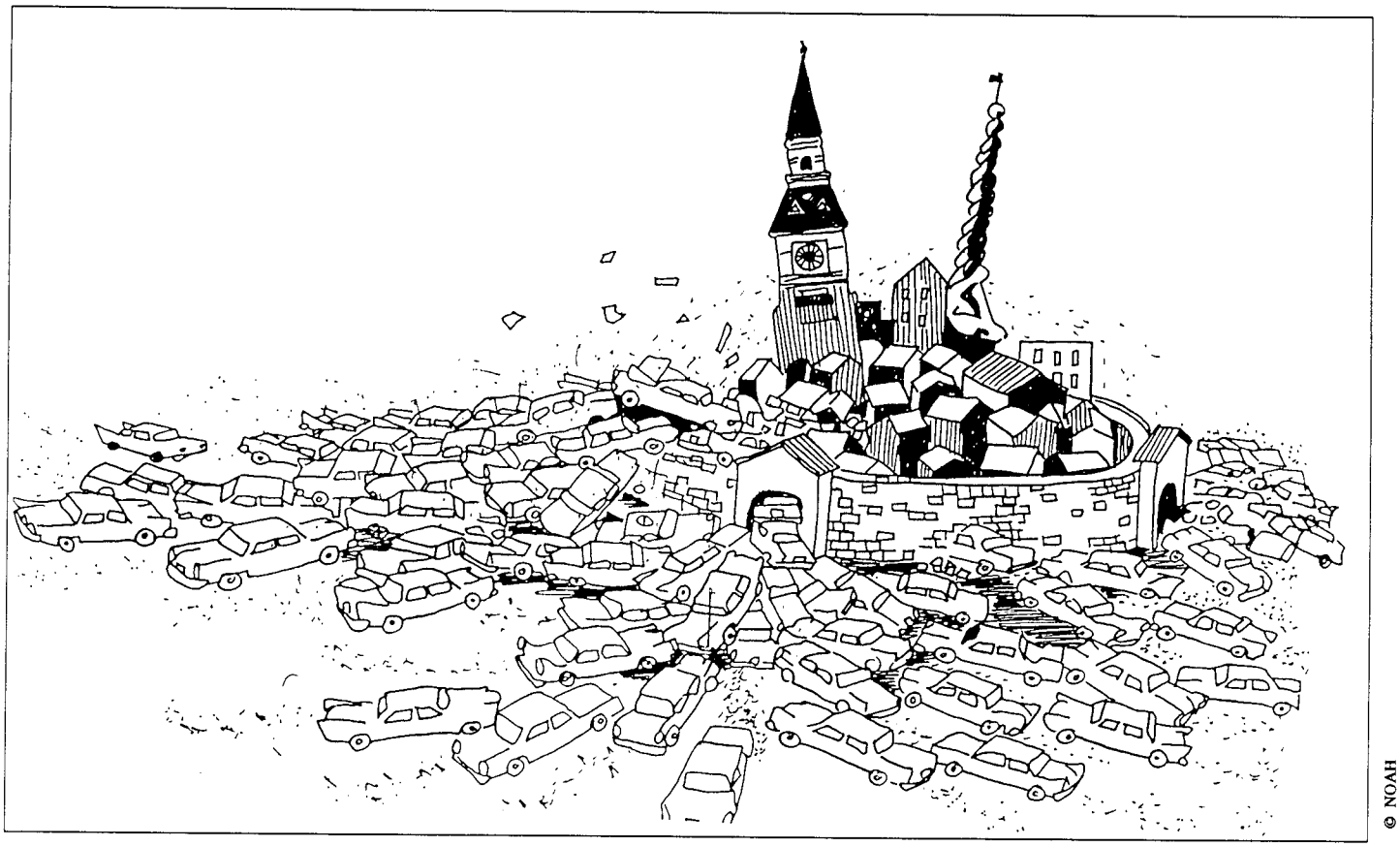
NO. 4, OCTOBER 1994

Acid News



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CITY TRAFFIC

Proposal for toll zones

WITH AN EVER GROWING number of cars, trucks, and buses on the roads, cities all over the world are having to face problems of traffic congestion, air pollution, and noise. And the commonest way out has been to build circular roads. Any improvement that has resulted has however mostly been temporary. Increased traffic has again filled the streets, and one is back to where one started.

As an alternative to ever more ring roads, road pricing has often been put forward. The idea has been that having to pay for taking up street space at crowded hours, as well as for the noise and pollution, will bring home to road users the true cost of a journey. Road charges are thus attractive from the socio-economic point of view. Nor should there be any difficulty nowadays in constructing a workable charge system. Vehicles can be made to pass the charge points without stopping, so there need to be no disturbance of the flow of traffic (see box p.3).

Any difficulty in introducing such a system will stem from political rather than technical reasons. Road users are an influential group, unwilling to take on additional burdens without getting something in return. When road charging has been applied, it has usually been to finance the building of more roads, giving users at least a temporary "dividend" in the form of improved mobility.

By international standards, Stockholm, with about a million inhabitants, is quite a small city. Here as elsewhere, however, steadily increasing traffic is causing problems. For some time the local politicians have been considering a scheme involving tolls for financing infrastructural investments, including a big orbital road project. The idea has met with strong opposition, in particular from environmentalist organizations, who are calling for a solution that will relieve traffic congestion without requiring enormous investments in infrastructure which may in any case turn out to have been futile.

At the instance of the Swedish Society for Nature Conservation an alternative scheme has now been devised by a traffic researcher, Gunnar Eriksson, which would substitute a system of road pricing in the inner city for huge expenditure on motorways in the outskirts. Instead of the proposed orbital system with tolls, the city would be divided into a number of traffic zones, with tolls debited electronically at each point of entry –

Continued on page 3

A NEWSLETTER FROM THE SWEDISH NGO SECRETARIAT ON ACID RAIN

Acid News

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

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

In order to fullfill 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 SECRETARIAT

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

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

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

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

EDITORIAL

Unique opportunity

SEVERAL OF THE MEMBER STATES in the European Union have failed to fulfill the requirements of the most important EU program for reducing emissions of acidifying air pollutants. This concerns the EU directive of 1988 for regulating emissions of sulphur and nitrogen oxides from large combustion plants (see pp. 14-15).

It says in an article in *European Environment* that at least four of the EU members – Belgium, Spain, Italy, and Ireland – will be receiving letters from the Commission commanding them to say why they have not complied with EU rules. This will constitute the first stage of proceedings for infringement. Members then have three months in which to give reasons for non-compliance and say how they now intend to fall in line.

France and Denmark, having only partially fulfilled their obligations, risk receiving av similar peremptory demand.

The member countries were supposed to report on the ways they intend to reduce emissions in accordance with the directive. More than four years ago, by July 1, 1990, they should have readied "appropriate programs," complete with timetables and descriptions of the procedures, and informed the Commission of these programs at the latest by December 31, 1990. Then, within one year of completion of each step towards reductions, they were to send in so-called summary reports concerning their implementation of the articles of the directive.

The fact that so many countries should have so blatantly failed to live up to the obligations they have undertaken in accepting the directive is clear evidence of a lack of will to do anything about environmental problems in the form of acidification, eutrophication, damage to health, etc. arising from emissions to the air of sulphur and nitrogen oxides.

In the course of 1994 the Commission should, in accordance with the directive, make a report to the Council of Ministers, with proposals, if necessary, for revision of the national targets for reduction of the emissions from existing combustion plants. By July 1995 it should also have submitted proposals for revised limits to emissions from new plants.

A review of the directive now having got well under way, the first draft of a new one, with proposals for new limit values and perhaps also revised national reduction targets, is expected by the year's end.

A key phrase running through the discussions has been Best Available Technologies Not Entailing Excessive Costs (BATNEEC), although what exactly is meant by "excessive" has never been precisely defined.

Since the Maastricht agreement appears to exclude all major matters concerning energy supply from the issues that can be decided by a qualified majority vote in the Council of Ministers, a unanimous vote will be required if the revision of the LCP directive should be seen as "significantly affecting a member state's choice between different energy sources and the general structure of its energy supply." This means that any member state can veto proposals to which it is opposed. It is thus unlikely that the revised directive will be as far-reaching as it otherwise might have been, and would need to be if the environment is really to be protected.

An overriding aim of the EU's Fifth Environmental Action Programme, adopted in 1993, was that critical loads were never to be exceeded. Certainly a worthy aim. So far however there has been a wide gap between words and action. The effects of the accepted measures will fall far short of that aim.

Now that there are proposals for regulating the sulphur content of fuel oils (p. 13), as well as a revision of the LCP directive, the EU has a great opportunity for establishing an effective policy to reduce emissions of acidifying air pollutants. It will also have a unique chance during the next few years of hastening developments towards a sustainable western European strategy for energy and transportation – and moreover setting an example for the countries of Central and Eastern Europe.

CHRISTER ÅGREN

Proposed division of the inner city into toll zones.

Continued from front page

the separate charge for each zone being intended to act as deterrant to aimless driving around town.

The toll charged for each passage could be varied according to the desired effect. In Stockholm's case the aim would mainly be to reduce noise and relieve inner-city congestion, which would entail reducing daytime traffic by 35 per cent. Doing that would automatically bring about the desired standard for clean air.

Such a reduction of traffic could, according to Gunnar Eriksson, be achieved by charging passenger cars and other light vehicles 4 kronor for every passage into a new zone, and heavy vehicles 12 kronor. The charge is put relatively high for the latter because of the noise and extra congestion they cause. Since they make less noise, heavy vehicles that fulfill the requirements for Class 1 of the Swedish environmental classification system would however only pay 10 kronor. The rate would not be affected by the fact that some vehicles emit less air pollutants than others, since the local concentrations are in general already in line with the present air quality standards. Since it is daytime traffic that needs regulating, tolls would only be charged on weekdays between 6am and 7pm.

Although ways of varying the charges are presented in the consultant's report, it is proposed that any further discussion of them should be postponed to a later date. The essential in the initial stages will be to have a simple and readily comprehended system, to which drivers can easily learn to accommodate themselves, and so bring about the desired effect. Only then, says Gunnar Eriksson, should the system be made more sophisticated.

Traffic developments and changed aims, such as an improvement of air quality standards, will mean that the times at which tolls are charged, their amounts, and the pattern of

Tolls collected automatically

Automatic collection of the charges is essential for the proper functioning of an inner-city toll system. Vehicles must be able to pass zone limits without having to stop or slow down. Advantages of the proposed system are that it can, if anyone desires, provide anonymity, while at the same time making it impossible to avoid paying tolls.

Tolls are collected by the means of a special card, somewhat similar to a bank cash card, which is inserted into a small teller unit that can be had on loan for placing in the vehicle. Each entry to a zone is registered automatically at an electronic toll gate which senses the information on the card, and the charge is debited centrally for subsequent payment.

Vehicle owners can alternatively pay in advance by buying another type of card, like a telephone paycard, with a specified number of zone entries. Vehicles lacking a valid card of either type have their number plate photographed automatically as they pass the gate, and are also invoiced later, although then they are debited with a slightly higher toll charge and a fee (15 kronor per day) for administration, as well as forfeiting any chance of anonymity.

ON THE FOLLOWING PAGES

Continued from page 3

zoning will have to be gradually adjusted. There is for instance a risk that with some drivers taking advantage of the toll-less hours, noise at night may increase.

With charges as proposed, income from the zone-toll system is estimated to amount to Skr 1.2 billion a year. Since the real intention of the scheme is not however to generate income, it is proposed that the greater part (about 80 per cent) should be redistributed among all the inhabitants of the city and county, with an equal amount to each individual, including children, no matter whether he or she drives a car or not.

Of the remaining 20 per cent, 4 per cent would be earmarked for a noise-abatement fund and 4 per cent for improvements in public transportation. Writing-off the initial investment over a period of fifteen years will take 5 per cent of the annual income from tolls, while operation and maintenance will require 8 per cent.

When presented earlier in the year, the proposal for inner-city zone tolls attracted considerable interest, not least from the opponents of a huge orbital motorway system.

