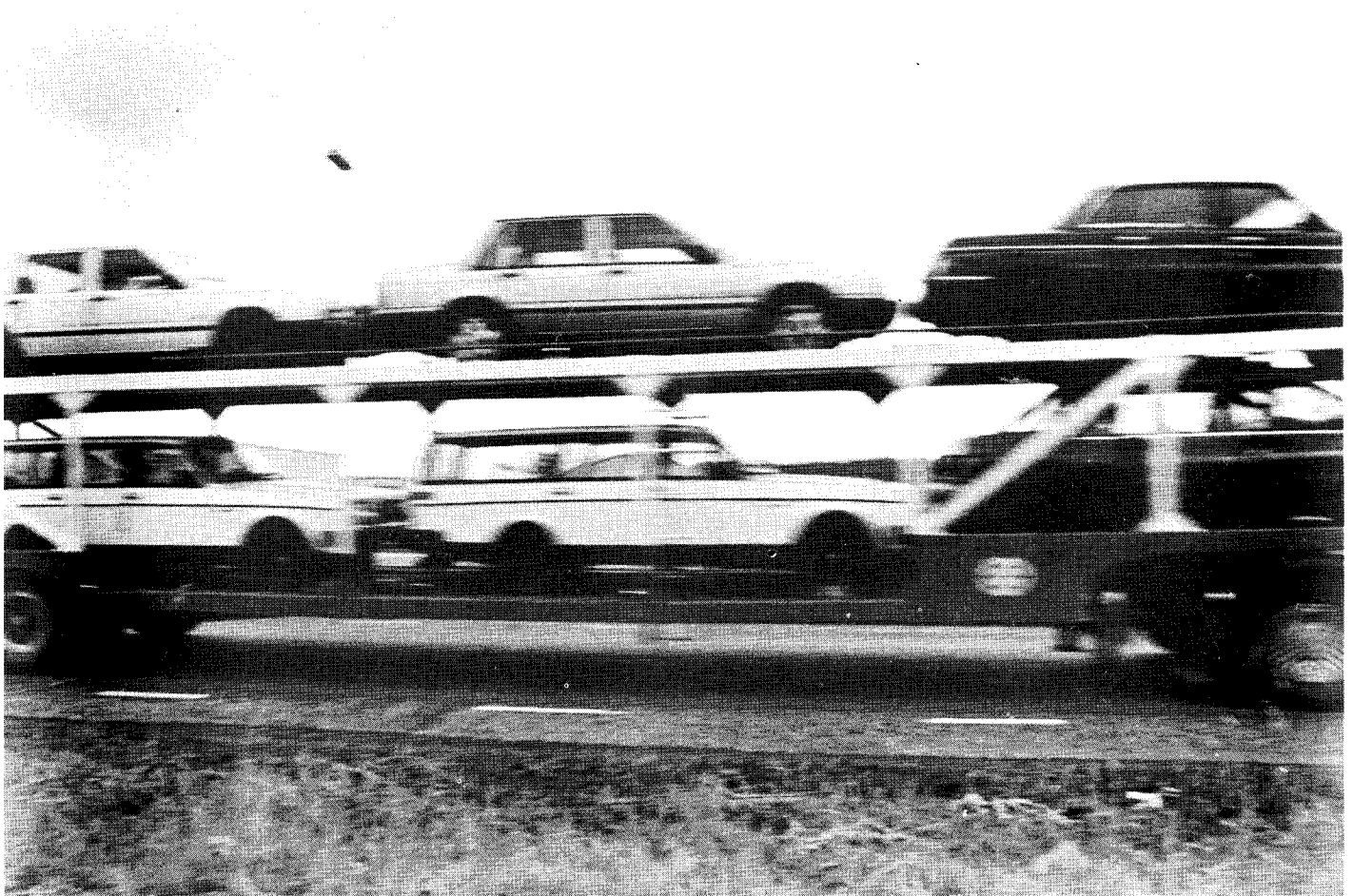


Acid News

A Newsletter from the Swedish and Norwegian NGO Secretariats on Acid Rain



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EAST GERMANY

What it will cost

THE FORMER German Democratic Republic attained the highest gross domestic product per capita in the Communist World, yet it was unable to implement efficient resource use. Compared with the Federal Republic, it expended nearly three times the amount of energy per unit of gross domestic product. Of all the world's major industrial countries, only the United States and Canada exceeded the GDR in primary energy consumption per capita.

Lignite, or soft brown coal, previously accounted for 70 per cent of primary energy consumption and nearly 85 per cent of electrical power

generation. Despite its low calorific value (only about one-fifth of that of heating oil), lignite has been the mainstay of the power and chemical industries ever since World War 1.

To enhance immunity from price changes on world energy markets, the highest possible use of brown coal was ordered in the late 1970s. In the following decade, the annual mining output rose from 253 to 320 million metric tons (1980-89), or a quarter of the global production. Removing this volume of lignite from opencast mines required pumping off about 2 billion cubic metres of subsoil water. The annual earth-

moving was more than five-fold that required for the Suez Canal.

With a water content ranging between 42 and 58 per cent, the east German lignite presents two alternatives for use: direct combustion at low thermal efficiency, or subsequent pressing and refining to enhance fuel quality. The latter took place in antiquated briquette processing plants, identified as the worst source of air pollution in the GDR and conceded by management never to have operated profitably.

Almost 100 million tons of brown coal were processed annually, pro-

Continued on page 12

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Acid News

A newsletter from the Swedish and Norwegian Secretariats on acid rain.

ACIDNEWS 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:

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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 Nature Conservation (Naturskyddsföreningen)
- The Swedish Youth Association for Environmental Studies and Conservation (Fältbiologerna)

Address and telephone: see above.

The Norwegian Secretariat, "The Norwegian Clean Air Campaign," is organized by five non-governmental organizations concerned with the environment:

- Nature and Youth (Natur og Ungdom)
- The Norwegian Forestry Society (Det Norske Skogselskap)
- 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)

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EDITORIAL

Only the best will do

IN THE PROCESS of harmonization, are European environmental requirements to conform to the worst or the best of the existing standards? Is the environment to be submitted to the requirements of polluters, or shall it be the other way round?

Negotiations have now been going on for some time between EC and EFTA concerning an agreement for a European Economic Area (EEA). The idea is that EFTA countries shall be included in the internal market when it becomes a fact for the EC in 1993.

The fear has been expressed by environmentalist organizations, among others, that as a result of an EEA agreement, the EFTA countries' environmental rules, which are often stricter than the Community's, will be watered down. There is also a fear that the freedom of individual countries to bring in more stringent regulations will be sharply curtailed.

Attention is focusing especially on products that are traded across national frontiers – concern being directed to such things as the marking of chemicals, motor vehicle exhaust standards, fuel-quality requirements, and the prohibition of dangerous substances such as asbestos and cadmium.

A harmonization of taxes might also affect the EFTA countries' possibilities of retaining environmental taxes and charges or introducing new ones.

The status of the negotiations was summarized in a Joint Declaration issued by the Ministerial Meeting between the European Community, its Member States and the countries of the European Free Trade Association on May 14. It was then stated, as regards the free circulation of goods, that such should apply from January 1, 1993 within the EEA, "although EFTA countries' national legislations may be maintained during a transitional period. In relation to motor vehicles agreement was reached on free circulation as of 1.1.95 on the basis of the Community acquis."

In effect this appears to mean that motor vehicles of a standard acceptable within the Community would

have to be accepted in EFTA countries from 1995. At present several of the EFTA countries have stricter emission standards than the Community, both for passenger cars and heavy vehicles. During an interim period the EFTA countries could retain their present legislation, such as that concerning the control of the durability and effectiveness of exhaust-cleaning equipment. The new EC exhaust standards, coming into force in 1993, include however no requirements as to durability, the control of the durability, or the manufacturer's guarantee of continued effective exhaust cleaning.

Concurrently with these negotiations between the EC and EFTA, others are proceeding separately between the Community and Austria on the one hand and Switzerland on the other regarding transit traffic through the two countries. (See article on page 5 of this issue.) The outcome of these negotiations will also be of prime importance from the point of view of the environment.

