

# Acid News



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## ACIDIFICATION

# Outlook for the year 2010

Considerable areas of Sweden, well worth protection, will continue to be overexposed

DESPITE the distinct reduction of acidifying emissions that is expected to take place in Europe during the next decade, by 2010 the critical loads for depositions are still likely to be exceeded over great areas, and acidification to remain a problem for many decades following. The outlook as concerns Sweden has now been probed by a group of scientists from the Swedish Environmental Research Institute (IVL) in Göteborg, who have calculated the species and areas of natural interest that will be affected even if the current plans for reducing emissions are actually carried out. The aim has been to give decision makers and the public an idea of the problems that will still remain.

The first part of their report<sup>1</sup> shows how acidification will affect

different parts of Sweden in 2010 under alternative assumptions<sup>2</sup> in regard to emissions (see table). These are:

□ The reduction resulting from decisions already made, both by individual countries and within the EU, and from international agreements beyond those. This is the reference scenario (REF).

□ The emission reductions that would follow if the acidification strategy (F1) proposed by the EU Commission's environment directorate were carried out.

According to computer modelling done by the IIASA research institute for the EU Commission, the proportion of the Swedish ecosystems where the critical load is being exceeded will drop from 16.4 per cent as in 1990 to 4.1 per cent in 2010

under the reference scenario, and further to 3.5 per cent with the acidification strategy. These relatively low figures can however be misleading. Since Sweden is a big country geographically, the total area where the critical load is still being exceeded in 2010 will still be very large – 1.60 million hectares under the REF scenario, and 1.36 million under F1. That is about half the whole area of Belgium.

In the international system, the critical loading is mapped for individual squares measuring 150x150 km. In Sweden, in the worst affected squares, the critical limit would be exceeded in 2010 on 12 per cent of the ecosystem area under the REF scenario and 9 per cent under F1.

*Continued on page 3*

# Acid News

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

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

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

The Swedish NGO Secretariat on Acid Rain  
Box 7005, S-402 31 Göteborg, Sweden

Tel: +46-31-711 45 15. Fax: +46-31-711 46 20

E-mail: info@acidrain.org

Internet: www.acidrain.org

Editor: Christer Ågren

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## THE SECRETARIAT

The Secretariat has a board comprising one representative from each of the following organizations: Friends of the Earth Sweden, the Swedish Anglers' National Association, the Swedish Society for Nature Conservation, the Swedish Youth Association for Environmental Studies and Conservation, and the World Wide Fund for Nature Sweden.

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

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

- Keeping under observation political trends and scientific developments.
- Acting as an information centre, primarily for European environmentalist organizations, but also for the media, authorities, and researchers.
- Producing information material.
- Supporting environmentalist bodies in other countries 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 Convention on Long Range Transboundary Air Pollution and policy initiatives in the European Union.
- Acting as an observer at the proceedings involving international agreements for reducing the emissions of greenhouse gases.

## EDITORIAL

# Piling it on

ON February 24 the *European Voice* bulletin ran an article stating that the expected proposal for an EU directive on national ceilings for four air-pollutants would cost the member states an extra euro 7.5 billion yearly in top of the euro 58 billion in annual cost for complying with existing and promised laws. It also quoted the Union of European Industrial and Employers' Federation as asserting that the draft proposals would impose an enormous and unnecessary burden on the EU and consumers.

No mention was made of the fact that those responsible for the figures – the Commission's environmental directorate and the consultants IASA – were fully aware that they were gross overestimates. There are several reasons for that being so.

Firstly, the estimates have been based on a reduction of the emissions solely through the application of technical measures – thus ignoring the fact that a lot of non-technical methods are possible and often relatively inexpensive. Among them are so-called structural changes, such as switching fuels from coal to gas or biofuels, improving energy efficiency, and early retirement of old, inefficient, and polluting plants.

Secondly, the figures reflect current technology and costs. They take no account of technical developments and improvements that could result in a more efficient removal of the polluting substances and lower cost. Nor of new techniques that are coming onto the market.

Finally there is the fact, and perhaps the most significant, that the energy scenario that has been employed for making the analysis stands in total contradiction to the EU's commitments to reducing the emissions of carbon dioxide. According to the Commission's own analysis, made with the use of a more appropriate scenario, implying fulfillment of the EU commitments under the Kyoto protocol, the cost for meeting the requirements of the four-pollutant directive would be 40 per cent less than supposed.

Besides trundling out these clearly wrong estimates, without any reservations, industry has often had a tendency to add up the total, also exaggerated, estimates of the cost of compliance with coming as well as

existing legislation – and call that an additional burden.

It is unfortunate that the writers should have played along, consciously or unconsciously, with such disinformation, since the bulletin reaches many officials, politicians, and other decision makers in Brussels, and so can broadcast a distinctly misleading idea of the effects of the proposed directive just at the critical moment of its being adopted by the Commission.

One wonders why industry persists in dealing out disinformation in this manner. A partial reply can be found in a study conducted by the Stockholm Environment Institute, where an attempt is made to compare the supposed costs of proposed legislation with assessments of the actual cost (see pp. 17-18 in this issue). Part of the answer also lies in the fact that trade associations, through some sort of tradition, often tend to adopt a "least-common-denominator" attitude – which means defending the arguments of those of their members with the worst environmental records. Consequently the trade associations are wont to express vehement opposition to any new proposals for regulation, their aim being first to try and prevent them, and if that fails, to delay and hold them up.

In conclusion it may be said that although euro 7.5 billion may seem a lot of money, it only amounts to euro 20 per individual in the European Union. If the EU should really carry out the climate policy to which it is committed, and there should be no stop to technical developments, the real cost of the four-pollutant directive would be no more than half the supposed figure, or at the most euro 10 per individual per annum. One would imagine that few people, if indeed any, would agree with the assertion that the regulation in question will lay an "enormous and unnecessary burden on the EU and consumers" – especially if all the ensuing benefits to health and the environment are taken into consideration. While only some of these benefits can be assessed in terms of money, those that are so quantifiable can be accounted as worth as much as four times the supposed, overestimated, costs.

CHRISTER ÅGREN



# ON THE FOLLOWING PAGES

## Multi-effect protocol 5

Although little progress was made at Geneva in March, the aim is still to have a protocol ready for signing before the end of the year.

## LCP directive 6

The EU Parliament wants to have stricter standards for new large combustion plants than those proposed by the Commission, but also to see controls extended to existing plants.

## Ozone, emissions 8

While measures for reducing acidification and ground-level ozone will be delayed as a result of the Commission's demission, the interim goal still stands, but with new figures for costs and benefits.

## Czech shake-up 10

A change in government policy has meant that the effects of proposed measures will have to be assessed in all fields, and a serious start has been made for energy.

## Forest soils 12

A study of the situation in southern Sweden shows increased acidification - a process that will only cease when acidifying depositions have dropped below the critical loads.

## Soil and water 13

Experiment in Sweden suggests that even with huge cuts in emissions it will take a long time to repair the damage from a lengthy period of acid fallout.

## Stuck with it 14

Estonia can find no alternative to oil shale as a source of energy. Pact with Finland calls however for an 80-per-cent reduction of sulphur emissions by 2005.

## Climate change 16

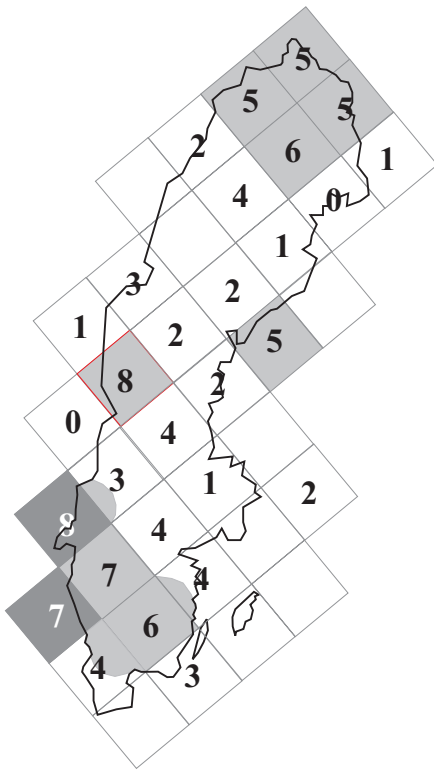
Warning of the effects of air traffic on climate, the IPCC proposes various measures for curbing emissions from aircraft.

## Alleged vs real costs 17

A study of cases of environmental regulation has been made to try and find out whether the claims of industry as to the costs of compliance have been valid or not.

## United States 20

Proposing new standards for cars and fuel, the EPA says this is the first time that tailpipe emissions and sulphur in gasoline are being addressed in a single system to achieve cleaner air cost-efficiently.



Percentage of the ecosystem in each square where the critical load for acid deposition will be still exceeded in 2010 according to the F1 scenario.

Continued from front page

As can be seen from the map, the areas where the critical load is being exceeded would be largely concentrated to a belt crossing southwestern and southern Sweden, to a part of central Sweden, and parts of the mountain range towards Norway as well as inland in the far north. The causes in the south are very sensitive soils combined with a relatively high acid fallout. While the fallout is decidedly less farther north, it still causes acidification, because the critical limits there are lower on account of slower weathering of the soil minerals and slow plant growth.

Proceeding from the expected situation as regards acidification, the investigators have drawn a picture of the species and areas of the country that are likely to be affected. While sticking in the main to the terms of their commission, and confining themselves to the rarer spe-

cies and specially protected areas, they also emphasize the need to study some ordinary species that are of great importance for the functioning of various ecosystems.

**THREATENED SPECIES.** A previous study had shown acidification to be a threat to many of Sweden's freshwater species, among them being three species of moss and fifteen invertebrates. Especially threatened in the latter group were snails, mussels, crustaceans, and mayflies. One species of fish, spring-spawning cisco (*Coregonus trybomi*), seemed to be on the verge of extinction, and many others were considered at risk, as were a number of birds, such as red-throated and black-throated divers and ospreys, as well as one mammal, the otter.

The effects of air pollution, rather than acidification, are noted for forests and farmland. Among the species thought to be under threat for this reason in the forests are thirty lichens, twenty mosses, and eleven invertebrates. Although depositions of nitrogen are considered a greater danger than acidification, both for forest and farmland, a number of species and groups with proven sensitivity to acidification are also noted in the report. They include terrestrial snails, of which several are rare and found in those parts of the country where acidification is greatest, some species of lichen, fungi, and moss, as well as a few vascular plants, including three rare grasses at home in the woodlands of southernmost Sweden.

**THREATENED AREAS.** A number of examples are given of areas of particular interest, from the point of view of nature conservation, where acidification will remain a threat even after 2010.

In southern Sweden there is the area comprising the Ätran and Högvedsån river systems (1 on the map on the following page), where the freshwater pearl mussel *Margaritifera margaritifera* and salmon are found, and the Store Mosse national park, with its raised bogs, fens, lakes and a plentiful plant and ani-

Continued on page 4

Expected decrease in the European emissions of acidifying substances, from the levels of 1990, as a result of decisions already taken (REF) and of the EU Commission's acidification strategy (F1).

	Sulphur dioxide		Nitrogen oxides		Ammonia	
	REF	F1	REF	F1	REF	F1
EU15	-70%	-77%	-45%	-53%	-12%	-22%
Rest of Europe	-55%	-55%	-31%	-31%	-14%	-14%

## Cleaner air in China

The Beijing municipal government has forbidden any further installations of coal-fired boilers as part of a nineteen-point program for clearing the air of the Chinese capital. Existing boilers of any size must now be fired with low-sulphur coal or some other cleaner fuel. The need for energy is to be met in part by importing gas from China's northern provinces. New exhaust standards for cars (corresponding to Euro I) are intended to reduce the emissions of nitrogen oxides from road traffic by 80 per cent. In the course of the next year 20,000 buses, taxis, and perhaps other vehicles are to be converted to gas.

The quality of air is bad in Beijing, and the city fathers are under pressure from the central government to take quick steps to improve it. In winter boilers are estimated to account for 90 per cent of the local emissions of sulphur dioxide, 50 per cent of the nitrogen oxides, and 40 per cent of the particulates. Since 1988 the number of vehicles has doubled, while coal burning has risen by a third.