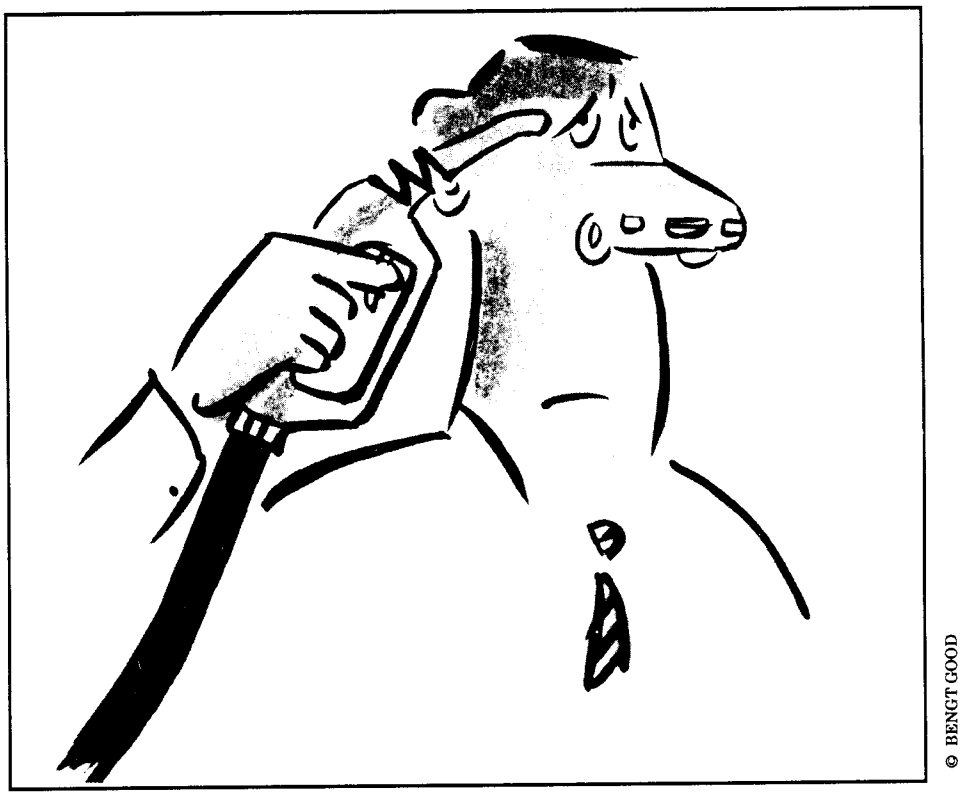
PER ELVINGSON

Istället för biltullar is the title of the report by Gunnar Eriksson of the Nordic Institute for Studies in Urban and Regional Planning (Nordplan). An English version, **Urban road pricing – an underutilized instrument for traffic calming**, can be ordered from T&E, Rue de la Victoire 26, 1060 Brussels.

Double benefit

Motorists who choose to park their cars in the outskirts and continue their journey into town by public transportation in Stockholm will now have the opportunity of aiding the environment in two ways. Not only will they be causing less pollution locally, but also contributing 25 öre (about 2 pence) of their parking fee to the "Living Baltic" scheme organized by the Swedish Society for Nature Conservation. The car parks company has said it would like the money to go to the Baltic States. At present it will not amount to very much, only about 75,000 kronor a year, but if a system of city toll zones should be adopted, the total would be likely to be much greater. The parking company is in any case trying to make the car parks more attractive, by placing them for instance close to the subway stations.

Dagens Nyheter, September 8, 1994.



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HEALTH

Risks from vehicles

TO LESSEN THE RISKS to health from air pollution, it will be necessary among other things to reformulate petrol and reduce vehicle emissions, in the view of medical experts appearing before the House of Commons Transport Committee in England. Both the Department of Health and the oil companies have however expressed scepticism.

At the first committee hearing, medical experts presented evidence of the effects on health at the present levels of pollution. Dr Simon Wolff, Senior Lecturer in Toxicology at University College, London, said that exposure to benzene in air may be causing 3000 deaths in the United Kingdom each year. This includes 70 per cent of the cases of childhood leukaemia. The figure accords with recent estimates of mortality due to the emissions of fine particles (PM10) from diesel vehicles.

An official British advisory body recently recommended a limit of 5 parts per billion for the annual average levels of benzene, to be eventually reduced to 1 ppb. But Dr Wolff warned the committee that exposure to 3 ppb would be sufficient to account for the already observed rates of childhood leukaemia – adding that an ambient benzene level of less than 0.01 ppb would be needed to reduce the risk to below one in a million individuals.

Dr Wolff described petrol products as "unacceptable in terms of their toxicity," saying that refiners should be forced to reduce the levels of benzene and other aromatics in the fuel.

At a later hearing the UK Petroleum Industry Association showed clear disapproval of the idea of tightening benzene standards, expressing doubt as to its scientific evidence. Some support for this view came from the Department of Health, which was of the opinion that "while the possibility that benzene emissions contribute to leukaemia cannot be entirely refuted," there had to be longer periods of exposure and higher concentrations than those found in the ambient air before there would be any marked increase in the risk.

The representative of the Department of Health, Gerald Jones, also expressed doubt as to the value of a study claiming to show a relation between high concentrations of nitrogen dioxide and increased mortality (see following article).

Source: **ENDS Report**, No. 234, July 1994.

New limit needed

THE EMISSIONS of common pollutants from industry and motor vehicles will have to be reduced by up to 95 per cent if the air of Britain's countryside is to come up to the quality aimed at in a proposed standard for ozone. The proposal from the government's Expert Panel on Air Quality Standards comes just as new evidence has appeared, showing how ozone exacerbates symptoms of hay fever.

The proposed limit of 50 parts per billion, as a running eight-hour average, is intended primarily as a precautionary measure to avoid adverse effects on health. Inflammation and changes in lung function have been observed in people exposed even to 80-100 ppb ozone for several hours. It may be noted that the proposed standard is stricter than both the EC and WHO guidelines.

Most of the ozone at ground level is formed by the action of sunlight on two classes of pollutant emitted mainly by vehicles, nitrogen oxides and volatile organic compounds. The levels of ozone at twenty-four monitoring sites all over Britain regularly exceed 50 ppb. The expert panel estimates that compliance with its proposal will require either cutting the present emissions of VOCs by 75-80 per cent or a reduction of NOx emissions by 95 per cent – or some compromise between the two.

The Department of the Environment was due to respond to the panel's proposal during this autumn. Meanwhile, new evidence of the effects of ozone on hay-fever sufferers has been forthcoming as a result of research at the Imperial College's Centre of Environmental Technology. It has been concluded from two studies financed by the National Asthma Campaign that sufferers experience more severe symptoms on days of elevated ozone levels. In each case the reported symptoms were about 15 per cent higher on such days.

The Department of Health insists however that any link between pollution from road traffic and an increasing number of sufferers from asthma "remains speculative." The National Asthma Campaign argues that as long as the connection is uncertain, "the benefit of the doubt should be given to people, not to cars."

Compiled from articles in ENDS Report, Nos. 232, 234, May and July 1994.

Smog again suspected

WHEN A LATTER-DAY smog enveloped London in 1991, the number of deaths rose by 10 per cent, according to a report made for the Department of Health. The figures suggest that the smog killed about 160 people. Here is the first direct evidence of deaths from air pollution in Britain for more than thirty years.

The smog built up from traffic fumes during four windless days in December 1991. Two pollutants reached exceptionally high concentrations: the levels of nitrogen dioxide peaked at 423 parts per billion, the highest ever recorded in Britain, and particulates, measured as the amount of black smoke in the air, reached 228 micrograms per cubic metre.

Many of those who died had probably been suffering from hearth disease and respiratory problems. Evidence of the deaths has been compiled by Ross Anderson, an epidemiologist at St George's Hospital in London, who found that the number of people who died from respiratory diseases, including asthma and severe lung disease, was 22 per cent higher during the week of smog than might otherwise have been expected. The number of those who died from cardiovascular disease was 14 per cent higher.

An epidemiological study such as this cannot prove that air pollution caused the extra deaths. But the abstract of the report concludes: "The results suggest that an increase in mortality occurred during the week of the episode. This would be consistent with an effect of air pollution."

Adapted from New Scientist, June 25, 1994.

BRIEFS

Unhealthy air

High levels of ozone and toluene in urban air have been causing ever more asthma sufferers to seek help in the emergency wards, according to a report from the county hospital in Halmstad, South Sweden. The relative humidity and temperature also played some part, it says, while sulphur dioxide did not – possibly because the concentrations were regularly low. The effects of nitrogen oxides were said to be difficult to determine.

This was seen to be the result of 4000 visits by 1100 asthma patients during rather more than three years. While the relation that they revealed was valid for the whole group, it became intensified if cases of children under fifteen were omitted – a possible reason being that asthma in children is due more to allergic causes.

YMK-bulletinen, No. 1, 1994.

Smog alert ignored

Fewer than one in ten motorists left their cars in the garage during the periods of smog in Britain last July, according to a survey carried out for the Department of Environment. On Friday, July 15, the department issued a warning about high ozone levels and asked people to avoid driving. Over that weekend it interviewed more than a thousand people. Of the 700 drivers questioned, 67 said they had not used their car on at least one occasion. Around six out of ten had heard warnings about air pollution but only half of these could remember any specific advice associated with it.

New Scientist, July 30, 1994.

Better petrol

In the spring of 1993 the Swedish Environmental Protection Agency put forward a proposal for the environmental classification of petrol. Since nothing came of it politically, the OK oil company started on its own account to market petrol qualifying for Class 2 in the Agency's proposal (see AN 2/94, p.8). To hurry the politicians, the Agency and the oil companies' trade association agreed last spring that Class 2 petrol was to replace other types at filling stations all over the country at the latest by July 1, 1995. Since the cleaner type is more expensive to produce, a condition was that the various qualities should be taxed differently. The government of the time then produced a bill to that effect, which was intended to be put before parliament this autumn. The agreement between the Agency and the oil companies also included a proviso that the sale of leaded petrol was to cease entirely from July 1, 1994. □

Can be too much of it

AMONG THE FACTORS contributing to the eutrophication and acidification of ecosystems is airborne nitrogen. In oxide forms, nitrogen is also party to the formation of low-level ozone, which can be harmful to humans and animals as well as plants. Although there is little sign of any great interest at present in reducing emissions of nitrogen compounds, the matter may soon come to public notice again as a result of re-negotiation of a protocol under the ECE Convention.

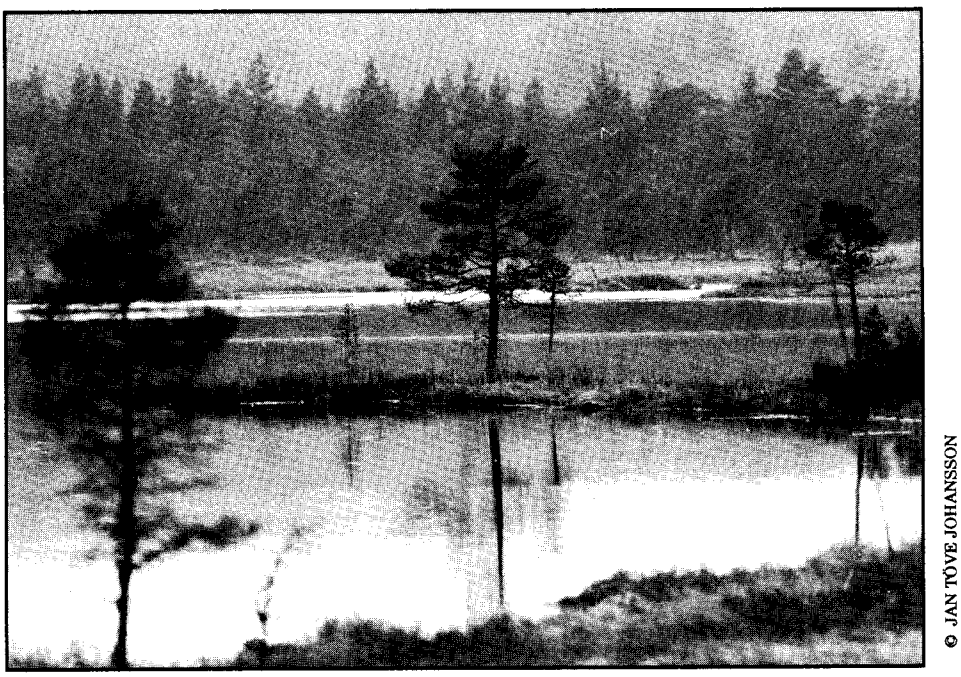
Extensive research is in any case now under way to determine the amount of deposition that can be tolerated if pernicious environmental effects are to be avoided. From a preliminary assessment it appears that critical loads are being exceeded over a greater part of Europe.

Eutrophication occurs because nitrogen is a nutrient that is usually available to vegetation only in limited quantities, thus controlling the rate of growth. Extra inputs to the soil tend to stimulate growth unnaturally, causing various kinds of imbalance in ecosystems.

Provided it is not too much, an addition of nitrogen causes trees to grow faster. In those parts of Europe that are heavily loaded with nitrogen, however, the growth-limiting factor may be some other nutrient, such as magnesium or potassium.