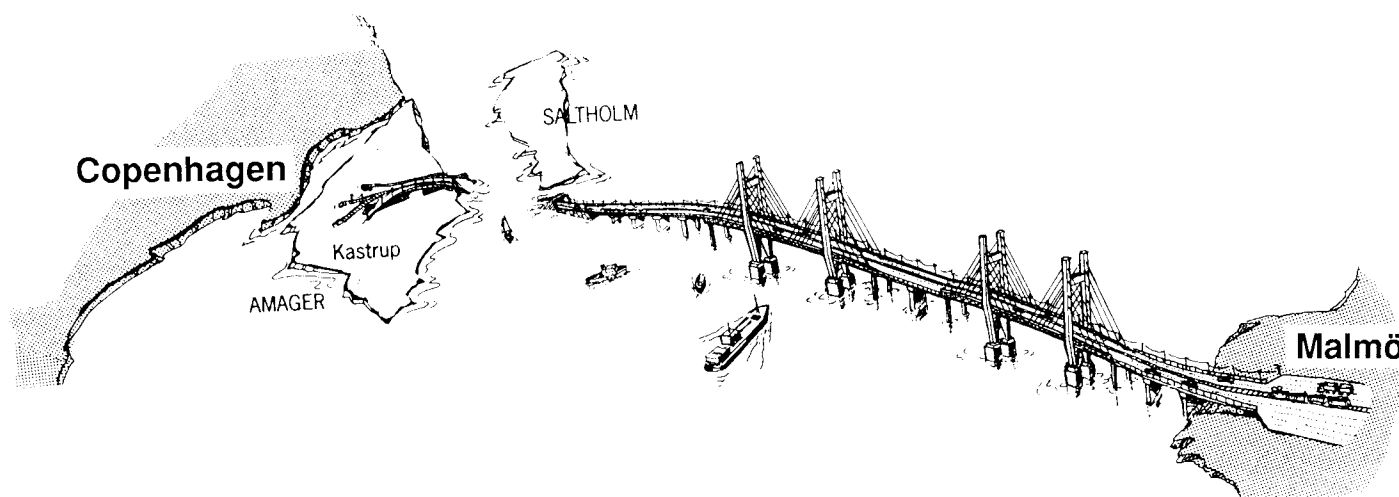
For decades Europe has been suffering from the acute effects of air pollution, for a great part of which motor vehicles are responsible. Its soil is becoming acidified and impoverished over ever widening areas, forest decline is steadily continuing, as is the destruction of lakes from acidic depositions, various species of fauna and flora are vanishing, and in cities sickness is spreading and cultural monuments are crumbling.

In view of all this it should be self-evident that any slackening of environmental standards, or delay in introducing further measures for the protection of the environment, can only be regarded as unacceptable.

Both the Community and the EFTA countries should make every effort to pick out the best and most effective environmental regulations that are in force in any of them, and make them applicable throughout the region. That should be the starting point from which to develop further measures for the protection of the environment.

CHRISTER ÅGREN

Opposed from two sides



© REGINA RICHTER

ON AUGUST 14 THE Danish parliament voted, in extraordinary session, in favour of an agreement with Sweden that opened the way for construction of a bridge over Øresund. What was thought would be a quiet one-day break in the parliamentary recess turned out to be a hectic six-day sitting during which the Danish bridge lobby worked frantically to make an end of resistance to the project. In which it eventually succeeded.

It is a matter of a combined road and rail bridge from Malmö in Sweden to an artificial island south of Saltholm island on the Danish side, with a continuation in a tunnel under the deep channel of the sound. The total length of the main structure, from coast to coast, will be about 17 kilometres, but to this must be added the length of all the approaches, which will be considerable. Large investments will be needed for linking up the bridge with the road and rail networks in and around Malmö and Copenhagen.

Estimates vary as to the cost of the project. According to figures released by the two governments, it would lie between 15.1 and 17.1 bil-

lion kronor, Danish or Swedish. Those who are critical of the scheme would however put it at twice that amount.

The cause of the mid-August uproar in Copenhagen was a letter written by four environmental organizations* to the EC Commission in Brussels, asserting that by agreeing to the bridge project, Denmark had gone against Community directives in two ways.

There followed a letter from a high Community official admonishing the Danish government to see that the parliament did not take any steps that would be contrary to EC's environmental directives. Intense political activity then ensued in Denmark, and it only became clear on August 13 that parliament would underwrite the bridge agreement.

About the same time the Finnish embassies in Copenhagen and Stockholm presented notes to the governments of the two countries, sharply calling into question the adequacy of the examination of the environmental effects on which the decision to agree to the bridge was based. The Finns claimed, moreover, that both Sweden and Denmark had failed to provide proper

information about the proposal, thus breaking four international agreements.

The Community had been aroused to intervene because of the assertion of the environmentalist groups that Denmark had not followed EC directives in two respects:

1. The bridge would encroach on two EC bird protection areas, on Saltholm and Vestamager. It would cause disruption of bird life on Saltholm in particular, which is of especial importance.

2. Denmark had sidestepped EC rules for describing the environmental effects. The Danish description was inadequate on no less than eleven points.

Failure in this latter respect interrelates with the environmentalists' criticism of the whole project – centring largely on the emissions of pollutants and the effects on the Baltic Sea.

Both governments maintain that the emissions of pollutants from traffic on the bridge will be negligible. That could only be the case however if the volume of traffic turns out to be as low as is assumed, viz. 6-8000 vehicles daily. But to keep the numbers down to that

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level, the bridge tolls would have to be relatively high, or about 160 kronor per passage. There appears little likelihood of such tolls being charged.

It has been agreed between the governments that the tolls shall be set according to market principles. A consultant's report commissioned by the Swedish government shows the financially most effective rate to be 37.50 kronor. Such a charge would inevitably invite a surge of commuter and pleasure crossings, bringing the traffic volume up to at least 30,000 vehicles a day – with a consequent marked increase in the emissions of pollutants.

The other great imponderable is the effect on the Baltic Sea and its approaches via Öresund. This sound is one of three connecting the Baltic with the North Sea. Although there is a net outflow from the Baltic, great quantities of water also flow in the opposite direction. The inflowing North Sea water is more saline and oxygenated than that in the Baltic, and preventing it from coming in could be disastrous.

Critics of the project insist that a bridge could greatly affect the natural flow of water through Öresund. Already dead areas of the sea floor would spread out still further if the inflow of oxygen-rich water were strangled. Moreover with many aquatic species existing precariously in the brackish water of the Baltic, reduced infusions of salt water would have serious consequences. Only a slight reduction of the water's salinity can be sufficient, for instance, to threaten the reproduction of cod in the Baltic.

The question is in any case who, if anyone, stands to benefit from a bridge. Although good connections

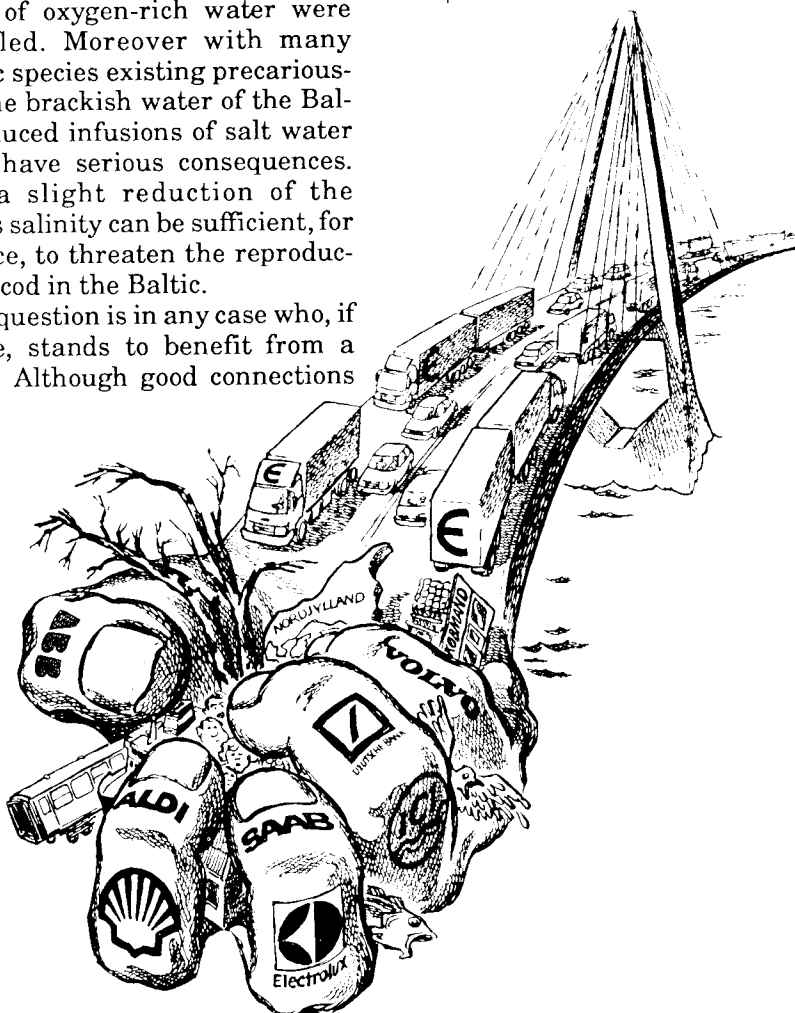
with the continent of Europe are of vital importance for Swedish industry, the transport companies are noticeably cool towards the project. The reason is obvious: The proposed bridge is not an attractive way for getting goods to European markets. It is quicker and cheaper to use ferries going directly to Germany, and thus avoid the circuitous route via Denmark, which lengthens the journey by 250 kilometres.