Car Lines No. 1, February 1999.

## Tiring of traffic jams

This spring the environmentalist organization Legambiente was urging the local authorities in Italy to hold referendums, concurrently with the elections to the EU Parliament, on a proposal to limit traffic in cities. Local referendums of this kind were held in Italy in the 1980s, when citizens voted heavily for various types of traffic controls. In Bologna, for example, 74 per cent of people supported pedestrianization of the city centre.

Since that time, local authorities have gained extra powers over traffic planning, and Legambiente believes that referendums could lead to a variety of new initiatives. According to a recent survey, 54 per cent of Italians believe that there are too many vehicles on the roads, and would agree to rules limiting car use. It has been calculated that in an average lifetime, every Roman, for instance, spends nearly seven years stuck in traffic.

ENDS Daily. March 12, 1999.

## To boost renewables

Early in May the EU Commission proposed what it called a "Campaign for Take-Off," aiming to bring about an increase of the use of energy from renewables to 12 per cent of the total by 2010. The Commission is hoping that the idea will attract 30 billion euros, of which something like 80 per cent would be in the form of contributions from industry. Definite targets are proposed for the use of biomass, wind power, and solar energy.



OSPREYS © CALLE BERGIL

Continued from page 3

mal life (2). Also Tresticklan, an area of virgin forest (3).

In the middle of the country are two mountain areas, part forested: Fulufjället (4) and the Långfjället-Rogen area (5). In the former it is mainly the water systems that are at risk, while the latter includes many sub-areas of great scientific interest which are especially sensitive to acidification.

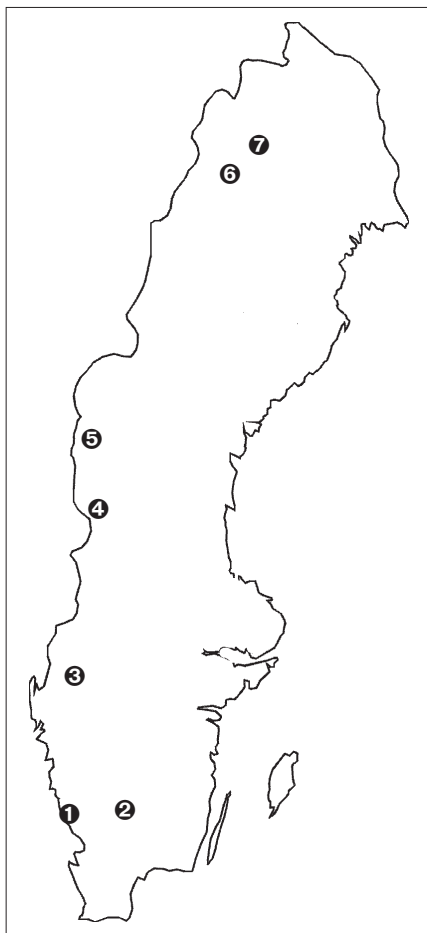
Examples in the north are the Pärälven reserve with its boreal forest (6), and what is intended to be the Sjaunja national park (7). Both

are areas of great biological diversity, containing many species and ecosystems that are particularly sensitive to acidification.

The authors of the report note a need for greater resolution in the mapping, as regards both the degree of sensitivity to acidification and the rate of acid deposition. With the wide-mesh squares that are now used there is a considerable risk of many sensitive ecosystems, of great natural value, slipping out of the statistics, because they only constitute a small proportion of the area in each square. They also point out that the actual situation in 2010 will differ from that coming out of the modelling, on account of the inertia in the natural system, which will mean that acidification will remain a problem long after depositions have lessened. For more about the soil's possibility of recovery, see article on page 13.

It can thus be said that the maps now being used to illustrate the future state of acidification give an altogether too good a picture. Unless further measures are taken to curb emissions, considerable areas of Sweden, many of which are well worth protection, will continue to be exposed to acidification for several decades to come.

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<sup>1</sup> By Håkan Pleijel, Ingvar Andersson, and Gun Lövblad of IVL and commissioned by the Swedish NGO Secretariat on Acid Rain with part funding from the Swedish Environmental Protection Agency. Available free of charge from the Secretariat.

<sup>2</sup> The figures in the scenarios have been taken from the Sixth Interim Report from IIASA, October 1998, and so do not quite correspond either to those given for the EU acidification strategy in March 1997 or in the directive for national emission ceilings that is now expected from the Commission.

# Negotiations are continuing

Disagreement on technical details, national emission ceilings to wait for next round

Some small advances were made towards a multi-effect protocol to the Convention on Long Range Transboundary Air Pollution when the matter was taken up during a second round of negotiations at Geneva, March 22-26. The subjects of discussion were, on the one hand, the general construction and content of the protocol, and on the other some proposed technical appendices. Although drafts of some of the more controversial parts of the text of the protocol were also considered, the more difficult matter of national emission ceilings that would be binding for the four air pollutants was carefully avoided. See AN 1/99.

There are technical appendices to several of the various protocols under the Convention. Among those attached to the sulphur protocol of 1994 are some describing BATs, the best available techniques for abatement, which mainly contain recommendations and advice, and others setting down mandatory requirements. The latter type includes one setting limit values for emissions from large combustion plants and also the maximum permitted sulphur content for gas oil (covering both diesel and light fuel oils).

Although both types of appendix were discussed at the March meeting, attention was mostly given to those setting emission limit values for SO<sub>2</sub>, NO<sub>x</sub>, and VOCs, but also to requirements for specific products. This last was because several countries want to have such requirements included as a complement to emission ceilings.

Since the new protocol will be taking in four different pollutants, the

number of emission sources and products that have to be covered can be very great. The meeting therefore aimed primarily at simplifying and shortening the draft versions of the appendices. Differences of opinion still remain as to the types of emission source that are to be included, and how strict the require-

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*The aim is still to have concluded negotiations early in September*

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ments are to be. Disagreement is greatest however as to whether the requirements of the appendices are to be considered as compulsory, or merely as recommendations.

The appendix for ammonia that is being considered would include a number of measures to limit emissions from various farming activities, but there is disagreement even here as to whether they are to be binding or not.

Considered simply as recommendations were on the other hand various existing documents dealing with ways of reducing emissions – the best available techniques for the four pollutants and their major emission sources.

At the meeting the American delegates announced that they had got clearance from the White House to engage fully in the proceedings, and would thus be in a position to sign a protocol. Since however the analyses on which the protocol is to be based will apply neither to the

United States nor to Canada, but only to Europe, these two countries will have to work out some kind of parallel requirements for themselves. But those would only be for SO<sub>2</sub>, NO<sub>x</sub>, and VOCs, not ammonia, since the United States and Canada are agreed that they have no environmental problems on account of cross-border movements of reduced nitrogen compounds.

For the same reason that the EU Commission has revised the basic assumptions for its forthcoming directive on national emission ceilings (see article on p.8), the Convention's Task Force on Integrated Assessment Modelling has had IASA revise G5/2, the central scenario for negotiation, on the basis of fresh data. That means that some of the figures for emission reductions, for instance, given in AN 1/99, have also had to be altered.<sup>1</sup>

The next meeting for negotiation of the protocol will also be taking place in Geneva, from May 31 to June 4. It is then intended to seriously start attacking the biggest and most controversial matters, such as the national ceilings for emissions, and whether any or all of the appendices with requirements for emission limit values are to be binding. The aim is still to have concluded negotiations early in September, so as to have a protocol ready for signing by the environment ministers before year's end.

CHRISTER ÅGREN

<sup>1</sup> The outcome from the analysis can be seen in the report from the March meeting of the task force, and also in IASA's report. The Task Force report, labelled EB.AIR/WG5/1999/4 can be obtained from Henning Wuester, e-mail: henning.wuester@unece.org. IASA's, entitled "Sensitivity analyses for a central scenario to control acidification, eutrophication and ground-level ozone in Europe" (March 1999) is on [www.iiasa.ac.at/~rains](http://www.iiasa.ac.at/~rains).

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## VOCs, air quality, sulphur in oil

Three further directives for the control of air pollutants have now been formally adopted by the EU Council of Ministers. They are:

□ Directive 99/13 on the limitation of emissions of volatile organic compounds arising from the use of organic solvents in certain activities and installations. See AN 4-5/97, p.10 and 2/98, p. 7.

□ The first daughter directive under the framework one on the assessment and management of ambient air quality (96/62/EC). Sets standards for sulphur dioxide, nitrogen dioxide, particulate matter (PM<sub>10</sub>), and lead. See AN 3/98, p. 7.

□ The directive to regulate the sulphur content of fuel oil. See AN 3/98, p. 10.

That on VOCs was adopted on March 29, the other two on April 29.

## Amsterdam treaty

The EU's Amsterdam Treaty entered into force on May 1. Virtually all environment legislation will now automatically be subject to the codecision procedure, which gives the Parliament as much say as the Council of Ministers over its final content. Among the proposed directives about which the Parliament has previously only been consulted, but on which it will now have the right of codecision, are those on large combustion plants and air quality standards. The new treaty also makes sustainable development a core task and objective of the European Union.

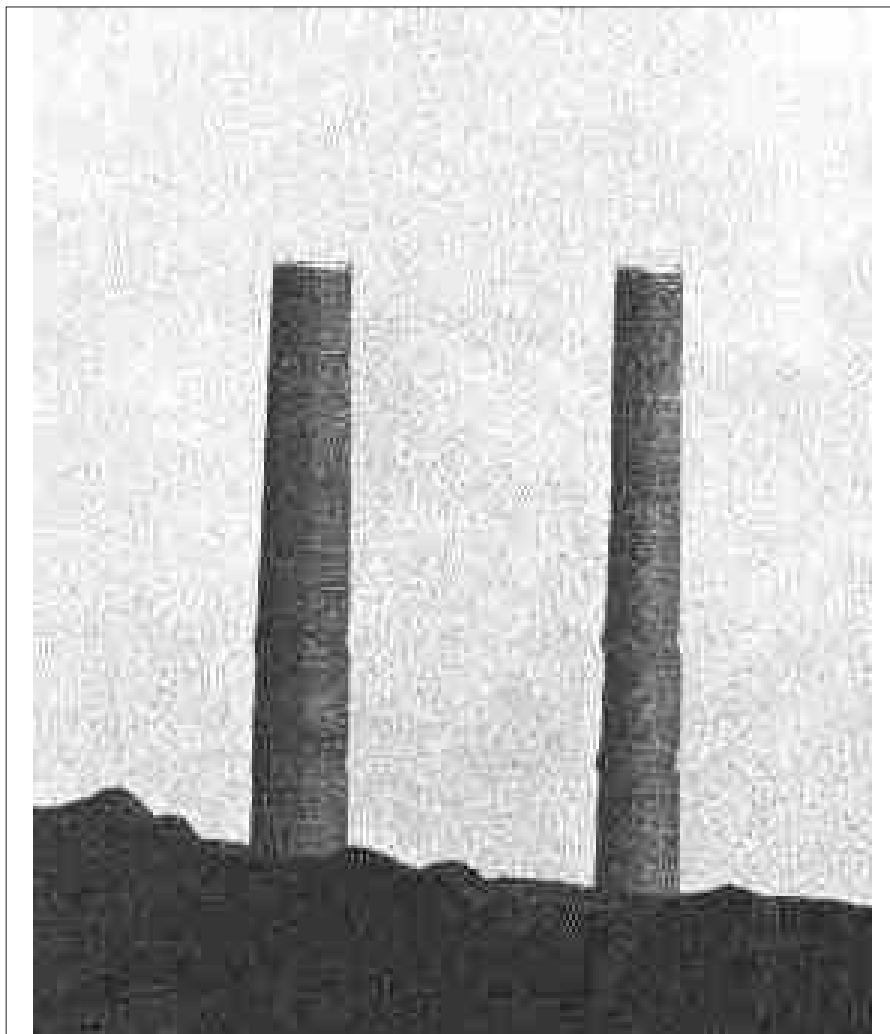
## Tractor emissions

The European Parliament has given its first reading to the proposed directive to reduce air pollution from farm tractors. The proposal seeks to bring tractors under regulations that will be similar to those already applying to other outdoor machinery, such as earthmoving equipment, under a 1997 directive (97/68), and will set emission limits for carbon monoxide, oxides of nitrogen, hydrocarbons, and particulates. Parliament was in the main satisfied with the proposal and passed only four amendments. The Council of Ministers is expected to reach a common position in June.