An excess of nitrogen causes the crown of the trees to grow more than the roots, and the increased volume of leaves or needles makes the trees more susceptible to drought. There is no doubt, either, that the risk of damage from frost will also increase, as will that from wind or snow felling, and attacks of parasites.

The mycorrhizal fungi also dwindle when there is an excess of nitrogen in the soil. The hyphae of these fungi extend the root systems of the trees 100-1000 times, and by and large the trees get all their nutrients and all their water through the mycorrhizal fungi. In exchange the fungi are supplied with carbohydrates. Experiments with the application of large amounts of nitrogen fertilizer have revealed a reduction of the mycorrhizal fungi species by up to 90 per cent, especially in ancient forests.



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Bogs are among those ecosystems that are most senitive to depositions of airborne nitrogen.

Other organisms will be affected, too, by an increased availability of nitrogen in forest soil. Some plants are better and quicker at taking advantage of the increase, and since the composition of plant communities is a result of competition, the balance among species becomes changed. Through experiment it has also been found that the number of species declines.

Nitrogen can also act as an acidifying agent

Nitrogen-loving plants such as nettles (*Urtica dioica*), raspberry (*Rubus ideaus*), rosebay willowherb (*Epilobium angustifolium*), and wavy hairgrass (*Deschampsia flexuosa*) spread out at the expense of various dwarf-shrub species such as heather (*Calluna vulgaris*) and cowberry (*Vaccinium vitis-idaea*). Changes such as these have been noted in the course of forest surveys, in particular in southwestern Sweden, where the depositions of nitrogen compounds are greatest. See maps on opposite page.

Experiments have also shown that there will be changes in the growths of mosses and lichens. If mosses at first dominate in forest undercover, they will diminish after the application of nitrogen fertilizer; but if lichens are predominant to begin with, mosses will increase. Independently existing blue-green algae and lichens with a blue-green algal component respond negatively to additions of nitrogen. While knowledge of these organisms is limited, it is nevertheless known that a relatively large proportion of the endangered species of lichens do have a blue-green algae component.

On lowland dry heaths, such as are found on sandy ground all along the northwestern coasts of Europe, an excess of nitrogen causes grasses to increase to the detriment of heather. Interaction between frost and nitrogen are also implicated in the decline.

In the Netherlands 35 per cent of the heathland is reported to have become overgrassed, and similar changes have been observed in southwestern Norway. On lowland wet heaths *Erica* plants are being pushed out by grass (*Molinia*, purple moor-

grass). In grass and herb communities within both types of heathland, excess nitrogen is lowering pH values, and so causing a decline of diversity.

Arctic and alpine heathlands, being adapted to very low inputs of nutrients, are likely to be affected by very small additions.

Even in species-rich grasslands on non-acid soil, disturbance of the nitrogen nutrition by atmospheric deposition will tend to cause taller, faster-growing species to dominate the plant community and so reduce diversity.

It is well known that wetlands, which include fens and bogs, are extremely sensitive to depositions of airborne nitrogen. This is especially so in the case of systems dominated by *Sphagnum*, relying totally on atmospheric inputs. Whereas fens may respond with changes in the balance between different species, bogs can be entirely destroyed at very low input levels. The invasion of many areas of open bog in Denmark and southern Sweden by pine trees and bushy vegetation is also ascribed to increased atmospheric deposition of nitrogen.

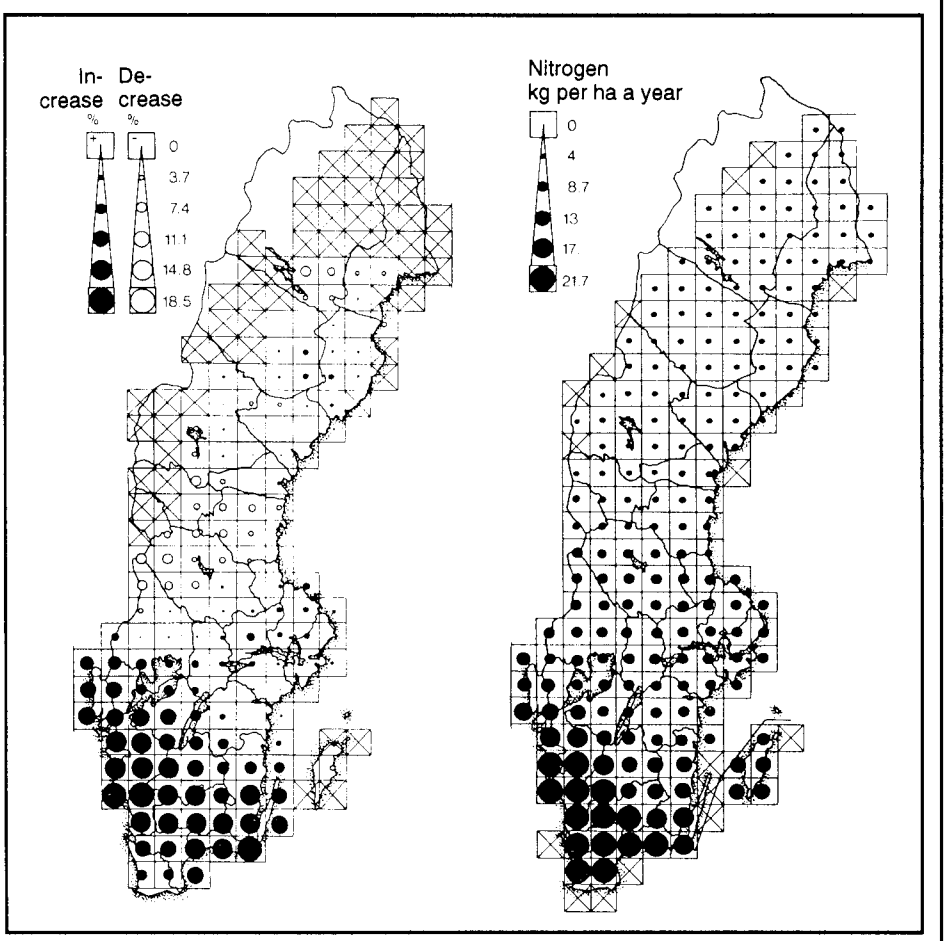
Table. The ratio between land-based and atmospheric inputs for various marine areas.

	Atmospheric		Land based	
	N	P	N	P
North Sea	26	5	74	95
Kattegat	27	11	73	89
Baltic Sea	32	7	68	93

Source: Critical loads for air pollutants.

Much of the research on nitrogen has hitherto concentrated on its effects on forestry. It is however important not to neglect natural systems, since most of our heritage of biodiversity lies in them, rather than in plantation forests. Compared to highly managed land, natural systems are also likely to be much more sensitive to increased inputs of nitrogen.

A considerable part of the nitrogen load on marine ecosystems comes from atmospheric deposition, especially if one includes that part of the fallout that is deposited on land and subsequently transported down to the sea. Effects of eutrophication, such as algal blooms and oxygen deficiency, are common in European



The spread (left) of narrow-bladed grasses in coniferous forests in Sweden from the mid-seventies to the mid-eighties. The change, a sign of eutrophication, coincides with the depositions of airborne nitrogen (right).

BRIEFS

Greece

Greece is proposing to spend altogether one trillion drachmas (US$4 billion) over the next six years on improving the environment-related infrastructure in Athens and the surrounding Attica prefecture. The package focuses in particular on fighting air pollution, a constant problem in the congested city. Short-term measures, such as staggered work schedules during summer, have already come into effect, while interim measures, including fuel-quality checks and emission-control cards for cars, are gradually being introduced. For the long term, environment minister Costas Laliotis envisions a complete overhaul of the city's public transportation system.

Environment Watch: W Europe, July 1, 1994.

Forest damage to court

Forest damage around the Sturup airport, in southernmost Sweden, is worse on the approach side than the others. Claiming that the damage is due to aircraft emissions, the owner of the woodland is suing the Civil Aviation Authority, which owns the airport, for Skr 5 million. At one place on the country's western seabord, some sixty forest owners have instituted proceedings against a number of petrochemical companies for similar reasons.

Skånes Naturkontakt, No. 3, 1993.

Bad company cars

Company cars produce five times as much carbon dioxide as private cars, and four times the amount of nitrogen oxides, according to research carried out by TNO, the applied-science research agency in the Netherlands.

The reason for this disparity is not only that drivers of company cars travel more, but that they also drive faster and more aggressively than private motorists. Furthermore, because the size of the vehicle is related to the executive's status, company cars are heavier than those bought by the more cost-conscious motorists. The reasearchers estimate that if companies used the same sized cars as private motorists, the emissions of carbon dioxide from cars in the Netherlands would drop by 7 per cent. In that country 10 per cent of the cars are company cars.

New Scientist, July 30, 1994.

Recent publications

Powering the future: Blueprint for a sustainable electricity industry (1994)
By C. Flavin and N. Lenssen. Describing the electricity business and what is happening now when its monopolies are breaking apart everywhere. The authors suggest a more efficient, environmentally sound model for the future.

74 pp. Worldwatch Paper 119. Can be ordered from Worldwatch Institute, 1776 Massachusetts Ave., NW, Washington DC 20036-1904, USA. Fax +1 202 296 7365.

State of the World 1994
Yearly report from the Worldwatch Institute on progress toward a sustainable society. The issues dealt with are for example the reshaping of the power industry, transportation and environment, information technology.

265 pp. Available from Worldwatch Institute, address as above. Also translated to other languages.

Institutions for the Earth: Sources of effective international environmental protection (1993)
Edited by P.M. Haas, R.O. Keohane and M.A. Levy. Shows what international institutions have done so far towards bringing about a healthier environment. Analyzes their potential contributions, and suggests promising new steps. Acid rain in Europe is one of six problems discussed.

448 pp. Published by The MIT Press, Massachusetts Institute of technology, Cambridge, Massachusetts 02142.

Strategy for sustainable development – proposals for a Swedish program (1993)
A major study by the Environmental Protection Agency on ways of achieving an environmentally sound society. Looks at the environmental impact of different sectors of society and proposes a wide range of measures. Report 4234. 265 pp. 290 kronor.

Among the background reports can be noted *Acidification – an everlasting problem, or is there hope?* Report 4242. *Ground-level ozone and other photochemical oxidants in the environment.* Report 4243. *Eutrophication of soil, fresh water and the sea.* Report 4244. *Environmental pollution and health.* Report 4249.

Available from Swedish Environmental protection Agency, Information Department, S-171 85 Solna, Sweden. Fax +46 8 984513. The study is summarized in the Agency's magazine *Enviro*, which can be obtained free of charge from the same address.

coastal waters, especially in the Baltic, Kattegat, Skagerrak, the Helgoland Bight, the southern North Sea, and the Mediterranean. The nitrogen fluxes to these systems have been calculated for some areas (table above) and they are not insignificant compared with the run-off. In fact direct deposition is probably more important than its relative contribution suggests, because of its direct impact on the main area where plankton photosynthesizes.

In freshwaters, too, additions of nitrogen can, in some circumstances, lead to eutrophication – although it is usually the availability of phosphorus that regulates plankton production. In waters where nitrogen is the limiting factor, any excess will cause unwanted growth of phytoplankton, benthic algae, and epiphytes. Here most of the input is through sewage water and drainage from agriculture and forestry. In areas that are unaffected by these activities the atmospheric deposition is however considerable.

Although sulphur is mostly responsible for acidification in Europe, nitrogen can in certain circumstances also act as an acidifying agent. It does so when most of the system is already saturated with nitrogen, so that any excess can no longer be bound or retained by biological matter. This means that in soils nitrogen in the form of nitrate will leak from the system, taking with it nutrient (alkaline) base cations such as calcium and magnesium, thus acidifying the soil. Acidification may also occur in non-saturated soils during winter when the vegetation is not taking up nutrients.

The surplus nitrogen can leach out into the surface and groundwater. This adds to the overfertilization of the marine environment, and results in unacceptable concentrations of nitrate in drinking water. Saturation has already come about in areas with a high loading of nitrogen, such as the Netherlands, North Germany, Denmark, and South Sweden. As saturation occurs over ever widening areas, leaching is likely to become steadily more serious.

PER ELVINGSON

Sources: **Eutrophication of soil, fresh water and the sea.** Swedish Environmental Protection Agency, 1993. Report 4244. **Critical loads for air pollutants – report from the third international NGO strategy seminar on air pollution.** Published by the Swedish NGO Secretariat on Acid Rain, 1992.