Remains local traffic as a possible beneficiary of a bridge connection – although even for such use its advantages are doubtful. Compared with a rail tunnel between Malmö and Copenhagen, which is advocated by a number of environmentalists, a bridge would, with all its auxiliary traffic apparatus, make for a much longer journey between the two cities. A driven tunnel would therefore be much the better alternative, both from the traffic and the environmental point of view. Moreover it would cost only about half as much as a bridge.

HARALD PERBY

Traffic Campaigner
Svenska Naturskyddsföreningen

*The four were: Danmarks Naturfredningsforening, Dansk Ornitologisk Forening, Svenska Naturskyddsföreningen, and The European Environmental Bureau.



CALIFORNIA

Cleaner fuel

CALIFORNIA'S STANDARDS for clean fuel, expected to be finalized before the end of this year, are forcing oil companies to come up with improved forms of petrol. Arco, based in California, announced recently a new form of petrol that it says is no more polluting than M-85, a blend of 85 per cent methanol and 15 per cent petrol.

According to Arco, its new petrol will reduce emissions of unburned hydrocarbons by 28 per cent, nitrogen oxides by 26 per cent, and carbon monoxide by 25 per cent. Sulphur compounds, benzene, and heavy aromatic compounds, as well as evaporation of hydrocarbons, will also be reduced.

The new petrol will cost 16 cents more than the US average of a dollar per gallon, which according to Arco makes it cheaper than methanol by between 9 and 34 cents a gallon.

Source: **New Scientist**, August 3, 1991

UNITED STATES

Fuel economy worsens

IN THE UNITED STATES the sales weighted fuel economy for cars peaked at 28.6 miles per gallon (mpg) in 1988, and has since decreased to 27.8 mpg. Since 1978, there has been an increase in average inertia weight, horsepower and engine size. Similarly, the fuel consumption of light trucks peaked at 21.6 mpg in 1987 and is 20.8 this year. This is the third straight year of declining efficiency for the entire light-duty fleet. It now averages 25.0 mpg, which is the lowest level since 1985.

If every car in each weight category did as well as the best model, the average new-fleet fuel economy would have been 34.4 mpg, a 24 per cent improvement. If an approximately 12 to 13 per cent drop in average weight, interior volume and top speed were acceptable, the overall fuel economy could have been 45 per cent better.

Source: **M P Walsh**, *Car Lines*, July 1991

Resisting EC demands

THE INCREASE in truck traffic through Switzerland and Austria, which may be an outcome of the negotiations now being carried on with the European Community, could greatly accentuate the environmental problems of the Alpine region. Such is the conclusion of the environmental organizations in these two countries, and their view is strongly upheld by similar groups in the rest of Europe.

The two outstanding problems are the emissions of pollutants, which for one thing contribute to forest decline, and noise.

"The noise from the heavy vehicles, re-echoing from the steep sides of the mountain valleys, becomes intensified and can be heard over great distances," observes Theresa Herzog-Zimmermann, who works at the office for European matters that is run jointly by the Swiss environmental organizations.

"The concentrations of air pollutants also become very high in these valleys. Those of ozone, for instance, exceeded the limits that are permissible in Switzerland on 133 occasions in 1988."

The forests in the worst affected areas are already badly damaged. Normally the tree cover above the Alpine villages serves as a natural barrier against avalanches, but when the trees die or become damaged, there is nothing to prevent snow slides. It is feared that villages in some parts may have to be abandoned.

"Here and there concrete barriers are already being built as a substitute for the damaged trees," adds Theresa Herzog-Zimmermann. "Being extremely thin, the soil layers erode easily, making it very difficult to generate new forest growth."

The Swiss environmentalist organizations have assembled enough signatures to enable them to demand a referendum on the proposition that all freight in transit through the country should be carried by rail. A local referendum has in fact already been held in one region, where the problem is particularly acute, with the result that 81

per cent voted in favour of transfer to rail.

A national referendum cannot however be carried out until next year, and there is a fear among environmentalists that by then an agreement will have already been made with the Community to permit increased road transport.

It had originally been assumed that the negotiations between the

Freight in transit should all be carried by rail

Community and Austria and Switzerland concerning transit traffic would have been concluded last June, but as in the case of those between EC and EFTA in regard to an EEA agreement, here too there has been a delay.

As it is, both Switzerland and Austria have restrictions on heavy truck traffic. Driving such vehicles by night and on Sundays is prohibited in both countries, and the Swiss have imposed a maximum weight for trucks of 28 tons, which is lower than in most countries. Moreover both have a quota system, which limits the number of trucks that may pass through the country.



Among the matters that are being discussed between Austria and the Community is a system of eco-points. Under this the Community would be allotted a certain sum of points, from which deductions would be made for trucks passing through. The number of points to be deducted would depend in each case on the environmental effects of the vehicle.

"The Community attitude is that the cleanest vehicles should not be penalized at all, but we regard trucks as an environmental problem in themselves, not only as polluters," says Elisabeth Freytag, who heads the section for European integration in the Austrian department of the environment.

She notes that whereas the Community wants points to be calculated on the basis of agreed environmental requirements, such as the new EC directive that limits emissions of air pollutants from heavy duty vehicles, Austria on the other hand proposes that the best available technology should serve as the basis.

As a first bid the Swiss government has offered to build a new and better railway line through the country, provided the Community would agree to use it for its through freight. As a last resort Switzerland would allow fifty 40-ton trucks to pass through daily, but only if they were carrying perishable goods.

Speaking for Austria, Elisabeth Freytag adds: "The real stumbling-block is that while we cannot accept any increase in the number of transiting vehicles, that is just what the Community wants."

The main reason why the Community is pursuing this matter so relentlessly is that it foresees a striking increase in transports by heavy truck when the internal market becomes a fact in 1993.

A convention on the Alpine environment was due to be signed this autumn. The articles on transportation are however being left aside until the negotiations with the Community have been concluded.

KJETIL BRAGLI ALSTADHEIM

Children at risk from road traffic

ROAD TRAFFIC is the largest single cause of air pollutants that put children in Great Britain at risk of lung disorders, including chest infections and asthma. According to Greenpeace UK, the situation is set to worsen with the projected 142 per cent increase in road traffic by 2025.

These conclusions derive from a 50-page report* commissioned by Greenpeace and written by the air pollution and health expert, Dr Cathy Read. The report is based on a survey of available research on the subject, including air pollution monitoring, and laboratory, clinical and epidemiological studies from ten countries.

Despite a relative lack of monitoring data in the UK, the report concludes, from research carried out in other countries, that there is cause for concern for Britain's children. Various air pollutants are linked with asthma, hay fever, chest infections including croup, and childhood cancer.

The report concentrates on the effects of nitrogen dioxide, ozone, sulphur dioxide and particulate matter, acid aerosols, carbon monoxide, lead, and benzene, all of which are caused in part by road traffic.

In the United Kingdom traffic accounts for 37 per cent of hydrocarbon emissions, 48 per cent of nitrogen oxides, and 88 per cent of carbon monoxide. The other major contributor is fossil-fuel power stations which account for 29 per cent of the nitrogen oxides and 71 per cent of the sulphur dioxide. Under the influence of sunlight hydrocarbons and nitrogen oxides form ozone.

The nature of air pollution has changed in the last decade. Road transport is emerging as the largest single source, with emissions that are projected to accelerate into the next century. In the last decade the volume of traffic has risen in the UK by 57 per cent. Pollution from traffic has also risen. From 1979 to 1989 the emissions of nitrogen oxides rose from 908,000 tons to 1,298,000 tons,

and those of hydrocarbons from 490,000 to 762,000 tons.

Children are likely to be more susceptible to air pollution than adults, since they breathe more air from a given volume of lung tissue, are more active, and spend more time outdoors in summer when low-level ozone (smog) is at its peak. Moreover asthma, which is known to be affected by air pollution, is on the increase, and is very common in young people – with one in seven of the primary-school children in Britain suffering from it.

Other high-risk groups are the over-65s, pregnant women and their unborn children, those with heart, lung and respiratory conditions.

From the limited government monitoring data available, it is known that World Health Organization guidelines for ozone were exceeded 322 times last year at monitoring stations around the UK. Dr Read's report concludes that levels of ozone commonly measured in parts of southern England could impair lung function in normal children.