ENDS Daily, May 6, 1999.

## Tax stumbling blocks

Spain and Greece are firm in their refusal to agree to raising the minimum tax level on oil products in the EU, and also to extend it to coal, gas and electricity, as proposed by the Commission in 1997. The Germans, who currently hold the chairmanship, have tried to find a solution, but yet without success. All decisions concerning common EU taxation have to be unanimous.



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EU PARLIAMENT

## Wants stricter standards for large combustion plants

Should be emission controls for existing plants, not only for new, was Parliament's response at a first reading of the directive.

Strong support for better control of the emissions from large combustion plants came out at the plenary session of the European Parliament at Strasbourg on April 14. Following the recommendation of the environment committee, Parliament voted for a distinct tightening up of the proposal for revision of the 1988 directive for limiting the emissions of sulphur dioxide and nitrogen oxides from big plants, which had been put forward by the European Commission in July 1998 (AN 3/98, p.11).

The Commission's proposal had previously been heavily criticized by environmentalists, among others, on the grounds that the proposed limit values for new plants were altogether too high, but also and primarily because it included nothing

about existing installations. See AN 4/98, pp. 9-10.

The Parliament's reporter, Ria Oomen-Ruijten, Dutch Christian Democratic member of the European People's Party (PPE), had noted in February that the Commission's proposal was "far too modest," and made various suggestions for tightening it up. Meeting on March 17, the environment committee backed a proposal not only to lower the limit values for new plants, but to make the directive include control for existing plants as well.

The committee also ruled out some permitted derogations, such as that allowing Spain higher limit values for emissions from plants burning solid fuels that might be built before 2005, and another al-

lowing gas turbines to be used on off-shore platforms without any emission controls.

Other ideas that the committee voted for were that the Commission should, at the latest by July 1, 2007, produce proposals for a downward revision of all or most of the limit values for emissions, and that the EU member countries should continuously make public both their total national emissions and the emissions from each separate plant.

The voting in the environment committee revealed unusually distinct splits within party groups, with MEPs<sup>1</sup> from Britain and the Mediterranean countries (Portugal, Spain, France, Italy, and Greece) tending to vote against any tightening of the limits, and those from countries farther north in general supporting it. It is remarkable that a great many MEPs from the largest political group, the Party of the European Socialists (PSE), voted against the proposal, as did some from the European People's Party.

Prior to the debate in Parliament the opposition within the PSE, led by the British members, had changed its attitude to some extent. Instead of trying to stop the proposal to include rules for existing plants, it tabled a counter-proposal to the effect that it could be done, but not until 2010 – in other words five years later than the environment committee wanted. Most of the Socialists were however still against the committee's proposal to tighten up the requirements for new plants.

It was even more surprising that many German MEPs from the PSE chose to vote against the Committee's proposals – and particularly so because Germany has had some of the toughest emission controls in Europe since the early 1980s, applying both to existing plants as well as to new ones. A general tightening of the requirements for Europe as a whole would thus hardly have

had any unwelcome effect on Germany, but rather the contrary.

Practically all the proposed changes were nevertheless passed in the plenary voting. The only item that was not found acceptable was the proposal to lower the limit values for SO<sub>2</sub> emissions from new oil-fired plants, Parliament backing instead the Commission's original

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*Voting in the committee revealed unusually distinct splits within party groups*

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proposal. The extent to which the Parliament would like to see the requirements tightened up can be seen from the tables.

With the coming into effect of the Amsterdam Treaty on May 1, future forming of the LCP directive will – as in the case of a number of others dependent on article 130s(1), the legal base for most environmental moves – be through the so-called co-decision procedure instead of the cooperative. That will give greater power to the Parliament – for one thing it will have the right of veto.

It is still uncertain however when the matter will be taken up again by the Council of Environment Ministers. When some initial discussion was started under the German chairmanship in February and March, there was surprisingly strong opposition in particular from Spain and Greece – Spain maintaining that the proposal from the Parliament would “significantly affect its choice between different energy sources and the general structure of its energy supply.” Its legal basis should, in Spain's view, be shifted from Article 130s(1) to 130 s(2), thereby making adoption dependent on a unanimous vote in the Council, instead of a qualified majority as envisaged by

the EU Commission. The reply of the Council's legal service was however that any country demanding a change of legal base had to prove that the proposed legislation would have such effects as Spain claimed.

The relatively unsuccessful meeting of the Environment Council in March has meant that a large number of matters are still waiting to be dealt with. It is therefore unlikely that Germany will give precedence to the LCP directive at the last meeting under its chairmanship towards the end of June. It will therefore be handed on to Finland, which is due to take over for the next half-year. The matter is further complicated by the fact that several countries would prefer to have the LCP directive taken up simultaneously with that for national ceilings on emissions of acidifying and ozone-forming substances. A proposal for the latter was ready for adoption on March 17, but as a result of the Commission's demission it has become shelved indefinitely – or at least until a new commission has been formed.

CHRISTER ÅGREN

<sup>1</sup> Members of the European Parliament.

**Table 2. EXISTING PLANTS. The emission limit values for SO<sub>2</sub> that Parliament proposes should become mandatory from January 1, 2005 for all plants that have been granted a licence before January 1, 2000. Milligrams of SO<sub>2</sub> per cubic metre.**

Plant size <sup>1</sup>	50-100	100-300	>300
Solid fuels, incl. biomass	900	900-300 <sup>2</sup>	300
Liquid fuels	900	900-300 <sup>2</sup>	300
Natural gas	35	35	35

<sup>1</sup> Plant size in megawatts thermal input (MW<sub>th</sub>).

<sup>2</sup> Linear decrease.

**Table 3. EXISTING PLANTS. Parliament's proposed emission limit values for nitrogen oxides (NO<sub>x</sub>), intended to become mandatory from January 1, 2005 for all plants that had been granted a licence before January 1, 2000. Milligrams of NO<sub>2</sub> per cubic metre.**

Plant size <sup>1</sup>	50-500	>500
Solid fuels, incl. biomass	450	350
Liquid fuels	450	350
Natural gas	350	250

<sup>1</sup> Plant size in megawatts thermal input (MW<sub>th</sub>).

**Table 1. NEW PLANTS. Emission limit values for sulphur dioxide (SO<sub>2</sub>) that are proposed to become mandatory from January 1, 2000. Milligrams of SO<sub>2</sub> per cu.m.**

Plant size <sup>1</sup>	50-100		100-300		>300	
	Commission's proposal	Parliament's proposal	Commission's proposal	Parliament's proposal	Commission's proposal	Parliament's proposal
Solid fuels	850	200	850-200 <sup>2</sup>	200	200	200
Liquid fuels	850	850	850-200 <sup>2</sup>	850-200 <sup>2</sup>	200	200
Biomass	200	200	200	150	200	100
Natural gas	35	10	35	10	35	10

<sup>1</sup> Plant size in megawatts thermal input (MW<sub>th</sub>). <sup>2</sup> Linear decrease.

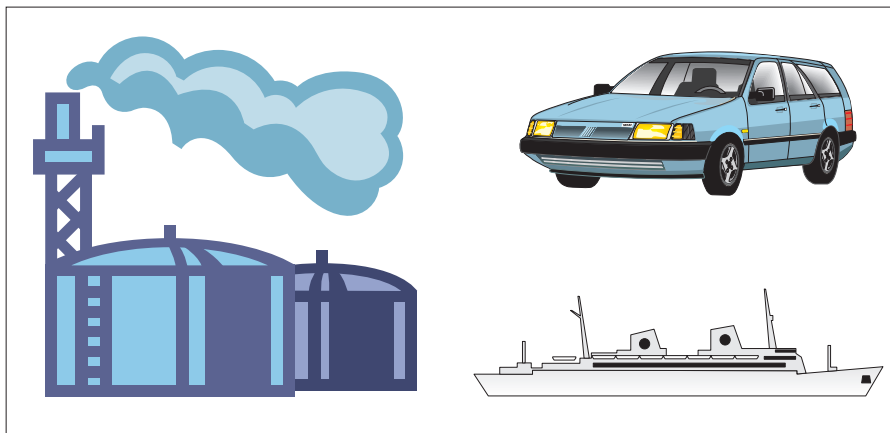
# Almost at a standstill

Handling of measures to reduce emissions of air pollutants will now be delayed

AFTER WEEKS of internal debate within the European Commission in January and February this year, agreement was finally reached on proposals for an ozone strategy, a directive on national ceilings for emissions of air pollutants, and a new daughter directive for the control of ground-level ozone. These proposals should have been officially adopted at the meeting of the Commission that was scheduled for March 17, but the whole timetable was upset by the Commission's sudden demission the previous night.

The present members will however be staying on until successors have been found, although they will only be attending to current business and otherwise only taking on matters of real urgency. In effect all politically controversial proposals for legislation and strategies are being put on hold. It is still uncertain when a new commission will be formed. It will certainly not be before July, and then probably only as an interim one.

Consequently the handling of proposals for measures to reduce the emissions and concentrations of air pollutants will now be delayed until after the summer, and maybe even longer. Whether any will have to be re-negotiated will depend on the constitution of the new



commission, and possibly whether the present environment commissioner, Ritt Bjerregaard, will stay on.

A detailed account of the work of the Commission's environment directorate in developing a strategy for dealing with ozone, as well as the form a directive on national emission ceilings would be likely to take, appeared in Acid News 4/98. Since then further computer modelling has been carried out, in order to include among other things the effects of proposed legislation, as well as fresh data from the EU member countries. The interim goal for 2010, for reducing acidification and ground-level ozone as agreed by the environment directorate, does however still stand. But the input of

new data has meant that some of the figures will differ from those given in the article. These concern for instance the national emission ceilings, the estimated costs, and the environmental benefits. The tables have been altered accordingly.

The renewed analysis shows among other things that the annual costs for these proposals can be estimated to fall from 9.1 to 7.5 billion euros in 2010. While the greatest reductions in estimated costs would fall to Germany, France, Belgium, Italy, and Portugal, some countries such as Britain, Greece, and Sweden will be hit by higher costs, according to the new estimates. One big reason for the total cost now being put lower is that the

**Table 1. Emissions (in ktons) under the reference (REF) and NEC scenarios. Percentage changes (in paranthesis) from the base year 1990.**

	Sulphur dioxide			Nitrogen oxides (as NO <sub>2</sub> )			Ammonia			Volatile Organic Compounds		
	1990	REF 2010	NEC 2010	1990	REF 2010	NEC 2010	1990	REF 2010	NEC 2010	1990	REF 2010	NEC 2010
Austria	93	40 (-57)	40 (-57)	192	103 (-46)	91 (-53)	77	67 (-13)	67 (-13)	352	205 (-42)	129 (-63)
Belgium	336	193 (-43)	76 (-77)	351	191 (-46)	127 (-64)	97	96 (-1)	57 (-41)	374	193 (-48)	102 (-73)
Denmark	182	90 (-51)	77 (-58)	274	128 (-53)	127 (-54)	77	72 (-6)	71 (-8)	182	85 (-53)	85 (-53)
Finland	226	116 (-49)	116 (-49)	276	152 (-45)	152 (-45)	40	31 (-23)	31 (-23)	213	110 (-48)	110 (-48)
France	1250	448 (-64)	218 (-83)	1867	858 (-54)	679 (-64)	807	777 (-4)	718 (-11)	2382	1223 (-49)	932 (-61)
Germany	5280	581 (-89)	463 (-91)	2662	1184 (-56)	1051 (-61)	757	571 (-25)	413 (-45)	3122	1137 (-64)	924 (-70)
Greece	504	546 (+8)	546 (+8)	345	344 (0)	264 (-23)	80	74 (-8)	74 (-8)	336	267 (-21)	173 (-49)
Ireland	178	66 (-63)	28 (-84)	113	70 (-38)	59 (-48)	127	126 (-1)	123 (-3)	110	55 (-50)	55 (-50)
Italy	1679	567 (-66)	566 (-66)	2037	1130 (-45)	869 (-57)	462	432 (-6)	430 (-7)	2055	1159 (-44)	962 (-53)
Luxemb.	14	4 (-71)	3 (-79)	22	10 (-55)	8 (-64)	7	7 (0)	7 (0)	19	7 (-63)	6 (-68)
Netherl.	201	73 (-64)	50 (-75)	542	280 (-48)	238 (-56)	233	136 (-42)	104 (-55)	490	233 (-52)	156 (-68)
Portugal	284	141 (-50)	141 (-50)	208	177 (-15)	144 (-31)	71	67 (-6)	67 (-6)	212	144 (-32)	102 (-52)
Spain	2189	774 (-65)	746 (-66)	1162	847 (-27)	781 (-33)	352	353 (0)	353 (0)	1008	669 (-34)	662 (-34)
Sweden	119	67 (-44)	67 (-44)	338	190 (-44)	152 (-55)	61	48 (-21)	48 (-21)	511	290 (-43)	219 (-57)
UK	3805	980 (-74)	497 (-87)	2839	1186 (-58)	1181 (-58)	329	297 (-10)	264 (-20)	2667	1351 (-49)	964 (-64)
<b>EU15</b>	<b>16339</b>	<b>4687 (-71)</b>	<b>3637 (-78)</b>	<b>13226</b>	<b>6849 (-48)</b>	<b>5922 (-55)</b>	<b>3578</b>	<b>3154 (-12)</b>	<b>2826 (-21)</b>	<b>14031</b>	<b>7128 (-49)</b>	<b>5581 (-60)</b>



emission reductions resulting from existing and proposed legislation – as presented in the reference scenario – are likely to be greater than was previously supposed.