Both good and bad

As a gas, nitrogen constitutes four fifths of the atmosphere. Only certain nitrogen-fixing bacteria and algae can take it up in that form. Plants cannot. For them to do so, it must be either in reduced or oxidized form. The reduced forms include ammonia (NH_3) and ammonium (NH_4^+), and among the oxidized forms are nitric oxide (NO) and nitrogen dioxide (NO_2). Nitrogen dioxide is formed directly from nitric oxide and is consequently the most prevalent. The oxidized forms are commonly lumped together under the designation NOx.

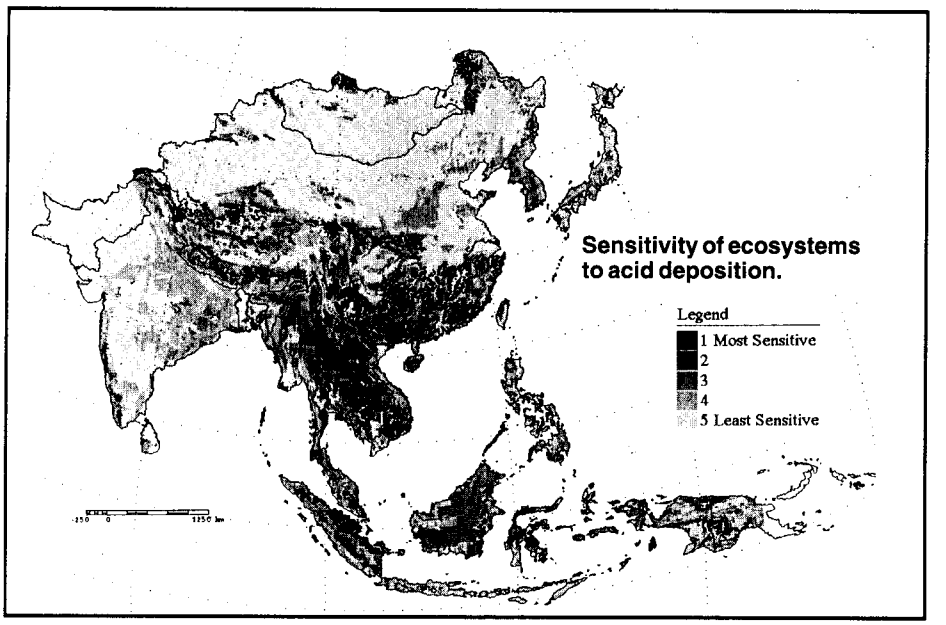
Reduced or oxidized nitrogen may be dry deposited to surfaces in any form, but if it is deposited in solution – as rain, mist, or snow) – it will either be as ammonium or nitrate ions (NO_3^-). Plants can take up ammonia and NOx in gaseous form through their stomata, just as they can be breathed by humans and animals.

Although nitrogen oxides may be formed in any kind of combustion, the greatest emissions come from the burning of fossil fuels, either in motor vehicles or power plants, the proportions from these two sources being, in most countries, about equal. In Europe the anthropogenic emissions of nitrogen oxides are about ten times greater than the natural ones.

Most of the ammonia and ammonium comes from intensive animal husbandry, especially when cattle and pigs are kept together in large numbers. Ammonia is given off from the manure, both when stored and spread out over the fields. About 90 per cent of the European nitrogen comes from these sources and emissions are on the rise.

Depositions over Europe average between 20 and 100 kg nitrogen per hectare a year. In the northerly parts of Scandinavia they are however considerably less, being only about 2-4 kg/ha per annum. Whereas oxidized nitrogen compounds and ammonium particles can travel over distances of 750-1000 kilometres, gaseous ammonia goes no farther than 20-100 kilometres, so depositions are usually highest in the vicinity of intensive animal farming.

Spotlight on Asia



AMONG THE AREAS of the world that are in the process of being mapped by the Stockholm Environment Institute for sensitivity to acid deposition are South and East Asia, where the rapid economic growth that is now taking place is based largely on energy generated by burning fossil fuels.

Over the past twelve years the use of energy has doubled in South and East Asia, and there are neither international conventions nor any other measures in place there for limiting the emissions of acidic substances. And yet, twelve of the fifteen most polluted cities in the world are found in Asia.

Experience from Europe has shown that ecosystems sensitive to acidification will be affected when sulphur, usually from the burning of fossil fuels, is emitted to the atmosphere and later deposited. The SEI has previously mapped the levels of deposition in Europe and laid the results against maps for each country showing the most sensitive areas.

Having a map of the sensitive areas in South and East Asia should help towards taking measures to counteract potentially harmful emissions. The most sensitive areas are likely to be the first that are affected, and it is hoped that with a better knowledge of the situation, measures will be taken before the problem has attained European proportions. But in the case of Asia there is as yet little firm knowledge of the ways in which transboundary pollution can be spread.

As explained by Michael Chadwick, the director of the SEI who worked with two other of the institution's scientists, Johan Kuylenstierna and Steve Cinderby, in developing the sensitivity maps for Europe: "In Asia the pattern of deposition depends on a number of meteorological events, such as the two-way wind directions of the monsoon region, together with other wind patterns at other times of the year. The situation is much more complicated than in Europe, and so far very little has been done to map the likely spread of emissions. As well as not knowing the details of the transportation pattern, we don't even know exactly where the sulphur comes from."

The SEI study, which is being financed by the World Bank, brings together scientists from Asia, the United States, and Europe in a joint project for mapping ecosystem sensitivity, emission sources, distribution patterns, depositions, and effects. While most of the work remains to be done, initial conclusions point to a need for fast action. Critical loads will in all probability be exceeded in parts of Japan, China, and India. Continued industrial development over the next thirty years could, it is estimated, bring a fourfold increase in the emissions of sulphur dioxide in those countries.

In developing its sensitivity maps for Asia, the SEI makes use of the RAINS-Asia computer model developed by IIASA, the International Institute for Applied Systems Analysis in Vienna. "We put in information on about twelve factors, such as type of vegetation, different properties of the soil, bedrock geology, temperature, precipitation, evapotranspiration, surface-water runoff, and so forth," says Michael Chadwick. "But it is a challenge to have to cover such a vast surface, three times the size of Europe. And while information on geology in China and Japan may be abundant, it is less well documented for some other parts of Asia."

Chadwick wants the sensitivity maps to be evaluated by local scientists who are better able to determine whether they correspond to the actual situation in their respective countries. European sensitivity maps can be verified against international assessment and monitoring systems. No such system is as yet in place in Asia, although one is now being developed.

He also sees a need for more involvement on the part of the people of the region, as there is always the possibility that issues may be viewed from different sets of circumstances.

"Parameters developed in Europe are not applicable in Asia, and need to be taken out or modified. The RAINS-Asia model is therefore being updated to reflect conditions that are specific to Asia. And best able to formulate the needs are the scientists of the countries themselves," continues Chadwick, who has gained an insight into conditions in developing countries after having lived and worked in some for several years.

"As regards transfers of technology, we are now beginning to realize that western technology is not always directly applicable in Third World countries. It is important not to make that mistake in our scientific cooperation."

SUSANNA BALTSCHEFFSKY

Adapted from an article in the Stockholm Environment Institute Bulletin, No. 2, 1994.

New agreement on sulphur

ON JUNE 14 last, a new international agreement was signed in Oslo, Norway, for reducing emissions of the acidifying air pollutant, sulphur dioxide. Nevertheless, European emissions as a whole are calculated to fall only by about 42 per cent by the year 2000 – from their levels of 1980, the base year.

So far this new agreement – in its full title, the Protocol to the 1979 Convention on Long Range Transboundary Air Pollution on Further Reduction of Sulphur Emissions – has been signed by twenty-six countries (see table). Three more countries – Hungary, Ireland, and Portugal – have announced their intention of signing shortly and another four – Bosnia-Herzegovina, Iceland, Lithuania, and Romania – have declared an interest in becoming adherents too.*

As may be seen from the table, most of the western European countries shall have reduced their emissions by 70 to 80 per cent by the year 2000, while the eastern European ones are allowed lower quotas, between 40 and 50 per cent.

Official data shows the overall emissions of sulphur dioxide in Europe falling by 25-30 per cent between 1980 and 1990. Estimates have now been made by IIASA (International Institute for Applied Systems Analysis) of the reduction that can be expected during the next few years if the signatory countries stick to their commitments. According to these estimates the reductions would amount to 42 per cent by 2000, 47 per cent by 2005, and 51 per cent by 2010, still as from 1980 levels. It thus appears that the rate of reduction will be considerably less in the nineties than it was in the eighties.

The reason for this slowing down is that several of the big emitters, such as Romania, Turkey, Bulgaria, and Spain, are thought unlikely to reduce their emissions at all, or certainly by no more than a third.

The expected reduction of rather more than 40 per cent should be set against the 60 per cent that would be necessary if the sub-aim agreed upon during the negotiations for the protocol were to be achieved – namely, to reduce the difference between the present depositions all over Europe and the critical loads by at least 60 per cent (the so-called 60-per-cent gap closure). The reductions that would then be required of individual countries can be read off from the A5 column in the table.

The lukewarm attitude expressed in the new protocol can only mean a lower degree of protection for European ecosystems than had been hoped for. Under the scenario for a 60-per-cent gap closure the depositions of sulphur would exceed the critical loads on 7 per cent of the total area.

Several countries have expressed disappointment at its feebleness

In other words the level of protection for the ecosystems would be 93 per cent. According to IIASA, the commitments of the new protocol will result in ecosystem protection levels of no more than 83, 86, and 89 per cent (by 2000, 2005, and 2010). In 1990 the level was 72 per cent.

The countries where more than a fifth of the ecosystems are likely to be still exposed to excess depositions by 2000 are: Belgium (92 per cent still exposed), Netherlands (78 per cent), Poland (73 per cent), former Czechoslovakia (72), Bulgaria (62), Germany (57), Hungary (47), Romania (46), Norway (30), Austria (26), Switzerland (23), and the United Kingdom (21 per cent).

In statements made at the signing, the environment ministers of several countries expressed disappointment at the feebleness of the new protocol. Speaking for Germany,

Signers and non-signers of the agreement, with presently expected reductions and new commitments. Reductions of sulphur emissions in per cent from base year 1980.

Country	CRP[1]	A5[2]	Commitment[3] 2000	2005	2010
Austria	80	80	80	—	—
Belgium	48	77	70	72	74
Bulgaria	50	50	33	40	45
Canada	—	—	30	—	—
Croatia	—	—	11	17	22
Czeck Republic	30	72	50	60	72
Denmark	61	87	80	—	—
Finland	80	80	80	—	—
France	67	80	74	77	78
Germany	90	90	83	87	—
Greece	-49	-49	-49	-45	-43
Italy	48	73	65	73	—
Liechtenstein	—	—	75	—	—
Luxembourg	58	58	58	—	—
Netherlands	77	77	77	—	—
Norway	50	76	76	—	—
Poland	37	66	37	47	66
Russian Fed.	38	38	38	40	40
Slovakia	30	72	60	65	72
Slovenia	—	—	45	60	70
Spain	35	55	35	—	—
Sweden	81	83	80	—	—
Switzerland	52	52	52	—	—
Ukraine	56	56	40	—	—
United Kingdom	48	79	50	70	80
European Union	—	—	62	—	—

[1] CRP = Current Reduction Plans: reductions by 2000 as expected *before* the new sulphur protocol was signed, according to the RAINS model by IIASA.

[2] A5 = 60 Per Cent Gap Closure Scenario: required reductions by 2000 after international cost-optimization, according to the RAINS model.

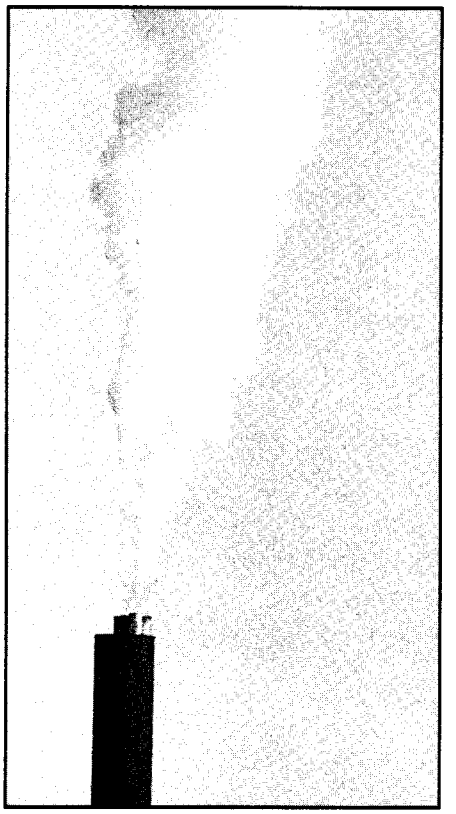
[3] Commitment = Committed reductions by the years 2000, 2005, and 2010 according to the 1994 UN ECE CLRTAP Protocol on Further Reduction of Sulphur Emissions.