Low levels of acid aerosols are associated with worsening asthma

and bronchitis in children. As there is no routine monitoring for acid aerosols in the UK, it is impossible to determine current levels or to identify the risks that might arise from them.

Over the last decade, deaths from asthma among people aged 5-34 years have risen by 30-60 per cent in Australia, France, England and Wales, Canada and the United States. Although asthma is a multifactorial disease, the evidence is convincing many physicians around the world that air pollution has contributed to a worsening of this problem.

Levels of nitrogen dioxide found in parts of urban Britain are such that they can cause respiratory symptoms including sore throat and cough amongst healthy children. They can also reduce lung function in those with asthma.

In addition to the health effects of air pollution caused by traffic, such pollutants also add to global warming and acid rain. When submitting a copy of Dr Read's report to Mr Malcolm Rifkind MP, Secretary of State for Transport, Greenpeace UK requested that he take urgent action to curtail the increase in private transport.

***Air pollution and child health** by Dr Cathy Read. Available from the publisher: Greenpeace UK, Canonbury Villas, London, England N1 2PN.



Swedish cartoon with a baby waving sign at motorists saying "Clean air a human right."

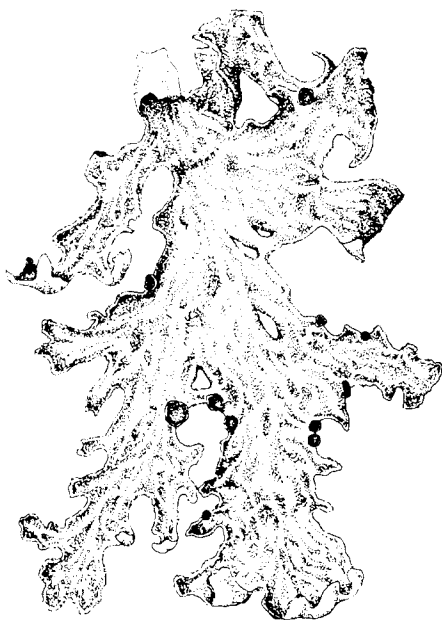
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May have to be lowered

HOW MUCH pollution the natural environment will stand is a matter of continual study. Scientists have tried to provide the answer by setting critical loads for various substances, and limits for sulphur and nitrogen are now generally agreed. If depositions are below the critical load, the most sensitive receptors are considered to be out of danger.

The difficulty is however that knowledge in regard to many organisms and mechanisms is still relatively poor. This is shown to be the case, for instance, with terrestrial blue-green algae, and lichens containing such algae, in a recently published review* of the literature by Tomas Hallingbäck.

Lichens are a group of organisms consisting of a fungus and an alga in intimate association. In most species the alga is green, but there is also a small number of lichens with blue-green algae. It seems that the latter are the most sensitive to pollutants, and are decidedly the most under threat. All such lichens have disappeared in the Netherlands, for instance, and 96 per cent of them have either van-



Lobaria pulmonaria, lichen with blue-green algae, under threat from air pollution.

ished or are in danger of doing so in Denmark. According to the writer of the article, the precise effect of airborne pollutants on the physiology of lichens remains to be determined. Most of the evidence points to a com-

bination of sulphur dioxide with general acidity as the most damaging. That lichens with blue-green algae should be especially affected may be due to the nitrogen-fixing ability of the algae. This process of nitrogen fixing has been shown to be very sensitive to acidity as well as to the deposition of nitrate and ammonia.

Hallingbäck's conclusion is that much more attention needs to be given to lichens with blue-green algae, as well as to blue-green algae generally, when considering the nitrogen load that the environment can stand. In Sweden alone there are 200 species of the former, and 500 of the latter. Better knowledge of the behaviour of these organisms will probably result, he says, in the critical-load limits having to be lowered.

PER ELVINGSON

***Blue-green algae and cyanophilic lichens – threatened by air pollution and fertilization.** By Tomas Hallingbäck. 1991. Swedish, with brief English summary. Published in *Svensk Botanisk Tidskrift*, No. 85, pp 87-104. ISSN 0039-646X.

GERMANY

Awesome gap

THE MUNICH BASED Ifo Institute for Economic Research (Institut für Wirtschafts-Forschung) has estimated that DM 211 billion will have to be invested in the new federal states (of former East Germany) by the year 2000 to bridge the awesome divide in environmental standards between the eastern and western parts of the country.

Of that total, DM 125 billion will be required for piping and sewage treatment plant, DM 34 billion for solid-waste disposal facilities, DM 22 billion for air pollution control equipment, DM 17 billion to improve drinking water quality, DM 11 billion for soil decontamination, and finally DM 2 billion for noise abatement measures.

Source: **Warmer Bulletin**, No 30, 1991

CZECHOSLOVAKIA

Czech cars to go clean

THE GOVERNMENT of Czechoslovakia announced in April that catalytic converters will have to be installed on all new cars manufactured and sold in Czechoslovakia after October 1993. The exhaust emission requirements are closely modelled on the European Community's 1989 Motor Vehicle Emissions Directive (89/458/EEC).

It was also decided that passenger cars currently on the roads are to be submitted to annual antipollution checks. The new regulation calls moreover for the creation of a network of filling stations carrying lead-free petrol, covering the whole of the country.

Source: **M P Walsh, Car Lines**, May 1991

AUSTRIA

Incentives to economy

THE AUSTRIAN GOVERNMENT is considering the introduction of a points system to reward motorists for buying cars that use less-polluting fuels. The proposal would, if passed by the parliament, come into effect during 1992.

A second measure that is being drafted is designed to influence motorists to purchase small cars that use less petrol. Buyers of bigger cars would pay a higher monthly tax than those buying smaller cars. Owners now pay a monthly tax based on engine size. Under the proposal, it would be according to a scale based on the average fuel consumption of the model in question.

Source: **M P Walsh, Car Lines**, July 1991

Preparing for clean-up

FOLLOWING THE political changes that took place in Czechoslovakia in the autumn of 1989, several environmental programs and resolutions have been put forward by the governments of the two republics. The federal minister for the environment, Jozef Vavrousek, has endeavoured to make environmental protection a central element in the reforms for creating a market economy – with “eco-taxes” and financial incentives playing a major role.

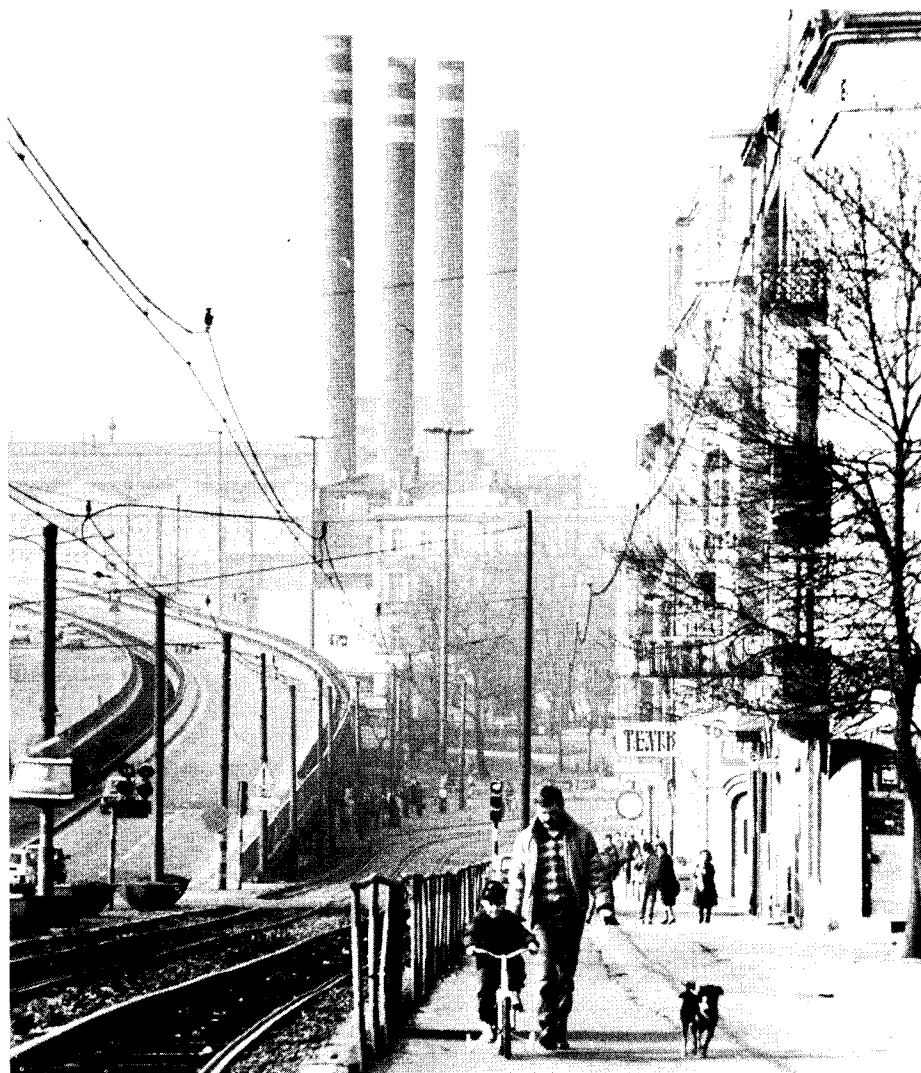
Three federal laws have been up for enactment this year: a general environmental protection act, a clean air act, and a waste disposal act. The Clean Air Act, which will allow penalties to be imposed on polluters, was approved by the federal parliament in July. This will enable the authorities to impose fines up to the equivalent of US\$200,000, with the possibility of a doubling for second offenders. In certain circumstances the inspectors will have a mandate to close down a polluting plant.