There is a detailed presentation of the alternatives in the input data, as well as the showings of the IIASA analysis, in the interim report of the International Institute for Applied Systems Analysis to the EU Commission.

CHRISTER ÅGREN

**Seventh interim report: Cost-effective control of acidification and ground-level ozone** (January 1999). By M. Amann et. al., IIASA, Austria. Available on Internet: [www.iiasa.ac.at/~rains/](http://www.iiasa.ac.at/~rains/), where the benefits analysis "Economic evaluation of proposals for emission ceilings for atmospheric pollutants" (January 1999) by M. Holland et. al., AEA Technology, can also be found.

**Table 2. Costs and benefits (with chronic effects on mortality included) of emission control under the NEC scenario. For 2010, in million ecus per year.**

	Costs	Benefits	
		VOLY <sup>1</sup>	VOSL <sup>2</sup>
Austria	119	440	790
Belgium	1053	860	1600
Denmark	5	110	190
Finland	0	23	46
France	916	3500	6100
Germany	2147	4400	8000
Greece	338	230	390
Ireland	44	57	110
Italy	403	2800	4700
Luxembourg	4	160	300
Netherlands	971	1500	2700
Portugal	57	180	330
Spain	22	820	1400
Sweden	87	140	260
UK	1348	2300	4700
EU15	7514	17000	32000

<sup>1</sup> Valuation of life-years lost. <sup>2</sup> Value of a statistical life. Both methods described in AN 2/98.

## IN BRIEF

### Themselves a victim

The United States, which is reluctant to admit that it is polluting others, is now finding itself on the receiving end. Researchers in the state of Washington, on the West Coast, have seen proof of imports of carbon monoxide and various hydrocarbons from East Asia. During March and April 1997 some ten episodes with raised concentrations were detected, the origins of which could be traced back, with the help of meteorological data, over the Pacific Ocean. It was found that the pollutants were being transported at relatively low heights of less than 3000 metres, and had been barely a week on the way. At its height the concentration of peroxyacetyl nitrate was three times the normal background value.

Car Lines, No. 2, March 1999.

### High praise for Danes

Denmark gets good marks in a survey of the country's environmental policy made by the OECD. Praise is given among other things to the use of environmental taxes and strategic environmental assessments. Notably, too, between 1980 and 1995 the country's emissions of sulphur dioxide and nitrogen oxides decreased by 67 and 11 per cent, while its GDP had gone up in the same time by 36 per cent. The OECD thinks however that more could be done to reduce the emissions of carbon dioxide, and recommends a higher tax on it. It also suggests that Denmark should consider increasing fuel prices and using road pricing.

### Mixed for Czechs

The environmental aspects of developments in the Czech Republic, which became a member of the OECD in 1995, have also been scrutinized. Air quality is said to have improved dramatically as a result of a shift away from the use of brown coal and a widescale retrofitting of the larger power plants with desulphurization equipment. Nevertheless emissions per capita are still the highest in the OECD. The low cost of energy from traditional sources is said to be slowing the development of fuel efficiency and the use of renewables.

While praising the Republic for extensive investments in environmental improvement, the OECD nevertheless notes that pollution charges have either been too low to begin with, or have been eroded by inflation. It also criticizes the continuing secretiveness towards the public. The OECD urges "closer and more sustained" relations between government, NGOs, industry, and local authorities.

Further reading: OECD Environmental Performance Reviews: See Recent publications, p.12.

**Table 3. Acidification. Unprotected ecosystem areas: with acid deposition greater than the critical loads. 1000 hectares and percentage (in parenthesis).**

	1990		REF		NEC	
	Value	(%)	Value	(%)	Value	(%)
Austria	2376	(47.6)	162	(3.3)	99	(2.0)
Belgium	410	(58.4)	155	(22.1)	52	(7.4)
Denmark	54	(13.8)	9	(2.3)	6	(1.5)
Finland	4963	(17.2)	1183	(4.3)	1150	(4.2)
France	8194	(25.8)	218	(0.7)	88	(0.3)
Germany	8158	(79.5)	1617	(15.8)	727	(7.1)
Greece	0	(0.0)	0	(0.0)	0	(0.0)
Ireland	97	(10.7)	12	(1.3)	9	(1.0)
Italy	2065	(19.6)	74	(0.7)	58	(0.6)
Luxembourg	58	(66.7)	5	(5.9)	1	(0.9)
Netherlands	285	(89.3)	193	(60.4)	76	(23.7)
Portugal	1	(0.0)	1	(0.0)	1	(0.0)
Spain	78	(0.9)	17	(0.2)	17	(0.2)
Sweden	6341	(16.4)	1605	(4.1)	1420	(3.7)
UK	4117	(43.0)	1182	(12.3)	649	(6.8)
EU 15	36928	(24.7)	6433	(4.3)	4351	(2.9)

**Table 4. Health-related ozone load estimated by the AOT60 exposure index<sup>1</sup> and vegetation-related ozone load estimated by the AOT40 exposures index<sup>2</sup>.**

	AOT60			AOT40		
	Million person ppm-hours			Million hectares excess ppm-hours		
	1990	REF	NEC	1990	REF	NEC
Austria	16	3	2	468	257	213
Belgium	71	34	23	177	141	115
Denmark	9	3	1	141	53	36
Finland	0	0	0	0	0	0
France	310	89	53	4158	2345	1816
Germany	405	140	99	2344	1204	943
Greece	7	4	2	231	170	137
Ireland	3	1	0	25	8	3
Italy	183	63	38	1773	1186	996
Luxembourg	3	1	1	25	14	11
Netherlands	73	38	27	109	79	63
Portugal	16	8	6	379	274	233
Spain	35	7	4	2037	1281	1093
Sweden	4	0	0	116	18	9
UK	125	77	45	192	153	96
EU 15	1259	466	300	12174	7183	5765

<sup>1</sup> The index is calculated by multiplying the AOT60 value for each grid cell by the population in that part of the grid cell falling within the country in question.

<sup>2</sup> The cumulative vegetation exposure index is calculated as the excess AOT40 (i.e. over the critical level of 3000 ppb-hours) multiplied by the area exposed to the excess concentration. The areas included cover agricultural land, semi-natural ecosystems (e.g. managed forests), and natural ecosystems.

# Stirrings on the energy front

Law requiring strategic environmental assessments must now be respected

Ever since 1992 Czech law has required strategic environmental assessments (SEAs) to be made of government policy for energy, transportation, agriculture, waste management, mining, recreation, and tourism. Throughout Vaclav Klaus' term as prime minister, however, the loosely formulated law enabled the government to ignore this requirement. It was thus in effect a pioneering act when the Ministry of Industry and Trade at the end of 1997 asked for tenders for an SEA on energy policy.

The winners, the Czech non-profit consultant organization SEVEN (The Energy Efficiency Centre) proposed a transparent public procedure. Starting in January 1998, a group of experts, including two NGO representatives, prepared two scenarios and assessment criteria for future development of the energy sector.

These scenarios were debated in February at the first of a series of public hearings arranged by SEVEN. There a group of environmentalist NGOs put forward a proposal of their own for an energy policy that would emphasize energy efficiency and the use of renewables. Revised and more detailed drafts of the three variants were then made by the expert group, for presentation at a second public hearing, which was held in the Senate. This meeting helped to bring together environmentalists, ministry officials, senators, and business representatives for a serious discussion of the Czech Republic's future energy policy – and to set a precedent for the use of SEAs in other sectors of the economy.

The three variants, proposed for implementation between 1998 and 2010, were as follows.

**VARIANT A** amounts to business-as-usual. In other words, the mass use of non-renewable energy, especially from coal and nuclear sources will continue and the demand will grow. This would violate the Eco-

greater use of natural gas. It respects the Ecological Landscape Limits, but still relies on the Temelin nuclear power plant coming on stream in 2000.

**VARIANT C** envisages a rapid improvement in energy efficiency and a greatly increasing use of renewables (fourfold by 2010 compared with 1995). Financing would be by an environmental tax and government grants. Coal mining would be constrained by the Ecological Landscape Limits. The use of energy would be reduced, and completion of the Temelin nuclear power plant abandoned.

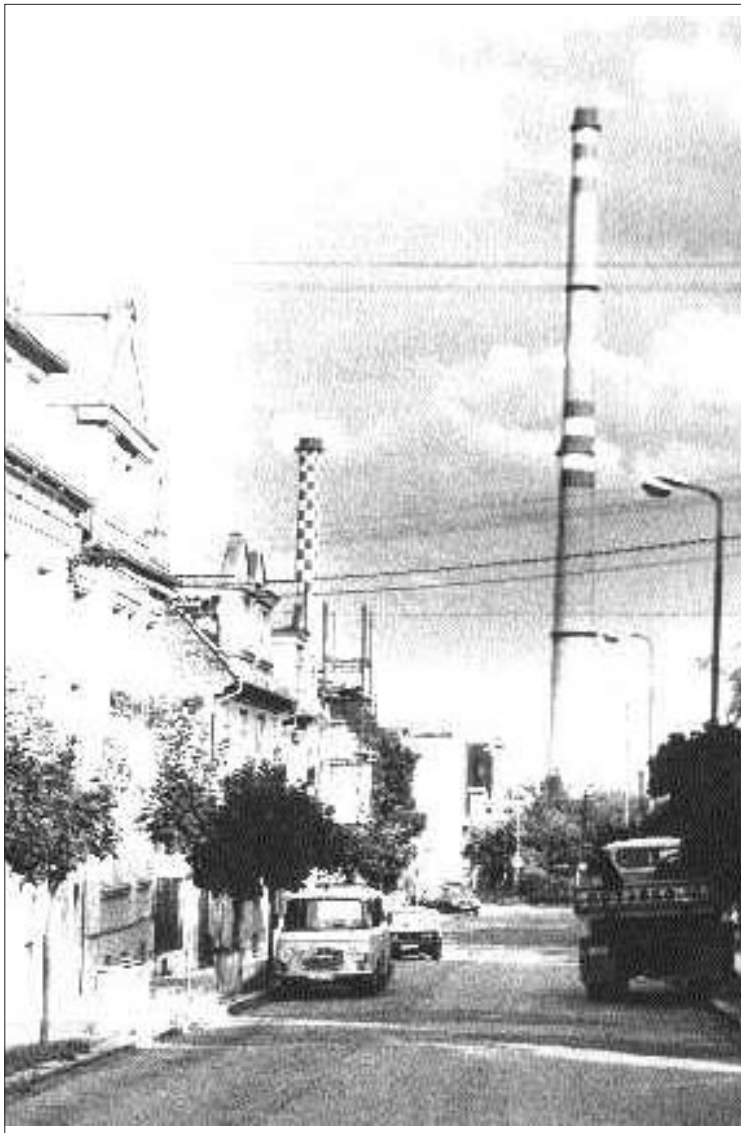
The expert group set up the following categories for assessment criteria:

- Direct environmental effects.
- Effects on mineral resources.
- Social effects.
- Economic effects.

