc
CH-1196 Gland
Switzerland

Youth and Environment Europe (YEE)
Klostermollevej 48
DK-8660 Skanderborg
Denmark

International Union for the Conservation of Nature (IUCN)
The World Conservation Union
Avenue du Mont Blanc
CH-1196 Gland
Switzerland

Foundation for Environmental
Contact Poland/Netherlands
P.O. Box 5627
NL-1007 AP Amsterdam
Netherlands

Swedish-Polish Association for Environment Protection
c/o M. Andersson
Hällbygatan 32 D, 4 tr
S-752 28 Uppsala
Sweden

Swedish NGO Secretariat on Acid Rain
Miljövård
Box 33031
S-400 33 Göteborg
Sweden

Canadian Coalition on Acid Rain
112 St. Clair Avenue West, Suite 401
Toronto, Ontario M4W 2Y3
Canada

National Clean Air Coalition
801 Pennsylvania Avenue, S.E.
Washington, D.C. 20003
USA

Greenpeace UK/Andrew Kerr
30-31 Islington Green
London
England N1 8XE

Institute for European Environmental Policy/Helmut Schreiber
Aloys-Schulte-Strasse 6
5300 Bonn 1
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