One of the aims of this federal law is to ensure that the emissions from existing stationary sources of pollution will comply with EC standards within five years.

While the law sets the general framework for a nationwide policy in regard to air pollution, its specific application will remain under the jurisdiction of parliaments of the Czech and Slovak republics. Both the construction of new plant and the modernization of old will be subject to each separate republic's legislation. It is expected however that the parliaments in each case will require compliance with EC standards from the start.

The commentary to the Clean Air Act states that the pollution of the atmosphere in the Czech republic places it among the most polluted territories in Europe. The quality of the air in northwestern Bohemia is coming close to constituting an ecological catastrophe, and the situation is not much better in a number of other industrial and residential agglomerations, such as Prague, Ostrava and smaller urban areas.

It says that the main cause of this state of affairs is the inordinate de-



© WALDEMAR KOMPALA

mand for energy, which is relatively far greater than that in any normally developed country. Moreover the leading source of energy is low-grade brown coal, with a high content of sulphur. The greatest demands for energy come from heating, the generation of electricity, and the metallurgical and chemical industries.

The Czech parliament has therefore adopted an energy-saving program which includes setting up of information centres for energy saving throughout the country and the possibility of financial support for energy-saving measures in private and public buildings.

Mobile sources also contribute considerably to air pollution, the most prominent being road traffic. A feature of the Czech republic is the old age of the vehicles. Already in a poor technical state, they suffer

from low servicing standards and a general lack of spare parts. The rate of renewal is also slow. While the domestic automobile industry is belatedly adjusting to western European emission standards, the emissions from the older vehicles remain among the continent's worst.

Czechoslovakia has however now begun to develop a program for reducing emissions of sulphur dioxide and nitrogen oxides. The Minister for the Environment estimates that 30 per cent of the sulphur dioxide emissions can be eliminated by installing scrubbers and filters, at a cost equal to about £400 million. Last January an agreement was signed with the European Community which makes available to the CSFR a sum of 30 million ecus for seventeen environmental projects, including one for cleaning up the

country's largest power station. Installations that exceed the new emission limits, and are too old to be cleaned up, will be shut down.

In an interview with the New Scientist, the minister said there is not enough money in Czechoslovakia for cleaning up the pollution. "We are prepared to use any equipment we can get," he said. "I know scrubbers with 95 per cent efficiency are available, but it is better to have scrubbers that work at 60 per cent than to have nothing at all."

With almost 8000 square kilometres, Northern Bohemia has 6 per cent of the total area of the CSFR and 7.6 per cent of its population. Its output of products for industry accounts for 10.6 per cent, that of consumer goods for 15 per cent, and of electric power for as much as 32.6 per cent of the whole country's production, as well as 69 per cent of the brown-coal mining.

The economy of the region, characterized by a high proportion of power resources, shows up in annual emis-

Not enough money in Czechoslovakia for cleaning up

sions of almost one million tons of SO₂, 330,000 tons of nitrogen oxides, and 212,000 tons of solids.

Faced with this situation, in November 1990 the Czech republic passed a resolution for an Environment-depolluting Program of the North Bohemian Region for 1991-95 with a Prospect until the Year 2000. The proposed investments include construction for a total of nearly 20.5 billion CSFR crowns, with 13.3 billion crowns earmarked for desulphurization.

The resolution calls for the establishment of regional funds for the depollution of the environment, to be administered by the Association of Towns and Communities of the North Bohemian Region, with contributions from the state budgets of the republic and the federation.

Since the whole package of measures was regarded as a matter for the entire nation, and not only the Czech republic, the resolution was submitted to the federal parliament for adoption, so far without result.

REINHOLD PAPE

As it is now

In 1990 the Czechoslovakian Federal Committee for the Environment published a study* on the state of the country's environment. This was intended as a basis for the development of a new environmental policy in Czechoslovakia. Here follow some of the main features of the study.

The existing data on emissions of air pollutants in Czechoslovakia consist mainly of calculated estimates. Only to a limited extent are they based on direct measurements. It is however clear that there has been a substantial increase in emissions over the last few decades.

It appears that from 1959 to 1970 the emissions of sulphur dioxide increased from 900,000 to 2,450,000 tons, and then to 3,100,000 tons in 1980 and 3,150,000 tons in 1985. Subsequently, due to milder winters with a lower consumption of coal, as well as an increased use of nuclear energy, the emissions have been relatively stable. They are now estimated to amount to 102 kilograms per capita and 12.3 tons per square kilometre.

By far the greater part of the emissions of SO₂, 79 per cent, emanates from power generators and heating plants. Industrial processes account for 11 per cent, domestic heating for 7 per cent, and diesel-driven vehicles for 3 per cent.

The total emissions of nitrogen oxides, expressed as NO₂, are estimated to be about 1,200,000 tons, or 57 kilograms per capita. The power generating and industrial sectors together contribute 71 per cent, transportation 22 per cent, and all types of heating 7 per cent.

Emissions of hydrocarbons (volatile organic compounds, VOCs) are put at 150-200,000 tons, the sources being industry (about 50 per cent), transport (30 per cent), and domestic heating (17 per cent). With a growing use of natural gas, these emissions are increasing.

About 60.4 million tons of the greenhouse gas carbon dioxide (expressed as carbon) are emitted in a year. This is the equivalent of 4.1 tons per capita. Carbon monoxide emissions are 1.5 million tons, transport being responsible for 45 per cent.

The emissions of solid particulates, especially fly ash, and aerosols have increased from 800,000 tons in 1950 to 2,800,000 tons in 1985. They continue to grow gradually as a result of the deterioration and hence reduced efficiency of the electrostatic separators installed 10-15 years ago.

The fly ash from the burning of brown coal in Czechoslovakia contains many hazardous substances: arsenic, beryllium, cobalt, nickel, selenium, and bismuth, as well as radioactive elements such as uranium and thorium. Even on an annual average, the concentrations of particulates in the air exceed by far the permissible levels in Czechoslovakia.

The atmospheric haze due to air pollutants cause a decrease in the hours of sunshine as well as in its intensity. In winter Prague, for instance, gets two hours less of sunshine daily, and the intensity may be reduced by as much as 40 per cent.

The concentrations of air pollutants have also increased in areas far distant from the main sources of emission. The average annual levels of SO₂ in such areas have, for instance, risen from 2-5 micrograms per cubic metre to 10-20 µg/m³. Ground-level ozone resulting from chemical reactions involving NO_x and VOCs has also shown a considerable increase. It is now almost impossible to find any part of Czechoslovakia where there is not an excess of harmful substances in the atmosphere.

From the point of view of the direct effects on human health, the peak concentrations of airborne pollutants – lasting for several minutes, hours or even days – are especially serious. In Prague, during the inversions of January 1982 and February 1987, the twenty-four-hour concentrations of SO₂ exceeded 3,000 µg/m³. The highest permissible limit is 150 µg/m³. In the town of Chomutov that limit is exceeded on an average during 117 days of the year.

About half of the population of the Czech republic, and a third of the Slovakian, are living in areas with notably low air quality.

***The Environment in Czechoslovakia (1990).** Report of the Federal Committee for the Environment. Published by the Department of the Environment, Slezska 9, 120 29 Prague 2, Czechoslovakia.