Klaus Töpfer said among other things:"The protocol does indeed give new quality to the pan-European policy of abating air pollution. Nevertheless, I believe more far-reaching measures are an ecological necessity, and for most countries such measures are both technically and economically feasible."

The Austrian minister for the environment, Maria Rauch-Kallat, stressed "the need for some countries to reconsider the commitments they have already made and to quickly adopt higher emission reductions under the provisions of the new sulphur protocol". Hans Alders, Netherlands environment minister, opined "... the emission ceilings that have just been accepted will have to be replaced as soon as possible by stricter commitments."

As might be expected, the new protocol was also criticized by the environmentalist organizations. In a joint statement, Friends of the Earth, Greenpeace, and the World Wide Fund for Nature, as well as the Swedish NGO Secretariat on Acid Rain noted that "the overall result of the commitments in the new protocol, whether expressed as the total of European sulphur emissions or the extent of ecosystem protection, can hardly be described as a success. Actually it will amount, by and large, to what could in any case have been expected from current reduction plans."

The statement includes a demand that the emission reductions needed to fulfill the intermediate target of a



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60-per-cent gap closure should take place by 1998 at the latest – although countries of Central and East Europe could be given 3 to 5 years of extra time – and that negotiations on the second stage of the protocol, aiming for a 100-per-cent gap closure, should start immediately.

CHRISTER ÅGREN

* A more detailed account of the negotiations leading up to the new protocol, its provisions, and the main changes from the previous one, appeared in AN 1/94, followed by editorial comment in AN 2/94.

One way of doing it

A COMPLETE BAN on dirty old cars and trucks has proved to be an effective way of reducing air pollution in urban areas, to judge from the results of a radical test in Germany. Faced with high concentrations of low-level ozone last June, the authorities of Heilbronn-Neckarslum, near Stuttgart, set up road blocks. Only cars with catalytic converters were allowed to enter the town, and only trucks with diesel engines of the most efficient design. According to the environment ministry of Baden-Würtemberg state, the results were dramatic. Traffic within the town fell to 60 per cent of the normal, and there was a 50-per-cent increase in the use of public transportation. There followed a drop of 40 per cent in the concentrations of nitrogen oxides in the air. The levels of benzene, a carcinogenic petrol compound, fell from 4 to 2 micrograms per cubic metre.

Simultaneously with the setting up of the road blocks, the speed limit on the nearby autobahn was lowered to 60 kph along a stretch of six kilometres. Motorists drove more slowly, but the volume of traffic remained unchanged, and there was no measurable improvement in air quality.

New Scientist, August 20, 1994.

BRIEFS

Please stop it!

Acid rain from the United Kingdom is devastating the natural heritage of Norway. Send no more! – Such was the message handed to the British minister for environment, John Gummer, at the signing of the new UN ECE protocol on sulphur in Oslo. The call came from thousands upon thousands of Norwegians in the form of singatures on a thousand-metre-long letter, delivered as a part of a campaign by Friends of the Earth Norway against acidification. Britain is the one country that affects Norway most.

Wasteful China

China is generating up to 184 times as much sulphur dioxide as Japan in the production of the same amounts of steel, electric power, cement, pulp, and paper. It also uses between 130 and 300 per cent more energy in these processes than Japan, according to a report from Japan's Ministry of Trade and Industry, made in collaboration with Keio University in Tokyo. The suggested solution is "environmental assistance."

Tomorrow Magazine, 1994.

Kola peninsula

Boliden Contech and Elkem Technology have been selected by Norilsk Nikel to modernize the company's copper-nickel plant at Nikel in the Kola peninsula. Norilsk is now discussing the contract with the Russian government, a process that could take some time. The Scandinavian proposal envisages sulphur dioxide emissions declining from well over 200,000 tons a year to around 10,000 tons. Financing is likely to come from a variety of sources, besides Norilsk Nikel itself.

Sulphur, No. 231, March-April 1994.

Smog and speed

Much of the debate on smog in Germany during the summer came to circle around the matter of speed limits on the autobahn – which has long been of symbolic importance. During episodes of high concentrations of low-level ozone, motorists were urged to reduce speed to 80 kilometres per hour, and many did so. This response encouraged the Social Democratic Party, SPD, to propose a permanent limit of 130 kph. The move met however with compact opposition from the other political parties, who regarded it as an "overreaction." Nevertheless, a limit of 90 kph would, in the view of many scientists, bring a marked reduction of the emissions of pollutants, especially nitrogen oxides and carbon dioxide – not to mention an enormous drop in the number of fatal accidents.

Natur & Miljö Bulletin, August 19, 1994.

USA

No stopping electric cars

CALIFORNIA remains unwavering in its decision to introduce electric cars by legal means. A public debate on the matter that took place in Los Angeles during the summer left this quite clear.

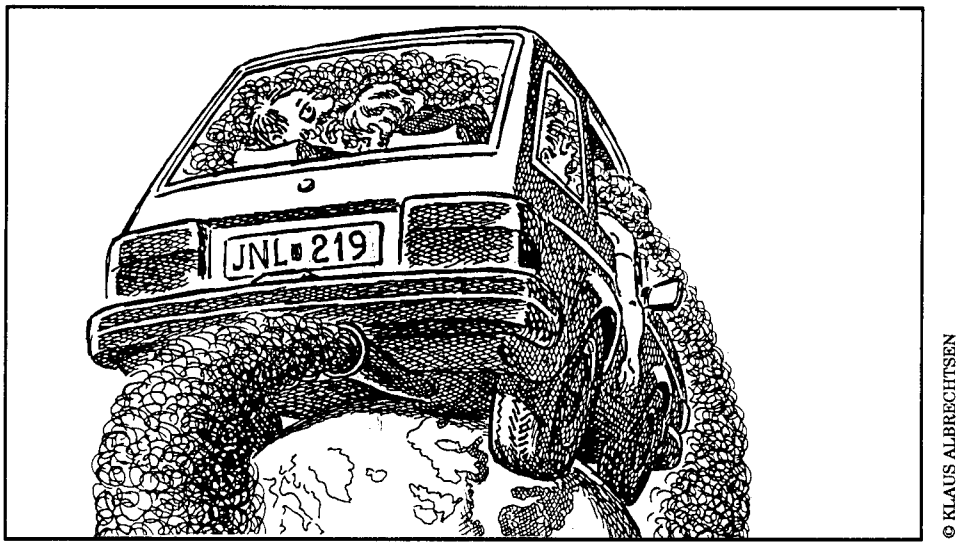
The Californian law on Zero Emission Vehicles was passed in 1990. As a first step it will apply to all manufacturers that sell more than 35,000 cars a year in the state. By 1998 at least 2 per cent of the cars offered for sale by any one company will have to be zero-emission vehicles. By 2001 the figure must be at least 5 per cent, and 10 per cent by 2003. The first companies to be affected will be General Motors, Ford, Chrysler, Toyota, Nissan, Mazda, and Honda, but from 2003 the law will apply to all makers that sell cars in California.

At first the manufacturers were in mild agreement, but subsequently they have changed their attitude and are now lobbying intensively to have the ZEV requirement put off. An argument that has often been brought up against it is that there are no suitable batteries. The California Air Resources Board however dismisses that objection, as do the battery manufacturers. Not only are several new types of battery on the verge of being marketed, but ordinary lead batteries, they point out, can always be used.

Insufficient electricity has also been put forward as an argument, but if most car owners charged their batteries at night, the existing generating capacity would, according to the power companies, suffice for up to a million cars. A more acute problem is the shortage of electric "filling" stations – a matter to which the CARB intends to devote careful attention during the next two or three years.

In the meantime, while the car makers are doing their best to hold up progress, the law on ZEVs is causing a whole new industry to arise. Hundreds of enterprises are already engaged in developing an entirely new technology to enable electric cars to be mass produced.

Adapted from Dagens Nyheter, July 12, 1994.



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EU TRANSPORT

German presidency raises hopes

HOPES in environmentalist circles are now pinning on the possible good effects of Germany's presidency of the European Union. The European Federation for Transport and Environment (T&E) has therefore taken the opportunity to present a memorandum addressed especially to the German ministers of transport and environment. Here it has drawn up some major issues that are expected to come before the Council of Ministers at any rate this year.

The memorandum gives most attention to the matter of sustainable mobility, which has been adopted by the European Union as the basic principle for a common transportation policy. But as things stand, the EU is, in the view of T&E, far from meeting the requirements in regard to air pollution, climate change, and noise that should form the basis of such a policy. If the concept of sustainable transport is to mean anything, T&E says, the EU will have to arrive at an operational definition and commit itself to firm implementation both of short and long-term objectives.

During the last few years the T&E has put a great deal of work into the development of a model for the internalization of transportation costs – in other words, making the users of the various modes pay the full socio-economic in addition to the ordinary cost of travel (see e.g. AN 2/94, pp. 6-7), and in memorandum the T&E reverts to this, saying among other things that a gradually increased tax on motor fuel would be the most effective and the most easily implemented measure for starting internalization. It proposes a variation of the tax, according to the environmental effects of the fuels. It also emphasizes the need for coordination within Europe, pointing out that the German Presidency has in its hands a great opportunity for taking a first step towards internalization, since the Council of Ministers will have to determine, before the end of 1994, a new level for harmonization of the excise tax on motor fuels.

The memorandum also draws attention to the emissions of nitrogen oxides from aircraft. The European Commission has been preparing a proposal for a directive aimed at reducing such emissions by 36 per cent from the current voluntary ICAO standards. It appears, however, that the proposal may not be brought before the Council, and T&E is careful to point out its importance as a means of improving the environment and handing a clear political signal to industry – yet without having adverse effect on the air transport business.

PER ELVINGSON

*** Memorandum on transport and environment to the Council of Ministers and the German Presidency.** July 1994. Available from T&E, Rue de la Victoire 26, 1060 Brussels, Belgium.

Sulphur limits for fuel oils

A CONSIDERABLE PART of the emissions of sulphur in the European Union comes from petroleum in some form, mostly as a result of combustion, and the proportion is tending to increase as emissions from other sources, in particular large coal-fired combustion plants, decrease. According to the European Commission, in 1993 36 per cent of the total EU emissions of sulphur from combustion, which then amounted to almost 15 million tons of sulphur dioxide, rested on petroleum. The remaining 64 per cent came from burning coal.

So far there has been no directive regulating the sulphur content of heavy fuel oils and marine oils. There are on the other hand EU rules for light fuel and diesel oils.

In 1990 a proposal had been put forward by France (the so-called French Memorandum) for limiting sulphur emissions from the entire petroleum chain. The proposal was environmentally far from radical.

Then last year saw the adoption of a revised EU directive relating primarly to the sulphur content of gas oil and kerosene (93/12/EC). Here it was stated that the Commission would later come forward with a proposal for a second stage, comprising measures for a further reduction of sulphur contents in 1999.

Now the Commission has produced a draft for a directive to reduce the sulphur content of various fuel oils. This covers, besides gas oil and kerosene, heavy fuel oils and marine oils.

The legal basis for this last proposal is in Article 100A, which is primarily intended to promote harmonization – meaning that the rules must be made to apply simultaneously in all countries. In this case however the Commission has taken a flexible attitude, making it possible for member states to choose – according to their environmental needs – one, two, or three limits for sulphur.

According to the official reference scenario, the total emissions of sulphur from combustion process in the Union may be expected to have dropped by 34 per cent between 1985 and 2010. Five alternative scenarios, with steadily stricter requirements, are presented to show how reductions might be increased to 42 or as much as 63 per cent. To evaluate the effects of the various measures, the Commission has had a cost-benefit analysis made in each case. Capital expenditures are estimated to be between ECU 1.3 and 16.9 billion, while the value of the benefits arising from reduced emissions is put at ECU 3.3 to 29.5 billion per annum. In each case the benefits are greatest in regard to human health and forests, and these two taken together are always found to outweigh the costs. But there are also further benefits in the form of reduced damage to materials (in buildings, for instance), to crops and waters, and in improved visibility.

Annual benefits found in all cases to outweigh the annual costs

So as to be able to compare the costs and benefits of the various scenarios, the costs (increased running costs and capital expenditures in industry) have been expressed in yearly amounts. Then the ratio between annual costs and annual benefits has been calculated. This shows the benefits to be between 2.1 and 3.6 times higher than the costs. In monetary terms the "profit" would be between ECU 2.3 and 16.2 billion.

For various reasons the Commission has decided not to recommend any of the five scenarios, proposing instead the following.