The outcome in each case is easily predictable. Variant A would produce the worst effect on the environment; only Variant C would be environmentally friendly. Variant C would on the other hand be the most expensive, and Variant A the least (ignoring in each case certain costs that are difficult to calculate). Variant C would require 5.6 billion Czech crowns per annum in govern-

ment subsidies for energy efficiency and renewables. Although that may seem an enormous sum, in fact much higher subsidies are already being paid for energy.

The rapid exploitation of domestic fossil fuels is the main fault of Variant A. The chief problem with Variant C is that there has been little experience anywhere of public reaction to rapid restructuring of the energy sector – even though it may be economically beneficial to the individual. While Variant B may seem



logical Landscape Limits which were set by the Czech Government to protect towns and villages from the ravages of brown-coal mining. It also relies on completion and start-up of the Temelin nuclear power plant by the year 2000.

**VARIANT B** also proposes a prolonged mass use of non-renewable energy, again mostly coal and nuclear. A growth in the use of energy is also anticipated, although less than in Variant A. It differs however from Variant A in that it makes



to lie halfway between A and C, actually it is much closer to Variant A.

The effects both of A and B on the environment would be unacceptable. Variant C, on the other hand, may be difficult to carry out. The suggested solution is to compensate for the disadvantages of A(B) by a series of measures to offset their negative effects on the environment.

The compensatory measures would take the form of government action to support energy efficiency and renewables, for example by

□ taking away the subsidies on fossil fuels, thus eliminating price distortion;

□ making legislative and structural changes to facilitate the development of a market for renewable energy (such as by liberalizing access to the electricity grid) and bringing about a more efficient use of energy in government properties, such as by allowing private financing of efficiency measures in government buildings.

A second round of public hearings on the preliminary SEA report took place in Prague, Brno, Ostrava, Ceske Budejovice, Duchcov, and Bozi Dar in May 1998. Lack of time prevented hearing being held throughout the Czech Republic. The places chosen varied in size, their environmental qualities, and social make-up.

As a result of those differences, a very complex set of opinions emerged in regard to energy policy, the proposed variants, and criteria for assessment of the effects. These were assembled by the consultants in a

final report, which emphasized that in future

□ public hearings must be held during the entire SEA process, not only after its completion;

□ several variants must be assessed;

□ the report must include compensation measures;

□ an SEA must be made while the policy is being prepared, so as to ensure that its findings will be incorporated in the policy.

It is intended that the experience gained so far shall be used in future SEAs, and applied in the near future to policies both for transportation, and mineral resources as well.

ALES KUTAK

Energy Efficiency Programme, Kratka 26, 100 00 Praha 10, Czech Republic. E-mail: ales.kutak@ecn.cz

## Czech nuclear move

The Czech government decided on May 13 to complete construction of the controversial nuclear power plant at Temelin in southern Bohemia. The government in neighbouring Austria, where there is no nuclear power, has made numerous attempts to persuade the Czech authorities to abandon the project. The Austrian chancellor, Viktor Klima, opines that the case could well lead to a reconsideration of the Czech Republic's candidacy for membership of the EU. In a recent resolution the EU expressed concern that Temelin could be a major safety hazard and urged the Czech government to consider alternatives.

Green Horizon. May 13, Ny Teknik. May 17, 1999.

## Swiss ammonia

IN 1990 the emissions of ammonia in Switzerland were running at 60,000 tons a year. A reduction in 30-40 per cent is the most that is estimated to be technically feasible, but even that could not be attained without a reduction in the number of farm animals. Without such a reduction it would often cost more to carry out the technically feasible measures.

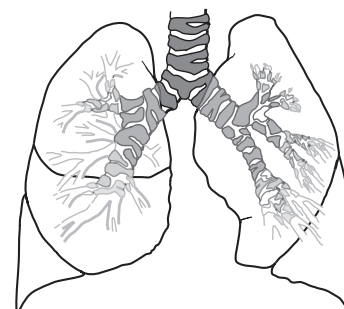
The greatest potential for improvement lies in changes in the way of spreading manure and in the composition of the animal feed. A 20-per-cent reduction of emissions could be brought about by the former, and 10 per cent by the latter. No noticeable reduction could be obtained by altering the construction of cowsheds and pigsties, nor by the manner of storing manure, since the present method, with covered slurry

storage, is just about the best possible from the point of view of controlling emissions.

Current Swiss agricultural policy is expected, with the assistance of technical improvements, to result in a reduction of ammonia emissions by 10-15 per cent by 2002, as compared with 1994. If the aim were to be a 20-per-cent reduction, the average cost would be SFr 4 per kilogram nitrogen, and SFr 6 if the aim was a 30-per-cent reduction.

The report, **Ammonia emissions in Switzerland. Present situation, development, technical and economic assessment of abatement measures, recommendations** can be obtained from the Institute of Environmental Protection and Agriculture (IUL) Liebefeld, CH-3003 Bern, Switzerland. E-mail: harald.menzi@iul.admin.ch.

## IN BRIEF



## Causing lung cancer, asthma

A study of 6000 non-smoking Seventh-Day Adventists in California, which has been going on since 1977, has revealed a connection between ozone and lung cancer. It has also shown that ozone can cause asthma.

As regards lung cancer, there was found to be a marked correlation with ozone when men were exposed to concentrations down to 80 ppb. The researchers thought the fact that it cannot be proved in women is due to men being outdoors twice as long as women during the summer months, when concentrations are high, and also because women are protected by oestrogen hormones.

Excess lung cancer was also found at levels below the 50  $\mu\text{g}/\text{m}^3$  annual mean  $\text{PM}_{10}$  level, and sulphur dioxide was also found to cause cancer.

It was already known that ozone and other air pollutants could lead to intensified attacks of asthma in people already suffering from the disease. What is new is that ozone can also cause fresh cases. Cumulative exposure is thought by the researchers to be significant, since even low concentrations can have an effect if continued for a long time.

Source: **Air Quality Management**. May 1999. The lung-cancer study appeared in *Environmental Health Perspectives*, vol. 106, No. 12, December 1998, the asthma study in *Environmental Research*, section A, vol. 80, pp. 110-121, 1999.

## Awards to film on acidification

At a Swedish festival for commercial films and interactive media, "Sex, Sulphur and a Fishy Business" received the award for the best manuscript. "A difficult subject treated in a disrespectful and unconventional manner," was the jury's verdict. The Swedish NGO Secretariat on Acid Rain was one of the film's backers. After a first showing in May, it received two silver and two bronze awards at the US International Film and Video Festival in Chicago that same summer.

Single copies of the film in video format is distributed free of charge within Europe. Please contact the Secretariat.



## Recent publications

### Renewable energy in the EU (1999)

An examination of technologies and policies relating to the development of renewable energy in the European Union and its member states. For each country the report provides an overview of the energy sector, past and present energy policies, the potential for renewables, etc.

£595.00. Available from FT Energy, Maple House, 149 Tottenham Court Rd, London W1P 9LL, England. Internet: [www.ftenergy.com](http://www.ftenergy.com).

### EEB Industry Handbook (1999)

Edited by C. Hey and K. Taschner. A critical evaluation of the EU legislation on industry and the environment.

160 pp. Can be ordered from EEB, Bd de Waterloo 34, 1000 Brussels, Belgium. E-mail: [eeb@eeb.org](mailto:eeb@eeb.org).

### Environment and European Enlargement: Air emissions (1999)

By J. Cofala, R. Kurz and M. Amann, IIASA. An attempt to determine the extent to which the expansion of the EU will affect air quality in Europe. Commissioned by the European Environment Agency and reviewed in AN 1/98.

97 pp. 7.00 euros. Published by the Office for Official Publications of the EC, 2985 Luxembourg. Available from local agents for the EU publications.

### Tropospheric ozone in the European Union. The consolidated report (1999)

A review of ozone measurements in the EU, showing how the thresholds for avoidance of adverse effects are regularly being overstepped – and often excessively – throughout the EU. This is the first evaluation of the EU monitoring program for ozone, started as a result of the ozone directive of 1992 (92/72/EEC). Covers the period from 1994 to 1996.

74 pp. 10.00 euros. Published by the Office for Official Publications of the EC, 2985 Luxembourg. Available from local agents for the EU publications.

### China Environment Yearbook 1998

300 pp. US\$165.50. Obtainable from Hans Consultants Inc., 19-1-3, East Section, Xiaohongshan, Wuchang, Wuhan, Hubei 430071, China. E-mail: [hanco@earthling.net](mailto:hanco@earthling.net).

### OECD Environmental Performance Reviews: Czech Republic and Denmark

The OECD makes regular analyses of the state of the environment and environmental policy in its member countries. These two came out in April. Czech Republic. 204 pp. Denmark April 1999.

224 pp. 180.00 francs. Can be ordered from OECD, 2 rue André Pascal, 75775 Paris Cedex 16, France. E-mail: [order@oecd.org](mailto:order@oecd.org). Internet: [www.oecd.org](http://www.oecd.org).

# Acidification process is still going on

Will only cease when acidifying depositions have been brought down to levels where the critical loads are not being exceeded.

Although the depositions of acidifying substances have greatly decreased during the last decade, forest soils in Sweden are becoming ever more acidified – as shown by a comparison of the situation today with that ten years ago, made by Christer Kalén, plant ecologist at the University of Lund.

The trend of soil acidification had previously only been studied on separate plots. This is the first time it has been done for a whole area of the country. The basic information has come from the nationwide survey of forest stands conducted by the Swedish University of Agricultural Sciences. Figures for the degree of acidification (the pH value) for 1983-85 and 1993-95 from 1453 sample plots in South Sweden were fed into a computer model, enabling a calculation to be made of the situation on all forest land in that part of the country.

As can be seen from the figure, the area of forest land in southern Sweden where the pH value of the mineral soil was less than 5.0 had increased from 4 to 6 billion hectares – in other words, from 50 to 75 per cent of the total area covered by the survey. The value of 5.0 has been taken as a limit to distinguish the acidification caused by human activity. When the pH value drops below 5.0, there will also be an increased risk of reduced growth, mainly because of a reduced availability of nutrients.

That soil acidification should continue to increase, despite reduced depositions, is not so odd as it may seem. The process will only cease when the additions of acid can be completely neutralized by the soil (mainly through weathering). This will only happen when the depositions of acidifying substances have been brought down to such levels that the critical loads for acidification are not being exceeded.

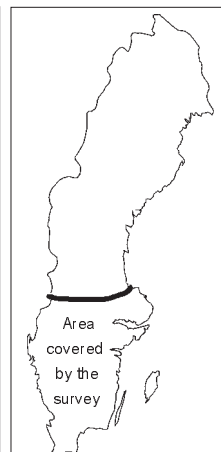
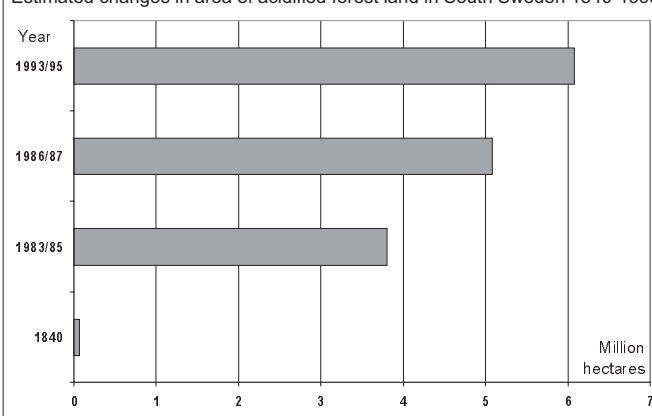
The cost will be high if soil acidification is allowed to go on. The annual value of forest increment in Sweden is estimated to be SKr 30 billion (timber value only), and the net value of Swedish exports of forest products to be at least twice that figure. Thus even a small decline in forest growth will result in considerable financial loss. There are also aspects that cannot be assessed in terms of money, such as the possible loss of recreational facilities and biological diversity.