Average annual concentrations of SO₂ in Czechoslovakia (mg/m³)

	1970	1975	1980	1985
Chomutov region	53	71	94	126
Most region	57	80	102	132
Teplice region	51	77	93	110
Ostrava region	36	36	46	55
Prague (Karlovy)	100	100	128	155
Bratislava	49	67	55	60

Key role for the West



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THE WORLD WIDE FUND for Nature recently published a survey of the trends in western investment activity in central and eastern Europe. A lot of alarming news has been circulating in western Europe and the United States on the environmental crisis in East Europe, leading to a public demand for western aid and investment. A new bank was also set up to facilitate help from western Europe, the European Bank for Reconstruction and Development (EBRD).

But what is being done in concrete terms? In coming issues of *Acid News* we intend to present details of the programs of western governments and funding organizations concerning air pollution control. Here we begin with a general presentation of some of the multilateral aid programs taken from the WWF report.

According to the WWF there is currently little investment activity in central and eastern Europe. "The general picture is one of governmental institutions trying hard to entice their reluctant industries into the region. Gloomy short-term prospects, however, contrast with the much more favourable long-term possi-

bilities. It is generally considered that western investment has a key role to play in economic restructuring and environmental clean-up in central and eastern Europe."

The general investment programs may be summarized as follows.

EUROPEAN COMMUNITY

The European Commission has been given the task of coordinating G-24 assistance (G-24 consists of the member countries of the European Community and EFTA, and Turkey, the United States, Canada, Japan, Australia, and New Zealand). The overall G-24 program is termed Phare – Poland/Hungary Aid for Restructuring of Economies, now extended to other countries without a change of name. Coordination involves monitoring the individual initiatives of the G-24 countries, proposing multilateral actions and administering the European Community's own funds for central and eastern Europe.

The Community funds for central and eastern Europe (excluding those in the programs of member states) amounted to US\$ 690 million in 1990, rising to \$1130 million in 1991 and \$1340 million in 1992.

Environmental projects are formulated through a consultative process between governmental authorities in the receiving country and the Commission. The total amount committed to environmental projects so far is \$123 million.

UNITED STATES

The USA is taking a leading role in the programs of the World Bank and the IMF in central and eastern Europe. Otherwise US initiatives to promote investment in the region remain small in comparison with those of the European Community.

Support for East Europe Democracy (SEED) Act of November 1989 allocated \$938 million for a large number of specified projects in Poland and Hungary, with \$40 million specified for environmental projects. The Foreign Operations Act of October 1990 allocated a further \$370 million for central and eastern Europe, of which \$65 million are for environmental projects.

OTHER G-24 GOVERNMENTS

Data provided by the EC Phare Secretariat, which coordinates G-24 activities allows a rough estimate of

the total amounts involved (including American activities).

- Grants \$3.7 billion
- Export credits \$5.8 billion
- Loans \$3.7 billion
- Unspecified \$3.0 billion

A number of G-24 countries have funds for environmental activities, totalling about \$400 million. This does not take into account however numerous projects for which data on costs was not available. A better estimate would be \$500 million.

The totals for environmental purposes would therefore be:

- Eur. Community \$123 million
- United States \$105 million
- Other G-24 nations \$500 million
- Total \$728 million

MULTILATERAL INVESTMENT BANKS

Altogether, the funds so far earmarked for central and eastern Europe amount to:

- World Bank \$4.3 billion

(total already committed)

- Eur. Invest. Bank \$2.8 billion

(total budget – not all allocated)

- EBRD \$12 billion

(none as yet allocated)

Both the World Bank and the EBRD have started to prepare environmental aid programs after massive criticism from environmentalist groups. The NGOs fear that only a very small proportion of the financing from West to East as described above will be used for environmental projects.

To get an idea of the sums that will be necessary to start cleaning up in East Europe, the following estimate for eastern Germany might be useful. The German government has estimated that at least \$120 billion will be necessary to solve the environmental problems in that part of the country alone. A study by BUND, the German environmental organization, on the other hand puts those costs at \$220 billion.

REINHOLD PAPE

More information can be found in WWF's report: **Who knows where the money goes? A survey of investments in central and eastern Europe**, March 1991, written by Duncan Fisher. Available from WWF-International Europe Office, 608 Chaussee de Waterloo, B-1060 Brussels, Belgium

Recently published

Steering a new course – transportation, energy, and the environment (1991)

By D Gordon. A report analyzing the history and current patterns of transportation in the US, as well as the environmental effects. Surveys alternative fuels and fuel efficiency, and presents various available strategies for addressing transportation problems, presents policy options, and lists recommendations. 228 pp. Obtainable from the publisher: The Union of Concerned Scientists, 26 Church Street, Cambridge, MA 02238, USA.

The environmental impact of the car (1991)

A Greenpeace report edited by S Elsworth, addressing the environmental impacts, such as the costs of cars in terms of the consumption of resources, road building, safety, oil exploration and transportation, and air pollution. It also looks at historical and future trends of car production and use, and at the influence of the car lobby. 60 pp. Obtainable from the publisher: Greenpeace International, Keizersgracht 176, 1016 DW Amsterdam, Netherlands.

Benefits and burdens of car ownership and use: the issues weighed (1990)

A 16-page summary in English of a Dutch report written by H L van der Kolk at the Institute for Research on Public Expenditure, and commissioned by the Dutch Society for Nature and Environment. Obtainable from Stichting Natuur en Milieu, Donkerstraat 17, 3511 KB Utrecht, Netherlands.

Ecological impacts of aircraft emissions (1990)

Tutzing Material Nr. 66. Edited by M Held. Describing environmental aspects of aircraft emissions. 59 pp. Price DM 8, plus postage. Obtainable from the publisher: Protestant Academy of Tutzing, Postbox 227, 8132 Tutzing, Germany.

Valuing the environment (1991)

Six case studies from the UK, Norway, Italy, USA, Germany and the Netherlands, describing various approaches regarding methods for the monetary evaluation of environmental costs and benefits. Editors J-P Barde and D W Pearce. 271 pp. Published by Earthscan Publications Ltd, 3 Endsleigh Street, London, England WC1H 0DD.

Sulphur dioxide emissions from oil refineries and combustion of oil products in western Europe (1991)

Concawe report No. 2/91. Between 1979 and 1985 the sulphur content of crude oil fell from 1.45 to 0.98 per cent, and refinery emissions of SO₂ declined from 884,000 to 526,000 tons. By 1989 the

average sulphur content had risen to 1.10 per cent, while SO₂ emissions remained unchanged. The amounts of sulphur left in oil products intended for combustion decreased from 8.94 to 3.44 million tons between 1979 and 1985. By 1989 they had decreased only slightly to 3.38 million tons. Obtainable from: Concawe, Madouplein 1, 1030 Brussels, Belgium.

Photochemical oxidants in the atmosphere (1991)

Report describing the formation and occurrence of ozone in Europe. Deals with emissions of the precursors, NO_x and VOCs, as well as source-receptor relationships, and strategies to reduce concentrations of ozone. 70 pp. Obtainable from the publisher: The Nordic Council of Ministers, Store Strandstraede 18, DK-1255 Copenhagen, Denmark.

Cause related monitoring of forest damage (1991)

Report, based on a literature review, focusing on possible improvements in the methods for assessment and monitoring of forest damage. Describes the effects of ozone, nitrogen, and soil acidification, separately and in combination with drought and frost. 73 pp. Published by and available from the Nordic Council of Ministers (address as above).

Low energy, low emissions: SO₂, NO_x and CO₂ in western Europe (1990)

By J Alcamo and B de Vries. Emissions of air pollutants are calculated for ten countries, using low-energy scenarios emphasizing energy efficiency, maximizing the use of renewable energy sources (other than nuclear), and minimizing the use of fossil fuels. By the year 2030 such scenarios result in a reduction of 54 per cent for SO₂, 37 per cent for NO_x, and 41 per cent for CO₂ emissions, as compared to their 1980 levels. 29 pp. Obtainable from the publisher: International Institute for Applied Systems Analysis (IIASA), A-2361 Laxenburg, Austria.

Economic restructuring in eastern Europe and acid rain abatement strategies (1991)

By M Amann, L Hordijk, et al. The report presents an energy scenario for eastern European countries in which a gradually improved energy efficiency is assumed. Analysis using the RAINS computer model shows that economic restructuring and efficiency improvements may result in significantly lower costs for reducing SO₂ emissions, as compared to abatement strategies using only "end of pipe" technologies. 25 pp. Published by and obtainable from IIASA (address as above).

What it will cost

Continued from front page

ducing half their weight in briquettes for heating, gasification, coking, and carbochemical manufacturing. Another 175 million tons were burned directly in electrical generating plants, and the remainder apportioned to factories and institutions.

Due to the high sulphur content of lignite, ranging from an average value of 0.6 per cent (eastern Elbe deposits) to 2.2 per cent (Halle/Leipzig) before processing, in 1989 an estimated 5.2 million tons of sulphur dioxide were released into the atmosphere. Desulphurization devices were never deployed.