☐ A general limit for sulphur in heavy fuel oil, set at 1.5 per cent in a first stage, and 1.0 per cent as from January 2001 in a second, with extreme allowances of 0.5 and 2.0 per cent in the best and worst cases, depending on local situations and needs. The present average sulphur content of this type of fuel is said to be about 2.2 per cent. Plants fitted for flue-gas desulphurization or similar effect would be absolved from these requirements.

☐ A general limit of 3.5 per cent for marine bunker oil, or at the lowest 1.5 per cent if found desirable. The global average for bunker oils is said now to be about 3 per cent.

☐ The current limit of 0.2 per cent sulphur to be kept as the general limit for gas oil, with 0.1 per cent as the lowest limit.

☐ A top limit of 0.2 per cent sulphur for aviation kerosene.

☐ Maintenance of current (as from October 1996) limit for the sulphur content of diesel fuels at 0.05 per cent.

It is proposed that the deadline for the mandatory introduction of these limit values should be January 1, 1999, with the exception of the second stage for heavy fuel oil, where it should be January 1, 2001.

Member states may adopt the alternative limits for all or part of their territories – although only "according to environmental needs." The Commission maintains that "allowing a greater variety of limits would conflict with the need for harmonization."

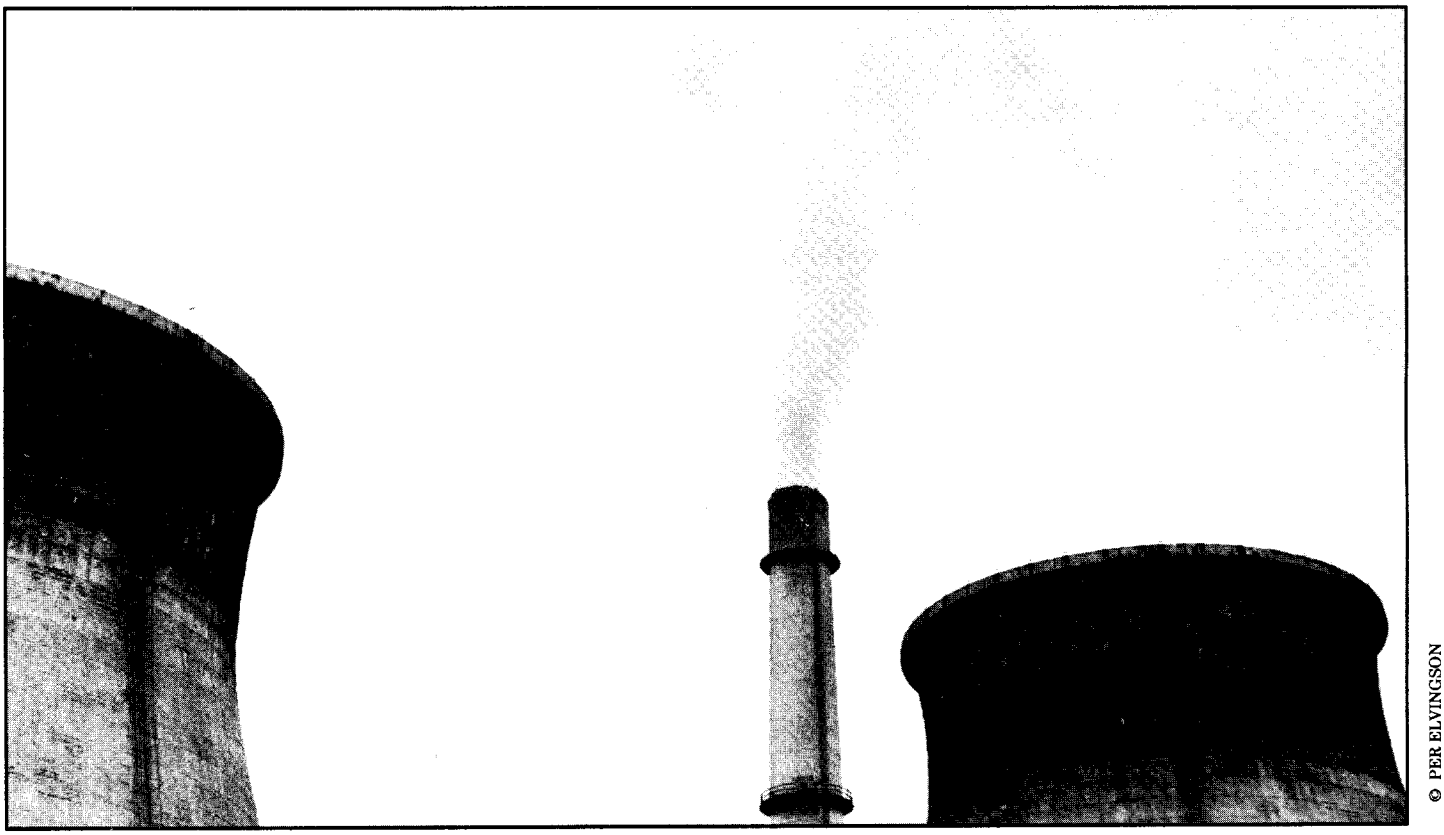
It is further said that economic instruments may be used "to promote the objectives" of the directive. To give industry time to adjust, notification procedures should in any case be established.

The Commission estimates the effect of the proposed limits will be to reduce the total of EU emissions of sulphur by 50 per cent by 2010, instead of around 35 per cent, as in the table.

CHRISTER ÅGREN

Emissions of sulphur in the European Union, forecast to 2010 on the basis of current legislation. The increase between 1990 and 1993 is due to the inclusion of eastern Germany in 1991. Million tons of sulphur dioxide.

Year	SO_2
1985	14,02
1990	11,73
1993	14,94
1995	11,32
2000	9,31
2005	9,17
2010	9,21



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LCP DIRECTIVE

Proposals for improvement

SIX YEARS AGO THE EC Council of Ministers issued, after some agonizing, a directive on emissions of sulphur dioxide, nitrogen oxides, and particulate matter from combustion plants with a capacity of more than 50 megawatts (MW_{th}). See box. In view of a revision that is being undertaken by the Environmental Directorate of the EU during 1994-95, the Swedish NGO Secretariat on Acid Rain is producing a report detailing the worst failings of the present directive and proposing improvements. Here are some of the main arguments.

METHODS OF MEASURING. The limits of emissions from new plants are now expressed in milligrams per cubic metre (mg/m^3). But that simply reflects the method of measurement, taking no regard to the harmful effect. From the point of view of the latter it would be more useful to know how the pollutants that are emitted relate to the amount of useful energy that is produced (g/MJ). That would make it easier to compare the various plants, while at the same time encouraging increases in energy efficiency and providing a better basis for the use of economic instruments such as taxes on emissions.

REQUIREMENTS FOR NEW PLANTS. The present requirements have not been set particularly high, being practically no more than a reflection of the technical standards of the early nineteen-eighties. Considering the state now reached by acidification as well as agreed environmental aims, today's Best Available Technology (BAT) should be the sole criterion.

The apparent plans for a new directive are quite inadequate

Applying BAT in the case of sulphur emissions would mean in the first place choosing an energy source, such as natural gas, that does not give rise to any emissions at all. Second best would be to use the most highly desulphurized oil or low-sulphur coal in combination with at least 95-percent flue-gas desulphurization. Such solutions would result in emissions that are less than a fifth of what is permitted under the present limit of 400 mg SO_2/m^3.

The best available technology for combatting NO_x from combustion plants is gas combined-cycle – a gas turbine in combination with a steam turbine. A majority of the plants taken into use since the adoption of the present directive have in fact been of this type. Equipping coal or oil-fired plants with low-NO_x burners and catalytic flue-gas cleaning (SCR: Selective Catalytic Reduction) can on the other hand reduce emissions of nitrogen oxides by at least 85 per cent – to less than a third of what is allowable under the present directive.

OTHER MEASURES. There are still other ways of bringing down the emissions of SO_2 and NO_x from large combustion plants, none of which have been taken into account in the existing directive. These include:

☐ Increasing energy efficiency, primarily through the application of economic instruments such as taxes on energy use as well as on emissions, but also by abolishing the subsidies, for instance, to the German and Spanish coal industries and French

uranium, and stopping tax reliefs to energy-intensive industry in general. Although it may be going too far to claim that any rapid improvement in energy efficiency could be achieved by market instruments alone, they are nevertheless an indispensable part of any program.

☐ Using technologies that give much lower emissions than the present rules call for, such as natural gas combined-cycle, which emits no SO_2 and much lower amounts of NO_x than any other type of fossil-fuelled plant. Another way is to use gasified fuel. At present there is no encouragement in the directive for achieving the "extra" cuts that can thus be obtained.

☐ Retiring highly polluting plants some years earlier than had been scheduled. The marginal cost for the reductions so achieved may actually be lower than could be obtained by other measures, such as retrofitting existing plants, especially when there is a general excess capacity. The money that would go to retrofitting could be spent instead on bringing about energy savings through demand-side management. If secondary benefits, such as reduced emissions of CO_2 and other pollutants, are taken into account too, such measures may well turn out to even more cost effective.

Although plants built before 1987 are responsible for by far the greatest part of the present emissions, the Commission has so far been extremely reticent about its intentions in regard to them. It has on the other hand indicated that the emission limits for new plants will be halved for SO_2 and lowered to a half or a third of the previous values for nitrogen oxides.

According to the long-term objective of the EC Fifth Environmental Action Programme, adopted in 1993, critical loads and levels should never be exceeded. If that is really the aim, the Commission's apparent plans for LCPs are quite inadequate. Environmentalist groups firmly contend that reductions of at least 90 per cent will be necessary, both for SO_2 and NO_x, if critical loads are not to be exceeded.

CHRISTER ÅGREN

*The report, which is intended to promote discussion and bring further proposals for revision of the directive, is expected to be available before year's end.

The making of a directive

AS PROPOSED IN 1983, the EEC directive for reducing emissions of sulphur dioxide and nitrogen oxides from large combustion plants would have reduced the emissions of sulphur from existing plants by 60 per cent by 1995, and of nitrogen oxides by 40 per cent, both from 1980. Each member country was to make the same percentual reduction.

The directive also included a proposal for introducing emission limit values for SO_2 and NO_x, based on the best available technology (BAT), for new plants, to come into force in 1985. These standards would have been more or less the same as those that had already been adopted in Germany in 1983.

The proposed emissions would, according to the Commission's own calculations, result in an increase in the production costs of electricity of less than 10 per cent, or about $0.003 per kilowatt-hour. The costs of the various kinds of damage that could be traceable to the emissions, which their reduction would have eliminated, were estimated to be at least as great as the costs of reduction.

The strongest opposition came at first from Great Britain. That country was the greatest emitter of sulphur dioxide in the EEC, and thus especially conscious of the costs that would be involved. It was later joined by Spain and Portugal after they had become members in 1986, and saw in the proposal a threat to their plans for strong economic development.

Since the directive could only be passed by unanimous vote in the Council of Ministers, there ensued a long-drawn-out process of negotiation. Agreement was finally reached in 1988, so that a greatly watered-down directive could be adopted in November of that year, entitled: Council Directive of 24 November 1988 on the limitation of emissions of certain pollutants into the air from large combustion plants (88/609/EEC).

Among the reasons that adoption just happened to be pushed through then is thought to have been the fact that in the view of approaching privatization of its power industry, Britain needed to have doubt eliminated as to future rules. Germany, having started the move towards a directive, was anxious to get any kind adopted, even if it should turn out to be worse than it had originally hoped for.

Spain managed to get special exemptions from the minimum rules for new plants, while Portugal, Ireland, and Greece were allowed to increase emissions from existing ones.