The National Board of Forestry, which commissioned the special survey, thinks delaying tactics, such as liming, will have to continue so long as there is an insufficient reduction of the emissions of air pollutants.

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Further reading: **Forests, Acidification and the Socio-Economic Cost – Estimating Damage and Mitigation Cost of Forest Soil Acidification.** By C. Kalén. Published by National Board of Forestry, 551 83 Jönköping, Sweden. Internet: [www.svo.se](http://www.svo.se).

Estimated changes in area of acidified forest land in South Sweden 1840-1995





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## SOIL AND WATER

# What hopes for recovery?

WHAT HAPPENS to soil and water when acid depositions lessen? Early in the nineties some scientists at the Swedish Environmental Research Institute (IVL) decided to try and find out by roofing over a whole area of runoff at Gårdsjön, near the coast in West Sweden.

The precipitation and drop from the trees are caught by the roof, covering 6300 sq. metres, and a corresponding amount of almost clean water is spread over the area by a sprinkler system – thus reducing the acid falling on the ground by 95 per cent. The acid in this artificial fallout is no more than the soil is naturally able to neutralize. In other words, it is below the critical level – as it must be if a complete recovery is to take place.

Using information from the Gårdsjön roof-over together with measurements of the deposition at some twenty places in southern Sweden, the IVL scientists have used a mathematical model for forecasting developments in southern Sweden during the next few decades. In this they are building on the assumption that acid depositions will drop by 80 per cent, from what they were

at the beginning of the eighties, as a result of current international agreements.

With that scenario the model indicates some improvement for all types of soil in the short term, followed however by a very slow change

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*Reasonable to conclude that liming lakes and streams will have to be kept up*

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thereafter. In many places the soil will still not have recovered even after a hundred years. Only the soils with good capabilities will be able to build up a resistance to depositions of acid.

The worst-off soils, with extensive acidification, will need emission reductions away beyond those now agreed upon. Even with huge cuts it will take long time to repair the damage from a lengthy period of acid fallout. Along Sweden's west coast it may take many decades, all depending on the composition and depth of the soil. In other parts of

the country, where acid depositions have been lower, it may take less time.

Some significant changes are on the other hand seen to have taken place under the Gårdsjön roof. Only a few years after its installation a distinct drop could be noted in the outflow of sulphur and aluminium compounds to the surface waters. The pH value of the runoff remained however unchanged and its content of base cations was still low. While that indicates a degree of recovery in the soil, it also means that the situation is still critical for surface-water organisms – since most of the water in the surrounding lakes will have passed through the soil.

It is thus reasonable to conclude that the liming of lakes and streams will have to be kept up for several decades after acid depositions have come down under the critical loads.

PER ELVINGSON

Further reading: **Geochemical modelling of acidification and recovery in forest soils and runoff waters.** F. Moldan, O. Westling and J. Munthe. Report B 1323, 1999. Obtainable from IVL, Box 470 86, 402 58 Göteborg, Sweden. Internet: [www.ivl.se](http://www.ivl.se).

# Stuck with a polluting fuel

No way for Estonia to stop burning oil shale, but the environmental cost is high

In Estonia, the energy sector and oil shale are like Siamese twins – next to impossible to separate. While it might seem a gift to have an indigenous fuel that is sufficient to cover almost the whole of the country's needs for power production, oil shale is also responsible for many serious environmental problems.

Oil shale is a low-grade type of fossil fuel that is rather uniformly spread over the world. The Estonian deposits are considered to be one of the most easily exploited of any. Around 90 per cent of the oil shale that is mined in Estonia is used for generating electricity, although petrol, oil and some chemical products are also made from it. But the importance of oil shale in power production is actually greater: 99 per cent of Estonian electricity is generated in big thermal stations that are fired with it.

After peaking at 31 million tons in 1980, the mining of oil shale has now stabilized at 15-16 million tons. Around 12 million tons are used for power generation, and 2.5 million for producing oil and some derivatives. A small part, 0.4 million tons, goes to the making of cement.

Considered as a fuel, the Estonian oil shale has a high content of mineral matter (60-70 per cent) and a moderate moisture content (11-13 per cent). The calorific value varies between 2.3 to 2.5 kWh/kg. The sulphur content is about 1.5 per cent, but the ash is also environmentally hazardous, since it contains a residue of heavy metals and other polluting substances.

The exploitable deposits lie in northeastern Estonia, between Kiviõli and the Narva River. The production of electricity from oil shale is also located in the northeast, at the Eesti and Balti thermal plants, near the Russian border. These plants are old and the efficiency is low – no more than 25 per cent, with a tendency to fall even from that figure.

Although the price of oil shale has increased fivefold in the course of the nineties, it still fails to reflect the real cost of production. Nevertheless electricity produced from oil



BALTI POWER PLANT. PHOTO BY EESTI ENERGIJA

shale is more expensive than that generated from other types of fossil fuel. The reason for it being used to

such an extent in Estonia is partly political, since oil shale is a source of livelihood for many people in the northeastern corner of the country. A rise in the price of oil shale would have a great effect on the Estonian economy.

But unfortunately the environmental cost of burning oil shale is very high. Air pollution from the Balti-Eesti complex seriously affects not only to the environment in Estonia but also the quality of the air in neighbouring countries as well. While they are decreasing, the emissions of air pollutants from the oil shale-fired power stations in Estonia are still rather high (see table).

A two-stage system, with cyclones and electric precipitators, is used to deal with the high content of fly ash

Emissions of air pollutants from the Eesti and Balti power plants. Ktons.

Year	Eesti		Balti	
	SO <sub>2</sub>	NO <sub>x</sub>	SO <sub>2</sub>	NO <sub>x</sub>
1990	66.0	6.8	58.7	5.3
1991	59.2	5.7	89.8	6.2
1993	43.4	4.0	53.6	3.6
1994	46.7	5.3	51.1	3.5
1995	41.8	6.1	32.5	3.5
1996	37.7	6.5	40.6	3.8
1997	38.1	5.9	36.5	3.7

Source: Estonian Environment 1991-1997.  
Estonian Environmental Information Centre.



in the flue gases, which are discharged into the atmosphere through four 150m-high stacks and two 180m-high ones at Balti, and two 250m-high at Eesti.

The amount of power produced has fallen off slightly in the last few years, and so have the emissions of air pollutants. The emissions of SO<sub>2</sub> depend on the rate of desulphurization in the firing process. While that varies, it is nevertheless important for keeping down the emissions to the atmosphere. At present the concentration of SO<sub>2</sub> in the flue gases varies between 500 and 3000 mg/m<sup>3</sup>. The formation of nitrogen oxides during combustion is on the other hand rather stable – with an average concentration within the limit value of 200 mg/m<sup>3</sup> (432 mg/kWh) of NO<sub>2</sub>.

Despite the self-desulphurizing capability of oil shale fuel, the emissions of sulphur dioxide have always been considerable – causing a bilateral agreement to be signed with Finland in July 1993. This called for a 50-per-cent reduction of sulphur emissions by 1997, and 80 per cent by 2005. A desulphurization unit for

the flue gas was installed at the Eesti plant, but ran into problems from the start, on account of clogging by sticky volatile particles in the ash. Electric filters from ABB have on the other hand functioned well.

At present there is no way for Estonia to stop using oil shale as a source of energy, although burning it is far from being the best way to utilize this natural resource. What Estonia needs is a well-balanced policy to make possible a switch to the use of local renewable sources of energy .

TÕNU LAUSMAA

Re-En Center TAASEN, 3 Tööstuse, 0004 Tallinn, Estonia. E-mail: tlausmaa@teleport.ee

## No stopping

The US concern NRG Energy, which is bidding for the state-owned Balti and Eesti power plants, intends to continue burning oil shale in them for the next 15-20 years, according to Hillar Lauri of NRG in Estonia. He denies rumours that it might be prepared to switch to natural gas from Russia.

Source: Baltic Times, January 14-20, 1999.

## ACIDIFICATION

# Dutch study illustrates both local and general effects

THE FINAL REPORT on the extensive research into acidification that has recently been carried out in the Netherlands gives a good illustration of the problem in general and the way it affects the Netherlands in particular.

□ Between 1980 and 1993 acid depositions dropped by 40 per cent in the Netherlands. The country imports rather more airborne sulphur than it exports, but the reverse is the case with nitrogen oxides and ammonia, where exports are much greater than imports.

□ Depositions of nitrogen average 30-40 kg per hectare a year on open country, and 50-60 kg on forest land.

□ Sulphur accounts for 36 per cent of the potentially acidifying substances in the fallout over the Netherlands, nitrogen oxides and ammonia for 17 and 47 per cent. But on an average 80 per cent of the nitrogen compounds is either taken up by the vegetation or bound up in the soil, thus neutralizing its acidifying effect. Consequently sulphur accounts on an average for two-

thirds of the actual acidification, the rest coming from compounds of nitrogen.

□ Despite reduced depositions, the critical limits are still being greatly exceeded for eutrophication as well as acidification. In forest ecosystems the effects of depositions of atmospheric nitrogen constitute almost as great a problem as acidification.

□ Nitrogen addition is a threat to biological diversity in heathlands and chalk grasslands – a threat that also affects ecosystems in reserves and other protected areas. As a result of heavy nitrogen depositions, grass instead of heather and other heath plants has become the dominant growth on a third of the country's former heathlands.

*For the full story:*

**Acid Atmospheric Deposition and its Effects on Terrestrial Ecosystems in the Netherlands.** Edited by G.J. Heij and J.W. Erisman. Studies in Environmental Science 69 (1997). 716 pp. 450 guilders. Published by Elsevier, P.O. Box 221, 1000 AE Amsterdam, The Netherlands. Internet: www.elsevier.nl.

## Further publications

### Adverse Health Effects Due to Soil and Water Acidification (1998)

Summary of a Swedish research project entitled *Health risks in conjunction with the acidification of soil and water* (described in Acid News 3/97). Available from the Swedish Environmental Protection Agency, 106 48 Stockholm, Sweden. E-mail: kundtjanst@environ.se.

### AMAP Assessment Report: Arctic Pollution Issues (1999)

Treats a wide range of environmental problems, including acidification, affecting the Arctic region. 860 pp. Published by Arctic Monitoring and Assessment Program (AMAP), P.O. Box 1800 Dep, N-0032 Oslo, Norway. Internet: www.grida.no/amap.

### Disturbance of the Nitrogen Cycle (1998)

Edited by T.A. Mansfield, K.W.T. Goulding and L.J. Sheppard. Proceedings of a symposium held in 1997, reprinted from *New Phytologist* 139, 1998. Unfolds the effects of human disturbance of the nitrogen cycle in the way of eutrophication, acidification, and the formation of ground-level ozone, etc.

234 pp. Published by Cambridge University Press, The Edinburgh Building, Cambridge CB2 2RU, England.

### Response to the European Commission report on the implementation of the Trans-European Transport Network Guidelines and Priorities for the Future (1999)

The European Federation for Transport and Environment (T&E) has in this report gathered together its views on the principles that should govern the development of the trans-European networks for transportation.

Report 99/3. Available from T&E, Bd de Waterloo 34, 1000 Brussels, Belgium. E-mail: t+e@arcadis.be.

### Response to the European Commission White Paper on Fair Payment for Infrastructure Use (1999)

T&E welcomed last summer's white paper (see AN 3/98, p.3) as an important initiative, but criticizes the over-concentration on the transportation of goods and the lengthy process for making freight carrying pay its full costs.

Report 99/4. Available from T&E, address as above.

### Response to the European Commission on the Common Transport Policy – Perspectives for the Future (1999)

The Commission's document envisaging future developments in the transport sector, in light of the Amsterdam Treaty and the Kyoto protocol is criticized by the T&E on the grounds that it fails to take proper consideration of environmental goals. Report 99/5. Available from T&E, address as above.