Having taken over international treaties signed by the GDR, the Federal Government is now committed by the UNECE Sulphur Protocol to achieve a 30 per cent reduction of SO₂ emissions or their transboundary effluents by 1993, based on 1980 levels. Last year the decline of unprofitable manufacturing in the GDR had already cut SO₂ emissions there by an estimated 10.5 per cent, or 550,000 tons. However, with fuel consumption still above 1980 figures, an additional reduction of over 30 per cent would be required for domestic fulfillment of the sulphur treaty.

This goal could be achieved essentially by substituting eastern Elbe lignite for the high-sulphur grades, which formerly represented only about one-third of brown coal production but contributed over 2.5 million tons of SO₂.

Additional reductions of sulphur dioxide might be realized by employing calcium carbonate additives with the lignite that is burned. If this were done at all major facilities, 2 million tons of SO₂ could be eliminated annually.

The projected modernization of lignite power plants will not, on the other hand, bring about any significant reduction of transboundary pollution by 1993. The second-largest plant at Jänschwalde, near the Polish border, took up operation after 1980, so that the estimated 400,000 tons of SO₂ emitted here are not even included in the reference-year figures. The complete installation of desulphurization devices is planned only for the mid-1990s.

While supplying only 70 per cent of total energy needs, the combus-



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tion of lignite accounted for 92 per cent of the sulphur emissions in the GDR. Using high-grade fossil fuels to replace lignite entirely could hence reduce SO₂ levels by two-thirds, even without anti-pollution equipment, while also halting the devastation of the landscape by mining activities.

The Intra-German treaty on national unification has provided a compromise arrangement. Production and distribution rights have

Replacing lignite could reduce SO₂ levels by two-thirds

been divided among a number of West German and European utility companies. Fuel substitution programs are presently being implemented to meet heating needs with natural gas and oil. With the demand for briquettes already declining, the output of many lignite processing plants has been reduced.

However, the utility companies have also announced continued electrical generation in lignite-fired plants. More than 8000 MW of generating capacity is to be reconstructed, older equipment (4000 MW) decommissioned, and additional plants erected. Together with renovation costs for distribution grids, required expenditures of DM 30 billion have

been predicted. Yet the high costs of lignite mining have also evoked calls for new state subsidies.

If present plans for lignite-based electricity production are upheld, East Germany could remain Europe's most inefficient user of energy from fossil fuels. National environmental organizations have vigorously protested against the entrenching of commercial monopolies that are intent on selling, rather than saving energy.

Nevertheless, there is some hope that decentralized energy concepts could be realized. A recent investigation has indicated the possible legal precedence of community property rights over the controlling interests of the utility giants, thereby presenting municipalities with the opportunity of operating their own cogenerating facilities. The economic viability of such projects remains uncertain, however, since among other things factory shutdowns have already eliminated a significant number of baseload customers.

Approximately a quarter of the population was served by communal district heating, compared with only 7 per cent in West Germany. East German housing programs generally resulted in close-knit settlements, providing favourable conditions for combined generation with overall efficiencies exceeding 80 per cent.

Most of the large electric power plants are located in the eastern Elbe region, which is too far distant

from major population centres for the expansion of domestic heating services. The low-sulphur lignite found at these locations, on the other hand, eases compliance with Federal emissions regulations, which already apply to newly constructed facilities and will be mandatory for all plants by 1997.

Owing to the low combustion temperature of lignite, the emissions of nitrogen oxides from the energy sector remained below 300,000 tons annually in the GDR. A comparison with western Germany indicates that a future substitution of high-calorific fuels may result in an appreciable increase of NO_x emissions.

Industry projections have cited an annual consumption of about 140,000,000 tons of brown coal for power generation around the turn of the century. While accounting for only about one-third of the predicted energy production, this alone would cause the emission of about 130,000,000 tons of carbon dioxide, or 8 tons for each of the 16.3 million east Germans.

That level is only slightly less than the *total* CO₂ emissions per inhabitant to be achieved in western Germany by the year 2005, according to a decision of the German

Federal Cabinet in November 1990. A 25-per-cent reduction of CO₂ emissions is planned, from approximately 12 to 9 tons per capita. The cabinet resolution has also called for "significantly higher percentage reductions" in East Germany in view of its previously high CO₂ emissions (approximately 22 tons per inhabitant). Remarkably, however, the

Strong opposition to more nuclear plants

same document also emphasizes "the new united German role of brown coal."

If lignite prevails as the pillar of electricity production in East Germany and total energy consumption remains at pre-1990 levels, CO₂ emissions may only drop to about 16-18 tons per capita, depending on the fuels employed.

Two additional factors may materially influence the CO₂ emissions ascribable to the power sector: electricity imported from western Europe, and the possible construction of new nuclear power plants.

As many as four 380 kV transmission grids are planned for linking up to West German and possibly French power plants. The BUND environmentalist organization has pointed out that these lines are superfluous for East Germany in view of local generating autonomy and stagnating consumption, although they are essential for the commercial sale of electricity into Poland and the USSR.

It appears unlikely that nuclear power will contribute to electrical output on East German territory in the near future. The Federal Government has taken over the existing nuclear park, and comprehensive investigations have confirmed the impossibility of meeting Federal safety standards for all reactors in operation.

In a speech before the German Bundestag in October 1990, Chancellor Helmut Kohl announced the shutdown of the plants on the grounds that it had been "irresponsible to operate them after Chernobyl" — a verdict also implicit to other nuclear reactors in eastern Europe.

Industry plans have recently been announced for two new plants of western design at Griefswald and Stendal, while feasibility studies



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are being conducted for other sites. Realization appears uncertain, however, owing to strong public opposition and the rising costs of construction and operation.

The Federal Government has assumed responsibility for the elimination of accumulated nuclear waste and the decommissioning of reactors, while paying the USSR for the cancellation of contracts for plant construction. The total cost of terminating the GDR atomic energy program has been estimated at DM 13 billion.

While stringent measures were imposed in the GDR against the disclosure of environmental data, the pollution levels estimated by western researchers were occasionally confirmed in published medical commentaries. Over 6.1 million cases of respiratory illness were reported for 1983, due in part to "more than 4 million tons of SO₂" and constituting the chief cause of occupational absenteeism.

The compounded effect of combustion gases, acid rain, and accumulated soil contamination was corroborated by visible evidence of defoliated and dying trees on southern mountain ranges. Notwithstanding the assertion of SED Party Chairman Erich Honecker in 1986 that "our forests are healthy," the first official statistics released already the following year identified 37 per cent of local woodlands as "damaged by smoke gases."

Emergency countermeasures included strewing powdered limestone with magnesium additives over affected forest ranges and planting 18 million "higher resistant" seedlings in 1988 alone. Subsequent data, however, indicated a continuing increase in damage symptoms of nearly 10 per cent per year, representing an even higher attrition rate among healthy trees.

Shortly after German reunification on October 3, 1990, forest damage of 66 per cent was reported for the former GDR. Detailed mapping revealed that 97 per cent of all trees were affected to some degree by ubiquitous atmospheric pollutants. Serious tree damage has been observed up to the Baltic coast, verifying the importance of long-range reduction strategies for effective air pollution control.

In contrast to the GDR, western Germany has made notable progress in limiting atmospheric emis-



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sions. Despite a population of 59 million inhabitants (nearly four times the number of east Germans), emissions of sulphur dioxide have been reduced from 3.2 million tons in 1980 to below a million tons per year. Virtually all new automobiles are equipped with catalytic converters, enabling annual emissions of nitrogen oxides to level off at 2.9 million tons despite increasing traffic volumes.

Air pollution policies have nevertheless been inadequate to prevent extensive forest damage, currently reported for 56 per cent of all wooded areas. Most dramatic has been the decline of healthy deciduous trees; more than 90 per cent of the beeches and oaks aged over 60 years exhibit disease symptoms.

Developments in the East German traffic sector have confirmed the imprudence of relying on market economics for environmental relief. As soon as travel to the west was permitted, 400,000 used cars, without emission controls, were imported from the Federal Republic. The total number of automobiles in the new German states is expected to rise from 3.6 to over 9 million in this decade.

An increase in truck freight is likewise anticipated – from 20 to 47 billion ton-kilometres between the years 1990 and 2000. Although the railways formerly handled over 70 per cent of the freight transported in the GDR, rail volumes are expected to have declined by about 30 per cent at the turn of the century. Despite the highest track density in Europe, the dilapidated East German railway system has already capitulated

to the logistical demands of "just-in-time" delivery.

The Federal Traffic Minister Günther Krause has announced an accelerated program to improve existing land-traffic infrastructures. In the coming years, DM 20 billion is to be spent for road and highway construction; private investors may be invited to participate in expanding the superhighway system.