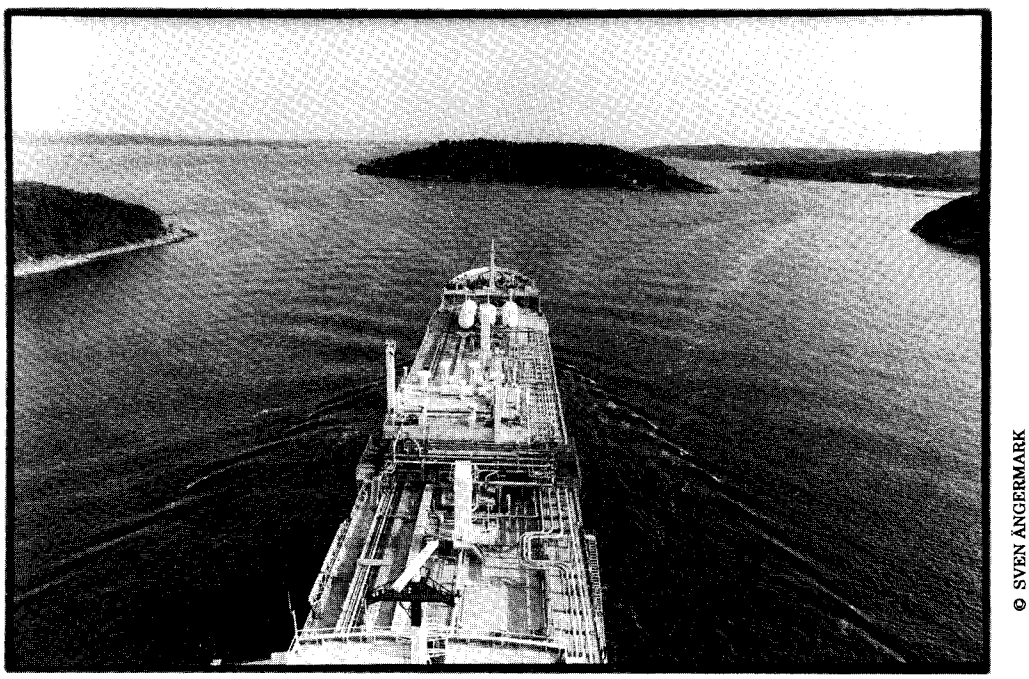
The 1988 directive may be said to consist of two parts, involving 1. A gradual reduction of emissions from existing installations, and 2. Limit values for emissions from new plants.

As regards emissions from existing plants, the member countries were allotted ceilings, which were also expressed as percentual reductions from 1980, the base year. For the whole of the EEC the emissions of SO_2 from existing plants were to be reduced, between 1980 and 2003, from 14.4 to 6.1 million tons – in other words, by 57 per cent – and of nitrogen oxides from 3.7 to 2.6 million tons, or 30 per cent, but in that case by 1998.

The second part of the directive, laying down emission limit values for SO_2 and NO_x from new plants, defined the latter as "any plant granted a construction licence after 1 July 1987." For units burning solid or liquid fuels, the SO_2 limits were set on a sliding scale, depending on boiler capacity. The requirements were not especially strict, only answering approximately to the technical levels of the early nineteen-eighties. A middling-sized plant could for instance meet them simply by burning medium or low-sulphur fuel. All that was needed to meet the NO_x requirement was a low-NO_x burner. And all the time since the middle of the eighties NO_x emissions could have been reduced by more than 85 per cent through flue-gas denitrification. And then, too, there were lots of derogations...

Emissions can be reduced

AS FAR AS SWEDEN is concerned, shipping accounts for about a fifth of all the emissions of sulphur and nitrogen oxides. Emissions of the latter are moreover tending to increase, as is also fuel consumption. Sjöfartsverket, the National Administration of Shipping and Navigation, has now put forward proposals for limiting both fuel consumption and emissions.



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Measures for dealing with sulphur and nitrogen oxides have to be aimed primarily at vessels of more than 300 tons dw. It is technically possible to reduce emissions by around 90 per cent – those of sulphur either by switching to low-sulphur fuel or by desulphurization of the exhaust gases, and nitrogen by catalytic cleaning.

The nitrogen reduction is reckoned to be highly cost-effective, the cost amounting to no more than 3-8 kronor per kilogram when applied during building, and 6-15 kronor when existing ships have to be retrofitted. This compares with 40 kronor per kilo which is considered socio-economically defensible in Sweden for shore-based installations.

Problems occur at the international political level, where negotiations are only proceeding sluggishly (see AN 1/94). Stricter requirements for Swedish shipping only would bring a risk of increasing registrations under foreign flag, and pending an international agreement the Shipping Administration is proposing bilateral agreements with the nations surrounding the Baltic and the North Sea. Such agreements would require ships in regular trade between any of these countries (so-called "dedicated" trade) to burn only fuel with a maximum of 0.5 per cent sulphur by volume throughout every trip. At present the average sulphur content of marine fuel is about 2.9 per cent.

If bilateral agreements prove unattainable, the Administration proposes that Sweden should unilaterally exact sulphur duties from all ships entering Swedish ports. The duty should be greater than the extra cost of low-sulphur fuel, and so as not to further discriminate those owners that have already gone over to using low-sulphur fuel, it should be introduced without delay.

If bilateral agreements should nevertheless come about, it is proposed that they should in a second step include clauses for a reduction of emissions of nitrogen oxides from shipping in dedicated trade by at least 90 per cent, no matter whether the ships are in building or already built. This requirement would probably have to be combined with environmental charges and some sort of favour to owners, such as advantageous loan terms.

The Administration places hope eventually on an environmental index for all shipping, which would serve as a basis for harbour dues (see box).

Pleasure craft are also included in the Administration's proposals. The two-stroke motors with which they are usually driven do not emit much in the way of nitrogen oxides, but all the more of hydrocarbons and car-

Indexing ships

An environmental index is intended as a means of favouring the owners of ships with good environmental characteristics. The idea is that every ship shall be indexed for those characteristics, and have its harbour dues set accordingly. Owners must be made to realize that efforts to protect the environment will be financially rewarding.

The difficulty in making an index is to decide on the parameters that are to be included, and still more, how they are to be weighed one against the other. Starting in the spring of 1993, a committee of the Nordic Council of Ministers has been working on a proposal that it hopes will find acceptance within IMO, the International Maritime Organization. An important parameter in this is a Formal Safety Assessment – a total risk assessment for each vessel from the points of view of environmental impact and safety. To make the system attractive, it is proposed to allow a general bonus for every ship whose owners agree to have it indexed, no matter what its environmental characteristics may be.

A proposal for an indexing system has also been put forward by the Norwegian Society for Nature Conservation and the Norwegian Shipowners' Association. This takes account of emissions both to air and water. Its parameters are coupled in various ways to the Convention for the Prevention of Pollution from Ships (MARPOL), and here, too, a total risk assessment is an important item.

bon monoxide. In Sweden 90 per cent of the emissions of these last two pollutants from boats of all kinds comes from pleasure craft.

Financial incitements (both stick and carrot) are proposed as a means of encouraging the use of cleaner fuel and a switch to four-stroke engines, which pollute much less than the two-stroke type. Using so-called alkylate petrol alone can reduce the emission of hydrocarbons by as much as 30-50 per cent. Biologically degradable lubricating oils are also said to help reduce the poisonousness of the exhaust fumes. The Administration in fact proposes that from 1995 on, only such oils should be allowed.

In Sweden, Norway, and Finland there is a voluntary system of environmental labelling for outboard motors, which is similar to a compulsory one agreed upon between Germany, Austria, and Switzerland for boats on the Bodensee. Since voluntary labelling is deemed to have only a marginal effect, it is proposed that as from September 1995 no petrol-driven outboard motors may be sold unless they meet the requirements of Bodensee Step 1 as regards exhaust emissions. All the most polluting types would thereby be eliminated. It is expected that there will eventually be an EU directive, also covering marine diesels.

Carbon-dioxide emissions are also touched upon. Since fuel consumption increases with speed by the square, or in some cases by the cube, reducing speed is an effective way of cutting down emissions of carbon dioxide. Lowering by, say, 25 per cent, would result in a halving of fuel consumption. Technical improvements can also make considerable difference. With contra-rotating propellers, for instance, fuel consumption can be reduced by about 15 per cent, and a further reduction by 15 per cent can be obtained with turbo-compound technology, which utilizes the waste energy in the exhaust gases.

The Administration says it is not opposed to the development of faster marine transport systems (cf following report on catamarans), since hastening progress towards more energy-efficient designs will excuse a temporary increase in emissions. Stricter environmental requirements and/or higher fuel prices will in time lead to a lowering of speeds and so a general gain for the environment. The Administration also points out that transport by water is in general more energy-efficient than road transport.

PER ELVINGSON

Åtgärder – luftföroreningar från den marina sektorn. Sjöfartsverket 1994. 210 pp. In Swedish only. Obtainable from Sjöfartsverket, S-601 78 Norrköping, Sweden.

FERRIES

Wrong development

FOR SEVERAL YEARS the world's largest ferry operator, the Swedish-owned Stena Rederi AB, has been trying to develop an environmental image. All the same it is now investing in big, fast catamarans with greatly increased emissions of air pollutants.

Of the three already ordered, one will be put in service on the Holyhead-Dun Loaghaire route over the Irish Sea, and the other two in the Kattegat and the English Channel. These ships will be driven by gas turbines, and their fuel consumption is expected to be four times as high as that of the present ferries, calculated on the amount of transport work they do. It is estimated that even with the use of the best technology, nitrogen-oxide emissions will be twice as great. Because gas turbines use a much cleaner fuel than the diesel engines of ordinary ferries, there will on the other hand be lower emissions of sulphur dioxide from the new vessels.

The owners' excuse is that they must invest in faster ferries in order to keep their customers, adding that "catamarans are in any case cleaner than aircraft." But how great the increase in emissions will be, they do no care to say.

Source: **Göteborgs Posten**, June 1994.

BRIEFS

Deceptive decline

The overall emissions of carbon dioxide from the burning of fossil fuels went down in the European Union by 3.2 per cent between 1990 and 1993. Eurostat, the Commission's statistical office which released the figures, was however quick to point out that the reduction is deceptive, being largely due to a move away from the burning of solid fuels, especially brown coal, in eastern Germany.

During the same period the emissions of CO_2 from transportation within the Union went up by 4.4 per cent, having risen in all countries except Denmark. Emissions from power stations were up by 2.7 per cent as a result of higher demand for electricity in all member states.

T&E Bulletin, No. 30, July 1994.

Better in Germany

The German government will not attain its goal of reducing carbon dioxide emissions by 25-30 per cent by 2005 unless it makes drastic changes in policy, according to a report from DIW, a leading German economics institute. The DIW calls for a tax on carbon dioxide, increased prices for petrol, tougher legislation for the insulation of buildings, reduced subsidies to coal producers, but subsidies for renewable energy forms, and greater efforts to promote public transport systems.

While admitting that some progress has been made toward reducing CO_2 emissions, the institute also said that much of it was due to the economic slowdown. In eastern Germany emissions dropped from 20 to 11 tons per capita between 1989 and 1993, bringing them down to the west-German level. But measured against gross domestic product, the east German levels were 2.2 times higher than the western. Western Germany has been most successful in improving energy efficiency. There, while the economy grew by 50 per cent between 1973 and 1993, energy use increased by only 7 per cent.

Car Lines, Michael P. Walsh, May 1994.

Letter to Kohl

Last spring environmentalist organizations in four EFTA countries – Finland, Austria, Norway, and Sweden – addressed a letter to the German Chancellor, Helmut Kohl, urging him as the incoming president of the European Union to strive for the introduction of a carbon dioxide/energy tax of $10 per barrel of oil. If made fiscally neutral, say by lower taxes on labour, such a tax would "not be a burden but a benefit," according to the environmentalists. They also emphasized that since it will be host to the first Conference of Parties in the Climate Convention, Germany has a special responsibility in this respect. □

Further publications

Health effects of particles in the ambient air (1994)
A review of the literature. Also describes the way particles are formed, as well as their chemical composition. Makes suggestions for air quality standards.

50 pp. Report 4261-0. Published by the Swedish Environmental Protection Agency, Information Department, S-171 85 Solna, Sweden.

Climate change policy initiatives: 1994 update – Vol. I OECD Countries
Study by International Energy Agency. Details the actions OECD countries are taking to meet their commitments under the Climate Convention. Up-to-date information on national strategies for the period 1987-1992.

Can be ordered from OECD Publications Service, 2, rue André-Pascal, 75775 Paris Cedex 16, France. Fax +33 1 45 24 81 76.

Environment in Poland – issues and solutions
Ed. M. Nowicki, published under the auspices of the Polish Ministry of Environment. Contains a chapter on the history of pollution in Poland, and three parts with facts and discussion on sustainable development in Poland.

Published by Kluwer Academic Publishers, P.O. Box 17, 3300 AA Dordrecht, The Netherlands.

EC Environment Guide (1994)
Guide to EC environmental policy, legislation, and structure. Description and contacts with EC institutions and national environmental affairs in the member states, as well as world organizations and NGOs active in environmental affairs.

200 pp. Can be ordered from the EC Committee of the American Chamber of Commerce, Avenue des Arts, 50 Box 5, B-1040 Brussels, Belgium.

Critical levels for tropospheric ozone – concept and criteria tested for Nordic conditions
Tropospheric ozone is causing significant damages to crops and forests in Europe. Within the UN ECE strategies to decrease the levels are currently being developed. These strategies include mapping of the extent to which critical levels of ozone are being exceeded. In this report the critical levels are discussed with a view to the specific climatic conditions in the Scandinavian countries.