## Panel warns on effects of aviation

### Away from the roads

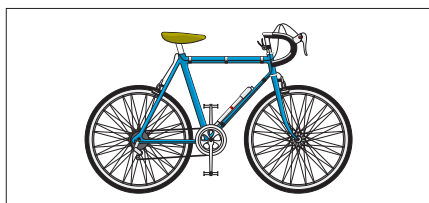
In April the T&E started, in company with Swiss environmentalist organizations, a campaign under the title of "Freight: From Road to Rail." The aim was to gather and disseminate information about the possibilities of switching freight carrying over from road to the railways. "Almost everybody in the transport debate recognizes the need to switch as much freight as possible from road to rail," said Matthias Zimmermann, the Swiss chairman of the T&E, when introducing the campaign. "But there is still a lot of doubt about how to do it."

T&E Bulletin. No. 76. March 1999.

### German energy tax

On April 1, as part of a "green" tax reform, German taxes on energy were increased by 0.01 euros (2 pfennigs) per kilowatt-hour of electricity, 0.03 euros per litre of petrol, 0.02 euros per litre of heating oil, and 0.002 euros per kilowatt-hour for natural gas. All manufacturing industries, as well as agricultural and forestry businesses, will pay only 20 per cent of the standard rate, and be eligible for a rebate if they continue to pay much more in energy taxes than they save from lower social security contributions. Cogeneration plants and electricity from small renewable energy sources are exempted.

Environment Watch: Western Europe, April 2, 1999.



### Get on your bike

There is good evidence that, if the sedentary population spent half an hour per day cycling or walking, the prevalence of heart disease, obesity and diabetes would be halved. A few countries – such as Switzerland, the United Kingdom, the Netherlands, Denmark, and Norway – have national strategies to promote this mode of transportation, but even in the Netherlands only 1 per cent of the population take daily cycling trips, and in the United Kingdom 0.1 per cent. Most countries take no account at all of walking and cycling in their transport and planning policies, and some countries do not even regard them as modes of transportation.

Press release prior to the Third Ministerial Conference on Environment and Health, London, June 16–18 1999.

THE Intergovernmental Panel on Climate Change (IPCC) has made a study<sup>1</sup> of the probable effects of aircraft operation on climate during the next half-century. It concludes that with the expected growth in traffic of 3.1 per cent a year, by 2050 the yearly emissions of carbon dioxide from aircraft would amount to 400 million tons, or some 3 per cent of the total global emissions at that time. But under other scenarios of potential growth, aircraft emissions might be anything from 230 to 1450 million tons a year by 2050. There would moreover also be an increase in the emissions of nitrogen oxides, resulting in increased concentrations of tropospheric ozone and depletion in the stratosphere.

In view of these and other factors, the Panel forecasts almost a quadrupling, under the reference scenario, of aviation's contribution to radiative forcing – the amount of incoming radiation absorbed by various greenhouse gases – by 2050. That would be about 5 per cent of the total radiative forcing projected for that year from all human activity. If the growth in traffic should be greater than assumed in the scenario, the contribution would doubtless also be greater.

The range of measures that the IPCC puts forward for consideration by governments includes charges and levies on aviation, improvements in air-traffic management, better engine technology, and substituting

rail travel for short-distance trips by air. The Panel makes clear however that the reference scenario has already taken into account the improvements in fuel efficiency that can be expected, leaving limited scope for further progress during the period under study.

The IPCC says there would not appear to be any practical alternatives to kerosene-based jet fuels for commercial aircraft for the next several decades, although in the longer term alternative fuels such as hydrogen might become viable. While the use of hydrogen would eliminate the emissions of CO<sub>2</sub> from aircraft, it would on the other hand increase those of water vapour, which is also a greenhouse gas. But the overall environmental effect of hydrogen and other alternative fuels will need to be analyzed in more detail, it says.

The emissions of greenhouse gases from international air traffic are not included in the agreement to reduce emissions under the Kyoto Protocol, among the reasons being the inability of the negotiators to agree on the way the emissions were to be distributed nationally.

<sup>1</sup> **Aviation and the Global Atmosphere.** The Summary for Policymakers will be available shortly on IPCC's website at [www.ipcc.ch](http://www.ipcc.ch). Printed copies can be obtained from the IPCC Secretariat, 41 Av. Giuseppe-Motta, CP 2300, 1211 Geneva 2, Switzerland. Fax: +41 22 733 1270. The full report will be published by Cambridge University Press in June.

### Soaring on subsidies

European airlines are in effect being subsidized to the tune of 45 billion euros a year through tax exemptions as well as direct subsidies, according to a study by Friends of the Earth Europe. There is for instance no duty on aviation kerosene, nor any account taken of external costs of air transportation (for noise and effects on the environment). These items alone would add up to 17 plus 16 billion euros a year.

The study questions whether air transportation is the motor of our economies and the huge job creator it is supposed to be. It maintains that the great expansion of civil aviation can be largely put down to financial favours, and that its economic utility is greatly overestimated. Civil aviation only accounts for 1 per

cent of Europe's GDP and employs a mere 0.2 per cent of its working population. But ways in which environmental charges could be applied are also studied.

*The Myths of Flying: putting aviation's economic benefits into perspective* can be obtained from Friends of the Earth Netherlands, P.O. Box 19199, 1000 GD Amsterdam, The Netherlands. Internet: [www.milieudefensie.nl/airtravel](http://www.milieudefensie.nl/airtravel).

### Different in Norway

Since last January Norway has been slapping a CO<sub>2</sub> tax of NKr 0.26 per litre on jet fuel – but only for domestic flights. It had to give way to the claims of international carriers that such a tax violated international agreements exempting aviation from national taxation.

Hotspot No. 6, March 1999.



## ENVIRONMENTAL STANDARDS

# The costs of compliance

Recent study examines industry's claims to see whether they have been valid or not

It is often suspected that the arguments put forward by industry in regard to the cost of compliance with environmental laws tend to overstate the case – that the real costs will be much less than has been claimed. The Stockholm Environment Institute (SEI) has now made a study<sup>1</sup> to see whether or not this is so. From a number of possibilities it has selected five examples of regulation, where in addition to the matter of costs, the tactics employed by industry to avoid or reduce the consequences of regulation have also been examined.

These were the examples selected:

- The protocols under the Convention on Long Range Transboundary Air Pollution and the EU Directive 88/609/EEC of 1988 on Large Combustion Plants.
- The EU Directive 91/441/EEC on Vehicle Emission Standards (Euro I Standards and catalytic converters on cars).
- The EU Auto-Oil Programme.
- The United States Clean Air Act.
- The Montreal Protocol on substances that deplete the ozone layer.

Typical arguments used by industry when faced with proposals for regulation are, according to the SEI:

The proposed policy will fail to yield the anticipated environmental benefits. The environmental goal

may be valid, but the proposed instrument is economically inefficient because it imposes unnecessary costs.

The proposed instrument will make particular sections of industry less competitive or disadvantage industry as a whole compared with other countries or regions.

Employment opportunities will be adversely affected.

There is a lack of high-quality scientific evidence linking cause and effect, and hence the action demanded will be unlikely to yield the desired result.

Regulation conflicts with companies' interest in improving shareholders' equity.

It appears however from the SEI study that these are not the only arguments used, although basically it is still all a matter of costs. Many of the car makers, for instance, were against catalytic converters, proposing instead lean-burn engines as a solution. It was claimed that the effects of enforcing catalyzers would range from workforce cutbacks to extensive plant closures (in oil refining). There were even warnings, such as were used in the negotiations for phasing out CFCs, that "entire industries could fold," with ensuing "economic chaos."

The supposed lack of scientific evidence as to the effect of regula-

tion could also be used to claim that regulation was not needed, as in the negotiations for the US Clean Air Act. Thus, although cost is usually the main argument, it is by no means the only one employed.

Another conclusion of the SEI study is that the attitudes of the various stakeholders are never constant. It is rarely a simple matter, either, of government versus industry. "Industry" comprises many stakeholders, each of which may take up different positions during the negotiation process. In the negotiations on catalytic converters, for instance, the makers of luxury cars were more in favour than those of small, low-priced vehicles. On the question of the European Auto-Oil Programme, the automotive industry found itself in opposition to the refiners as to who was to pay the costs. The development of new engine technologies would have required higher-quality fuels with a low sulphur content, to which the oil industry was opposed.

In some cases governments and industry have taken the same attitude. During the initial stages of negotiation for the EU directive on large combustion plants, the British government sided with the power generators, using the cost as an ar-

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gument against regulation. In the lead-up to the Montreal Protocol, some of the manufacturers of CFCs changed their stance to the point where they were strongly urging a more stringent control of ozone-depleting substances – since they had in the meantime developed viable chemical alternatives which could give them a competitive advantage.

The SEI found comparisons of cost estimates in general to be difficult. Since cost can mean many different things, there are endless opportunities for differing interpretations of the cost of any regulation. This is a problem that can only be mitigated by adopting rigorous rules for comparative costing. It is all a matter of where the boundaries for the activity in question are to be drawn, what procedures are to be used for cost estimating and auditing, what discount, interest, and exchange rates are to apply (together with their likely changes), the external costs, and the form in which costs are to be presented.

Although cost data existed, in none of the examples studied could the pre- and post-regulation costs be properly compared. It was thus difficult to demonstrate, simply and unambiguously, that estimates made in advance of regulation usually come to more than the real cost. Nevertheless it does seem from the cases studied that industry's real cost of compliance is likely to be lower than predicted during negotiations. In short, industry may overestimate the cost and base its opposition on such estimates. But there is also some evidence that the real costs of compliance may sometimes have been reduced by developments that industry could not reasonably predict.

Nevertheless it is possible in some cases to compare the estimated costs with the real costs. This is when the strategies and technologies proposed in the negotiations have actually been carried out. One such case concerned the installation of FGD (flue-gas desulphurization) in Germany. Industry's claim that the investment costs would be twice as much as estimated by the German Environment Protection Agency was not borne out, the real cost coming close to EPA estimates. Industry's idea of the cost of reducing VOC emissions in the Netherlands was also about twice that of the country's Central Bureau of Statistics. Initial

estimates for the Auto-Oil Programme of the extra cost of producing petrol with a 30 ppm sulphur content were found to be 17



per cent too high, and for diesel, with 50 ppm sulphur, 55 per cent. The lower estimates aroused a much greater interest in fuel improvements, and strengthened the attitude of the European Parliament in this respect.

Some comparison was also possible in regard to the effects of the EU

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*Studies of the costs of implementing regulations seem surprisingly few*

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directive on vehicle emission standards, which forced the introduction of catalytic converters on petrol-driven cars. It is evident that here too industry's ideas of the costs were higher than they have in fact turned out to be.

Studies of the costs of implementing regulations seem however to be surprisingly few. There are in any case inherent difficulties in comparing industry's views of the costs and the actual ones. Estimates of the costs before and after compliance may not be directly comparable, because they only take account of unit costs, ignoring others such as the costs of installation.

Manufacturing scale can also upset comparison. The unit cost of producing is usually high to begin with, but falls at output increases. It seems from the case studies that

this failure to consider the economies of scale may often have been what led to industry's wrong estimates of compliance costs. Industry may also absorb some costs instead of passing them on to customers. This was one reason why it was difficult to discern the effect of catalytic converters on car prices.

Here are other reasons why comparison is not always simple:

The means for compliance eventually employed by industry turned out to be different from those for which costs had been discussed during negotiations.

The claims made by industry as to costs have been vague and un-specific, while those made by some stakeholders were based on packages of measures.

The costs proved to be less than supposed because the potential for improvements in technology and efficiency had not been foreseen.

The potential for innovation was also underestimated.

It seemed clear to the SEI researchers that industry was always ready to change its response to any proposed regulation, and could adopt a variety of solutions to enable it to comply. The strategy on which the supposed costs are based will not necessarily be the one adopted for compliance. This is just what happened in connection with the reduction of sulphur emissions in Britain. The supposed costs referred to the installation of FGD, but the eventual solution was a greatly extended use of natural gas for power production. That was however more for other reasons than to reduce the emissions of sulphur.