A major expenditure of DM 30 billion is planned for railroad improvement, particularly on the routes between Berlin and western Germany. While impressive, this sum falls far short of the DM 100 billion calculated by the railway workers' union to be necessary for modernization needs.

According to some estimates, 1500 square kilometres of East German countryside may be disappearing under asphalt as new roads are built.

At the East/West Symposium in Düsseldorf in January 1991, one participant called for a departure from windfall strategies in pursuing the economic reconstruction of eastern Europe: "Instead of expecting returns in two to three years, investors should get used to realizing profits only after 10 to 15 years' time." The opportunity of establishing a precedent for worldwide ecological security makes the delay appear worthwhile.

JEFFREY H. MICHEL

Adapted from an article in *Forum*. The author is an American environmental researcher who is a member of the Energy Task Force of BUND/Friends of the Earth in Germany.

Revised Clean Air Act

TWO RECENT government initiatives in the United States could have major impacts on the emissions of acid rain precursors. They are the 1990 US Clean Air Act Amendments (CAAA) and the National Energy Strategy as submitted to Congress by the Bush administration.

The Clean Air Act Amendments, which revised the original Act of 1970, have been well received by environmentalists because of their innovative approach to controlling air pollutants. Title IV, dubbed the acid rain title, contains new guidelines for reducing emissions of sulphur dioxide and nitrogen oxides. By the year 2000, annual sulphur dioxide emissions will be reduced by ten million tons from the 1980 level. That is approximately a reduction to half of their current levels. At that time there will be a cap of 8.9 million tons per year of SO₂ emissions that can be emitted from all sources.

The key of this program is a new approach called allowance trading. All utilities will be given a reduction target that must be met by the end of the decade. For every ton of SO₂ reduced beyond this limit, the utility is awarded one allowance which can be saved, leased, bought and/or sold in the same manner as stocks and bonds. The price of an allowance is

expected to offset the cost of the utility's investment for lowering emissions beyond the required level. In this way polluters may choose the most cost-effective means of emissions control and for the first time will be encouraged not merely to meet pollution standards but to exceed them.

As opposed to the 50 per cent reduction of sulphur emissions, ni-

New approach with allowance trading

trogen oxides are expected to be curbed between 15 and 30 per cent. Reduction standards for NO_x will be set for all power plants by 1997. Although the CAAA do not allow for trading allowances between SO₂ and NO_x, that concept will be studied. To ensure that reduction targets for both sulphur and nitrogen oxides are met, continuous emissions monitors must be installed for each pollutant.

The Bush Administration's National Energy Strategy (submitted to Congress on February 20, 1991) has objectives that could harm the

environment. The key tenets of this program are to open 1.5 million acres of the Arctic National Wildlife Refuge to exploration for oil and gas; to increase nuclear-power capacity by 30 to 80 per cent over the next thirty years; and to streamline operations of the natural gas industry by eliminating federal review of imports and exports.

The administration chose not to revise the Corporate Automobile Fuel Efficiency (CAFE) standards. According to the US Natural Resource Defence Council (an environmental NGO), the United States would save approximately 21.6 billion barrels of oil during the next three decades simply by raising CAFE standards from the current 27.5 miles per gallon to 40 miles per gallon.

All in all, this strategy (which still requires Congressional enactment to become effective) relies on low-efficiency automobiles to meet US transportation needs. This would exacerbate NO_x-generated smog problems: the well known smog infestation of Los Angeles may eventually be shared by metropolitan areas all over the United States.

BOB JACKSON

Pacific Energy and Resources Center, Sausalito, California, USA.

Coming events

World Clean Energy Conference, Geneva (Switzerland) November 4-7, 1991.

Organized by The Earth Summit Energy Coalition and supported by United Nations. The conference is to formulate and propose concrete measures to the UNCED Earth Summit to be held in June 1992. Details from: Intercongress, Route des Acacias 54bis, CH-1211 Geneva 26, Switzerland. Phone: +41-22-435179, fax: +41-22-430086.

Conference on the Environment, Industry and Investment Decisions in Central and Eastern Europe, Budapest (Hungary) November 20-22, 1991.

Organized by The Commission for the European Communities and The Regional Environment Center for Central

and Eastern Europe. The Conference is to explore, with the active participation of western European manufacturing enterprises, guiding principles concerning the environment and decisions on investments in central and eastern Europe. For details contact: The EC Commission, Directorate-General for Environment, Nuclear Safety and Civil Protection, Rue de la Loi 200, B-1049 Brussels, Belgium. Phone: +32-2-2351111, fax: +32-2-2350144.

Environmentally Sound Coal Technologies – Policy Issues and Options, Beijing (China) December 2-6, 1991.

Organized by The Centre for Science and Technology for Development (CSTD) of the United Nations. First conference in a series of three – the others to be

held in India (January 1992) and the Soviet Union (April 1992). A final policy meeting to review the conclusions of the conference series will be organized in Germany, in May 1992. For details contact: United Nations CSTD, DC1-1074, New York, N.Y. 10017, USA, phone: +1-212-9638428, fax: +1-212-9631267.

International NGO Preparatory Conference for UNCED, Paris (France) December 17-20, 1991.

Organized by The International NGO Steering Committee for 1992, conference is expected to be attended by more than 600 organizations. For details contact: Environment Liaison Centre International (ELCI), P.O. Box 72461, Nairobi, Kenya. Phone: +254-2-562015, fax: +254-2-562175.

Call for urgent action

EXHAUST emissions from airplanes may be adding substantially to global warming, according to a new study* released by the WWF International.

Apart from the noise it makes, air travel has so far attracted little attention on account of its environmental impact. "New scientific data suggest that air transport may be contributing an additional 5 to 40 per cent to global warming. This is especially significant because the previous scientific assessments have not comprehensively taken into account the effects of aircraft emissions at high altitudes," says Adam Markham, head of Resource Consumption and Pollution Policy at WWF International.

The effect of certain pollutants is far worse at high altitudes than it is at ground level.

"The bulk of emissions of nitrogen oxides (NO_x) from aircraft are produced at cruising heights – typically 10-12 kilometres – where they are extremely effective in creating ozone. Unfortunately," he continues, "this is exactly the altitude at which ozone has most effect as a greenhouse gas."

Computer modelling shows that if current trends continue, by the year 2020 CO₂ emissions from aircraft are likely to have doubled, and NO_x emissions to have increased by 50 per cent. The model also shows that only by a combination of technical and operational improvements, together with a reduction in the growth in demand for air travel, can emissions in 2020 be brought roughly into line with those of the present.

The WWF is calling for urgent action on the part of governments, the air transport industry and individual passengers. It would include:



INTERNATIONAL ACTION TO CONTROL GREENHOUSE GASES. The control of pollution from aircraft should be linked to the international negotiations for controlling climate change that are currently taking place under the auspices of the United Nations General Assembly. Since they are more damaging, the NO_x emissions from aircraft should be treated as a separate category from other NO_x emissions. Internationally agreed emission limits for different types of aircraft should also be set, as well as targets for stabilizing and then reducing the global emissions of NO_x and CO₂ from aircraft.

BETTER USE OF AIRCRAFT. Airlines should increase the load factor (less empty seats on each flight) from 70 per cent to around 90 per cent in order to bring about a fuel saving of around 24 per cent per passenger-kilometre. Air-traffic management

should be better organized so as to reduce stacking and congestion at airports and enable shorter routes to be taken.

CHANGE OF TECHNOLOGY. Technical improvements are urgently needed in order to increase fuel efficiency and also to reduce NO_x emissions. Newer, cleaner aircraft should be introduced as soon as possible.

REDUCING DEMAND. Before travelling, individuals should carefully consider whether there are alternatives to flying on short journeys. A small proportion of the journeys now undertaken by air could be transferred to rail or water.

Because air transport represents one of the fastest-growing sectors as regards energy use, the effect of these high-altitude emissions is likely to become increasingly damaging. More people are flying each year (the fig-

ure is increasing by 4 per cent annually) and they are flying further (the distances are increasing at a rate of 5 per cent per annum).

"Inevitably there will have to be a reduction in the growth of demand for air travel, if serious environmental impacts are to be avoided," says Mr Markham.

Although civil aircraft account for the bulk of the pollution, military airplanes are also major polluters. Operational secrecy cloaks however any hard data about their speed, altitude, and fuel mix. Globally, about 25 per cent of aviation fuel is used by military machines. And approximately 25 per cent of civil transport is for freight.

***Aircraft pollution: Environmental impacts and future solutions**, by Mark Barrett. Obtainable from the publisher: WWF International, CH-1196 Gland, Switzerland.

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