40 pp. Can be ordered free of charge from Nordic Council of Ministers, Store Strandstraede 18, DK-1255 Köbenhavn K, Denmark. Fax+45-33 96 02 02.

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AIR TRAFFIC

Offsetting the effects of potential growth

THE DEMAND FOR AIR transportation is forecast to grow steadily by 5 per cent per year, and thus to double in less than fifteen years. The potential for long-term growth is enormous, and unless policies change, emissions will grow rapidly, warns WWF International in a recently issued discussion paper.

Globally, aircraft release around 2-3 per cent of all the carbon dioxide and nitrogen oxides that are emitted as a result of burning fossil fuels. Aircraft also emit a mixture of other pollutants, including soot, carbon monoxide, hydrocarbons, and water. About half of the emissions are poured out into the atmosphere at an altitude of 8-12 kilometres. At this height pollutants can have more serious and enduring effects than at ground level. High-altitude emissions of water and nitrogen oxides are of particular concern, because it is possible – although not certain – that they contribute to global warming and ozone depletion.

Technological and operational improvements should ensure that pollution levels will grow less rapidly than the demand for air transportation, but if policies remain the same, pollution from aircraft will double in the next two decades or so. Suggestions for a series of new or improved policy measures are therefore put forward in the WWF paper.

Technological improvements might, it is suggested, include the introduction of slower, more fuel-efficient aircraft, optimized for passenger transport. Operational change – especially increasing the load-factor of aircraft – could rapidly reduce pollution by 30 per cent. But even if technological and operational measures were applied to a maximum, fuel consumption and pollution would still double in the next thirty years.

Consequently, if the emissions of greenhouse gases and other pollutants are to be reduced or at least stabilized, demand management will have to be applied. Emissions could be stabilized over the next four decades by reducing the rate of demand growth by 50 per cent in conjunction with technological and operational measures.

The paper also discusses the problems of implementing new policies – a rather difficult process, since aviation is such an internationally integrated industry.

PER ELVINGSON

Pollution control strategies for aircraft. Discussion paper by Mark Barrett for World Wide Fund for Nature International, Avenue du Mont-Blanc, 1196 Gland, Switzerland.

Negotiations stalled

THERE IS AN EVIDENT disinclination on the part of the industrialized countries to take any really effective measures at the moment against global warming. At the last meeting of the International Negotiating Committee on Climate Change, at the end of August in Geneva, most governments refused even to start work on a protocol for a reduction of CO_2 emissions.

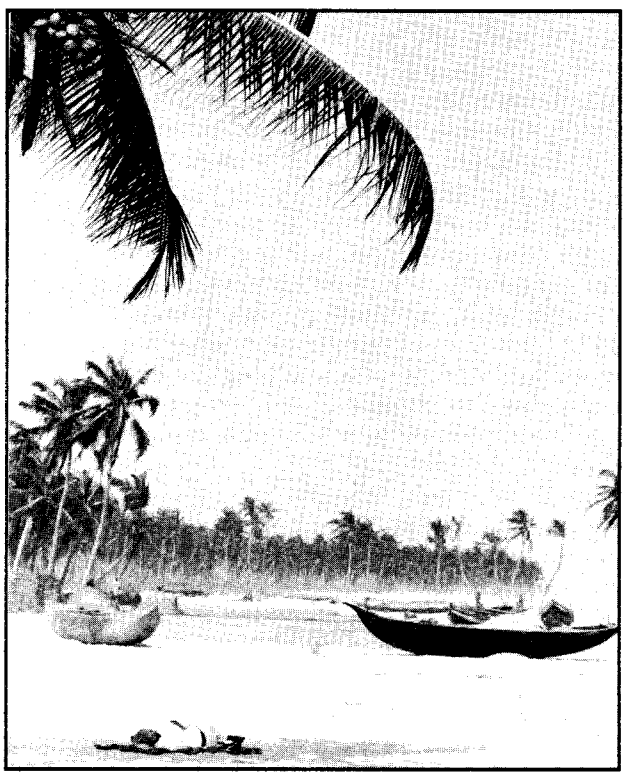
The only country to put forward specific suggestions was Germany, which is to host the UN Climate Summit in Berlin next March. But the German move amounted to little more than an attempt to get action started towards realization of the target from the 1992 Rio conference – where the industrialized nations had agreed to stabilize emissions at 1990 levels by the year 2000 – by putting it into a binding protocol.

But many countries, including Britain and the United States, appeared unwilling to support even this modest proposal, and environmentalists are in any case critical of it, not wishing for a reopening of negotiations on the stabilization target.

Already in 1990 the UN Intergovernmental Panel on Climate Change had stated that CO_2 emissions would have to be reduced globally by at least 60 per cent during the next fifty years. This means that the industrialized countries, which are historically responsible for most of the emissions, would have to reduce by at least 80 per cent.

In Geneva however this warning was brushed aside. Governments were much more eager instead to discuss a pilot phase for the concept of "joint implementation." This would allow industrialized countries to invest in greenhouse-gas abatement, say, in Central and Eastern Europe or in developing countries, and so acquire a credit as though for a reduction of their own emissions. But environmentalists fear this would seriously delay a shift in the industrialized countries towards environmentally sound energy and transportation systems and general policy.

At Geneva environmentalist organizations presented a proposal of their own for a "Berlin" protocol, to include a commitment on the part of the industrialized countries to reduce their emissions of CO_2 to at least 20 per cent below 1990 levels by the year 2005 – i.e. the Toronto target.*



Rising sea levels resulting from global warming pose a threat to populations of islands and other low-lying areas.

This proposal would also require countries to set up detailed regulations concerning integrated resource planning, energy efficiency, and renewable energy, as well as rules for education, training, and information.

Subsequently, at the end of September, the Association of Small Island States submitted to the UN Climate Convention Secretariat the first definite proposal for a CO_2 protocol, intended for discussion in Berlin. This also includes the 20-per-cent reduction of the Toronto agreement.

It is however highly uncertain whether the proposal will receive any support from the industrialized countries. The European Union has for instance still not decided on any measures for attainment of the stabilization target set at Rio. For years one of the potentially most important measures, the introduction of a CO_2/energy tax, has been blocked by the United Kingdom. A positive decision regarding that tax at the next meeting of the EU Council of Environmental Ministers is probably an important precondition for further negotiation of the AOSIS proposal prior to the Climate Summit in Berlin.

It is now time for environmentalist organizations to step up pressure on governments to make a success of the Berlin meeting.

They are therefore urged to send letters as follows in support of the Climate Action Network's campaign for a CO_2 protocol.

1. To the Environment Minister of the United Kingdom protesting against his country's blocking for three years the introduction of an EU CO_2/energy tax. Address: Ministry for the Environment, 2 Marsham Street, London, England SW1P 3EB.

2. To the German Minister of Environment, now president of the EU Environmental Council, asking for decision to be made on a CO_2 tax at the next meeting of the EU Council of Ministers on December 15-16, 1994. Address: Environmental Minister, Kennedyallee 5, D-53175 Bonn, Germany.

3. To national governments of the OECD countries demanding support of the AOSIS proposal for a CO_2 protocol, with the aim for bringing about a decision at the Climate Summit in Berlin next March.

Copies of both proposals for a CO_2 protocol, from the AOSIS countries and the Climate Action Network, can be obtained from: Climate Action Network, 44 rue du Taciturne, 1040 Brussels, Belgium.

REINHOLD PAPE

* In 1988 ministers for environment, scientists, and environmentalist organizations, meeting in Toronto, Canada, recommended for the first time political measures against global warming.

B FÖRENINGS-
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SWEDEN

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P 28

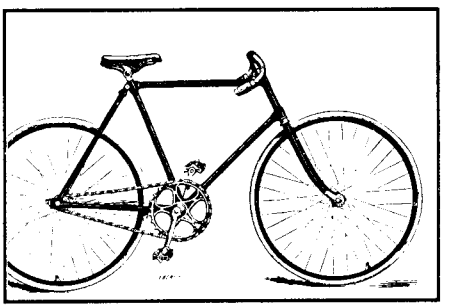
A better investment

It would pay in Sweden to invest in railways as a means of moving freight faster, and so giving industry a competitive advantage. It would be throwing away money to invest in roads, since the standard of the Swedish road network is already very high, and any additions to the motorway system would only result in marginal time savings in road transportation. There are great possibilities on the other hand for improvements on the railways, such as raising the speed limits, doubling tracks, and facilitating combined road-rail transport. "It is obviously pointless to put money into roads if you want to help industry become more competitive. It would only result in more environmental destruction at the expense of the taxpayer," comments Anders Roth, who was responsible for the report from the Society for Nature Conservation.

To be...or not to be?

There was political turmoil in Sweden early this summer on account of the plan for a combined road-rail bridge over to Denmark. On June 16 the government gave the go-ahead by accepting the environmental consequences test. But while Carl Bildt, the conservative prime minister at the time, described the bridge as "the greenest that can be built," his minister of environment, Olof Johansson, leader of the greener Centre party, resigned in protest, saying that the project had been inadequately investigated and that he was "convinced the bridge had been wrongly thought out, was environmentally dangerous, and a costly and unnecessary project." The Society for Nature Conservation commented that Sweden had "now been degraded to the status of a banana republic" as regards environmental protection, and promised continued opposition.

The government acceptance notwithstanding, further formal decisions are required before construction can start, which cannot be before next year.



A key for a bike

Hand in your car key at the tourist office – and in exchange get a free bike for a day. This is how the village of Achensee in the Austrian Tirol is trying to hit two birds with one stone – on the one hand lessening road traffic, and on the other seeing that visitors have more leisure to enjoy the lovely Alpine scenery around Maurach. Cycle tracks lead around the lake, into the neighbouring valleys, and up to the alpine pastures.

Paid for not parking

California has recently started a so-called "cashing out" system for moderating the use of cars. Businesses with more than fifty employees must give their staff the choice of either continuing to enjoy free parking or being given cash for the amount that a car's parking space costs. It has been shown in Los Angeles that cashing out can help reduce commuting trips by 50 per cent. Now President Clinton wants to see the system introduced everywhere. Besides making for a cleaner environment, it would boost federal income, since firms can make deductions for parking costs. Removal of that possibility could improve such income by as much as a billion dollars a year.

Natur & Miljö Bulletin, March 11, 1994.

Cleaner vehicles

Investor-owned utilities have joined forces with health and environmentalist groups in urging regulators in northeastern US to seek standards for combatting smog that would make electric and other zero-emission vehicles mandatory. Concerned that aggressive efforts to defeat clean-vehicle initiatives could shift an undue share of the burden of compliance with the Clean Air Act onto stationary sources, utilities have asked the Ozone Transport Commission to recommend the adoption of targets.

A ruling could of course open the door to much higher demand for electric vehicles, to the advantage of the utilities.

Car Lines, M. Walsh, May 1994.

Coming events

Energy Efficiency Business Week '94. Prague, Czech Republic, November 8-10, 1994.
International conference and exhibition. Theme: State-of-the-art technologies for energy efficiency.

Inquiries: Martin Dasek, SEVEn, Slezká 7, 120 56 Praha 2, Czech Republic. Fax +42-2 2424 7597.

Future perspectives for Energy Efficiency in Slovakia. Banská Bystrica, Slovakia, November 15-17, 1994.
Conference and exhibition. Program similar to the above.

Inquiries: Marian Rutsek, EMES, Partisánska 94, P.O. Box 135, 974 01 Banská Bystrica, Slovakia. Fax +42-88 745 183

International Conference on Climate Change Research. Maastricht, The Netherlands, December 6-9, 1994.
Presenting the state of the art in different fields of climatic research, with evaluation of the results of Dutch climate research. Response options. Role of research programs for policy development.

Inquiries: Marianne Vonk, RIVM, P.O. Box 1, 3720 BA Bilthoven, The Netherlands. Fax +31-30 251932.

Acid Reign '95? 5th International Confernce on Acidic Deposition. Gothenburg, Sweden, June 26-30, 1995.
The conference will focus on recent findings regarding the origin and effects of acidic deposition and the different measures that have been taken to combat the resulting problems, with special importance attached to the use of the critical-load and other effect-oriented concepts for development of abatement strategies. Plenary sessions, poster sessions, excursions to different sites and experiments related to the theme of the conference (e.g. liming of lakes, corrosion studies, ozone experiments). Just before the conference there will be a three-day excursion to areas severely damaged by air pollution in the Czech Republic and southwestern Poland.

Inquiries: Gainmore AB, Conference & Exhibition Services, St. Badhusg. 18-20, S-411 21 Göteborg, Sweden. Fax +46-31 774 2730.