Compliance could also be made easier as a result of improvements in technology that had not been foreseen at the time of negotiation. The advanced catalyst technology that was apparently required to meet the Euro IV standards for cars had been estimated by the German Environment Protection Agency to cost at the most DM 200-350 per car. It was subsequently found that the standards could be met for even less (at the most DM 100) simply by fine-tuning existing technology instead of improving catalyzers. From the Auto-Oil study it appeared that some of the costs of the investment needed to meet stricter standards for motor fuels were offset in the Scandinavian refining industry by gains in efficiency as well as other benefits in the refining process. Greater availability of the supplies of sweet

crude oil also helped to keep down the costs, which may again not have been envisaged.

Industry's potential for innovation was often found to have been underestimated, with the result that the costs of compliance were in turn overestimated. Being difficult to foresee, reduced unit costs due to rapid technical innovation tend not to show up in industry's cost estimates. It is also difficult to determine which costs or benefits should in fact be ascribed to changed regulation – as was illustrated in the run-up to the Montreal Protocol. Pessimistic views as to the availability of replacements for CFCs, as well as to the potential for innovation, coloured assumptions of the costs of phasing out CFCs and other ozone-depleting substances (ODS).

The eventual development of the Protocol, followed by a rapid phase-out of the chief ODS, was a result of a remarkable response from industry. The initial resistance of some manufacturers to regulation became weakened by technical innovation, leading to the development of substitutes and alternative technical processes, which enabled the phase-out to proceed much faster than had been anticipated. Here industry played an unusually constructive role, although it was fortunate that the part of it losing its market for CFCs happened to be the same as that gaining new markets with HFCs and HCFCs in consequence of the protocol. The situation can of course be much more precarious if the regulated industries can find no compensation.

A conclusion of the SEI study is that some proposals for regulation may really impose burdens on industry, which will then oppose it. But industry has also come to recognize that environmental regulation does not necessarily mean increased costs, and can, if properly conceived, actually increase the competitiveness of well-run companies. While regulation cannot be guaranteed to generate innovation or lead to greater competitiveness or higher productivity in all companies, those that seize the opportunities will usually be gainers.

CHRISTER ÅGREN

<sup>1</sup> **Costs and strategies presented by industry during the negotiation of environmental regulations.** (1999) Prepared by the Stockholm Environment Institute for the Swedish Ministry of Environment. Available from SEI, Box 2142, S-10314 Stockholm, Sweden.

BRITAIN

# Shades of green in Brown's budget

THE MARCH BUDGET in Britain included a fair amount of proposals for tax shifts, one being to impose a tax on business energy use as from April 2001. This is calculated to bring in £1.75 billion a year and result in reducing the country's emissions of carbon dioxide by 1.5 million tons yearly by 2010. That would amount to a cut of 5 per cent from the 1990 level. The tax will fall on natural gas, coal, and electricity used by business, and also in farming and the public sector, but not on the producers of electricity or on transportation. As envisaged in the budget, it would be £0.002 per kWh for coal and gas, and £0.006 per kWh for electricity.

The idea is to compensate business for the effects of the tax, primarily by lowering employers' payroll taxes by 0.5 per cent, but also by using part of the revenue to promote schemes for improving energy use and for increasing the use of energy from renewable sources. Energy-intensive industries will be offered "significantly lower" tax rates if they make voluntary commitments to improving energy efficiency in their businesses.

There was also a proposal for lowering the excise duties on small

cars and increasing those on larger ones as well as light-duty vehicles. An idea for 2002 is, further, that taxes generally should be tied to the amounts of carbon dioxide emitted from vehicles. The special taxes on company cars would also be made to follow this rule. Further, the discount for long-distance driving in company cars will be abolished, and there are a number of proposals for ways of promoting non-car commuting. As has been usual each year, the tax rate on petrol and diesel fuel will be increased by 6 per cent over inflation, and the tax difference for low-sulphur diesel will now be widened.

The Conservative opposition has claimed that the budget proposals would increase the burden on business without producing any environmental improvements. Industry representatives were likewise sceptical, while the British environmentalists expressed general approval. Greenpeace, for instance, has called the budget proposals "welcome recognition that the protection of the climate requires a long-term signal to industry to change its ways."

Further information: UK finance ministry: [www.hm-treasury.gov.uk](http://www.hm-treasury.gov.uk).

## Standing firm

Faced with road blocks and general protest from the truckers' organizations, the British minister of transport has defended his government's decision to raise the tax on new 40-ton trucks as well as increasing that on diesel fuel. In reply to the assertion of a representative of the Road Haulage Association that it would mean a loss of 53,000 jobs, the minister referred to a recent investigation showing that the total costs to the transport companies were about a third lower in Britain than in France, Germany, and Italy – despite higher road charges and fuel taxes in Britain.

ENDS Daily, March 23, 1999.

## Has its effect

As a result of the steadily increased favouring of low-sulphur diesel in the British taxation system, diesel with a sulphur content of 50 ppm is expected soon to dominate the market in Britain – despite a long-standing claim that production would be inordinately ex-

pensive, if not physically impossible, for the refiners. But as has already been shown in Sweden and Finland, such results can be obtained through differentiated taxation (AN 4/98, p.6)

T&E Bulletin, No. 76, March 1999.

## Coal to the fore

The British government and coal industry predict a worldwide doubling of the use of coal for generating electricity by 2020. In April they presented a common research-and-development program, which is aimed at "improving the environmental acceptability of coal extraction, preparation, and use." This is estimated to cost £60 million, of which a fifth would be paid by the government, and the rest by industry.

Cleaner and more efficient methods for burning coal are held forth as a prerequisite for continued exports of technology, in particular to the potentially very large markets in China and India.

ENDS Daily, April 23, 1999.



UNITED STATES

# Standards both for cars and "gas"

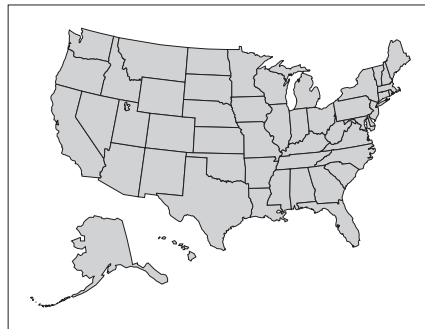
THE US Environmental Protection Agency is proposing to apply the same emissions standards to all cars and light-duty trucks, and also to set a much lower limit for sulphur content in petrol.

In recent years there has been a strong trend in the United States towards heavier vehicles for family use. People are choosing sport utility vans (SUVs), mini-vans, and other light-duty trucks to such an extent that these types now account for 50 per cent of all new-car sales, and their share appears likely to go on increasing.

At present the emissions standards are much less strict for light duty trucks than for ordinary cars – for nitrogen oxides they are ranging from 0.6 grams per mile (0.37 g/km) for cars to 1.53 gpm (0.95 g/km) for the heaviest SUVs and vans. The new standards – the same for all – would be 0.07 gpm (0.043 g/km) for NOx. That means a lowering of the limit by 77 per cent for cars and 95 per cent for trucks and SUVs. There will also be stricter limits for the emissions of carbon monoxide, hydrocarbons, and particulates. The EPA

estimates that the average cost of compliance would be \$100 per vehicle for cars and \$200 for SUVs.

The American standards would apply to all types of engine. The EU rules, both present and proposed, allow diesels to emit much more



than petrol-driven vehicles in the way of nitrogen oxides and particulates.

As regards petrol, the refiners will be required to have brought down the average sulphur content from the present 300 parts per million to 30 ppm by 2004. Small refiners would have an extra four years in which to comply, with some possibility of further extension. The EPA puts the cost at one to two cents per

gallon, or about \$12 to \$24 dollars a year for a car in normal use.

It is proposed to allow companies flexibility in meeting the standards, so as to enable them to do it cost-effectively. For example car makers would be permitted to let their output consist of vehicles emitting 0.00 to 0.2 grams NOx per mile, as long as the average for the whole range stayed at 0.07 gpm.

The new standards would be gradually phased in. Starting in 2004, 25 per cent of the new lighter vehicles would have to meet them, finishing at 100 per cent in 2007. Larger vehicles would have until 2009. There would also be a system of credits for early compliance.

The EPA claims that by using these market mechanisms, the cost to industry can be kept down and the air made cleaner more quickly – with an estimated saving of 2400 deaths, 3900 cases of chronic bronchitis, and tens of thousands of other respiratory trouble each year.

PER ELVINGSON

EPA's proposals can be read on internet at [www.epa.gov/oms/tr2home.htm](http://www.epa.gov/oms/tr2home.htm).

## Coming events

**Third Ministerial Conference on Environment & Health.** London, England, June 16-18, 1999. Ministerial Conference organized by World Health Organization. *Information:* WHO Europe, [www.who.dk/london99/](http://www.who.dk/london99/).

**Healthy Planet Forum.** London, England, June 15-18, 1999. A conference for non-governmental organizations, arranged as a parallel to the above-mentioned. Seminars, workshops, etc. *Information:* Healthy Planet Forum, UNED UK, 3 Whitehall Court, London SW1A 2EL, England. Internet: [www.oneworld.org/uned-uk/health.htm](http://www.oneworld.org/uned-uk/health.htm).

**Council of EU Environment Ministers.** Luxembourg, June 24-25, 1999.

**1999 Edberg Summer Course and Seminar.** Gdansk, Poland, June 21-July 1, 1999. Open for all students at universities and similar. *Information:* The Edberg Foundation, Karlstad University, 651 88 Karlstad, Sweden. Fax: +46-54-7001462. E-mail: [edbergfoundation@kau.se](mailto:edbergfoundation@kau.se)

**Air Pollution 99: The International Conference on Modeling, Monitoring, and Management of Air Pollution.** San Francisco, California, USA, July 27-29, 1999. *Information:* Air Pollution 99, Wessex Institute of Technology, Ashurst, Southampton, SO40 7AA, UK. Fax: +44 1703 292 853. E-mail: [wit@wessex.ac.uk](mailto:wit@wessex.ac.uk).

**Working Group on Strategies under the Convention on Long Range Transboundary Air Pollution.** Geneva, Switzerland. August 30-September 3, 1999.

**Urban Transport and the Environment for the 21st Century.** Rhodes, Greece, September 8-10, 1999. *Information:* Conference Secretariat, UT 99, Wessex Institute of Technology, Ashurst Lodge, Ashurst, Southampton, SO40 7AA, UK. Fax: +44 1703 292 853; E-mail: [sradford@wessex.ac.uk](mailto:sradford@wessex.ac.uk). Web site: [www.wessex.ac.uk/conferences/1999/ut99](http://www.wessex.ac.uk/conferences/1999/ut99).

**Fifth Conference of the Parties to the UN Framework Convention on Climate Change.** Amman, Jordan. October 25-November 5, 1999. *Information:* Climate Secretariat, P.O. Box 26 01 24, 53153 Bonn, Germany. Fax:

+49-228-8151999. Web site: [www.unfccc.de](http://www.unfccc.de). E-mail: [secretariat@unfccc.de](mailto:secretariat@unfccc.de).

**International Conference on Air Quality Management.** Brunei, November 15-19, 1999. *Information:* Dr. Miroslav Radojevic, Department of Chemistry, University of Brunei Darussalam, B.S.B. BE1410, Brunei Darussalam. E-mail: [miro@ubd.edu.bn](mailto:miro@ubd.edu.bn).

**Critical Loads.** A conference under the Convention on Long Range Transboundary Air Pollution. Copenhagen, Denmark, November 21-25, 1999. *Information:* [bt@dmu.dk](mailto:bt@dmu.dk) or [www.dmu.dk/critical\\_loads\\_copenhagen](http://www.dmu.dk/critical_loads_copenhagen).

**Executive Body for the Convention on Long Range Transboundary Air Pollution.** Göteborg, Sweden, November 29-December 3, 1999.

**Acid Rain 2000: 6th International Conference on Acidic Deposition.** Tsukuba, Japan, December 10-16, 2000. *Inquiries:* Acid Rain 2000, c/o International Communication Specialists, Sabo Kaikan-bekkan, 2-7-4, Hirakawacho, Chiyoda-ku, Tokyo 102-8646, Japan. E-mail: [acid2000@ics-inc.co.jp](mailto:acid2000@ics-inc.co.jp).