

Acid News

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BRITAIN

Road building revised

IN A RECENT "white paper" (in reality a largish volume)¹ the British government presented its plans for dealing with the country's transportation problems – mostly by curbing car use and slimming the need for transportation generally. A whole array of proposed measures includes a stop in principle to the building of new motorways, annually raising the tax on petrol and diesel fuel by 6 per cent over inflation, charges for travel on roads that are liable to congestion, and a special tax on company parking places in large cities.

"The country wants a better transport system which does not continue to damage our environment and people's health. Doing nothing is not an option. People want radical change and I am going to deliver it," declared John Prescott when pre-

sending the white paper on July 20. (Prescott is not only minister of transport but also environment minister and deputy prime minister.)

The ground for this new policy had actually been prepared by the former Tory government. In 1996 it had issued a "green paper," entitled *The Way Forward*, in which widespread car use was declared a serious threat, not only to the environment but also to the country's economy.

The first definite step was taken when vast plans for motorways were vigorously cut back. It was the Tories, too, that started the automatic annual increase in fuel taxes, first to 2 per cent and then to 5 per cent over inflation.

The now Labour government is continuing along the same lines.

Already in its first budget, last spring, it increased the annual rise in fuel taxes to 6 per cent above inflation. With an extra tax on diesel, Britain has now become the only country in the EU where diesel is more expensive than petrol.

A key measure in the government's policy will be to reduce the need for new roads – by better use of existing network, redirecting traffic, and favouring non-road modes of transportation.

"Our roadwork is largely complete," it says in the white paper. But a brake will have to be put on traffic growth if the system is to function effectively. Says Prescott: "No-one really believes that we can allow traffic growth to go unchecked when projections show that the growth of the motor vehicle is going

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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:

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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

The quicker, the better

HOW LONG will it take for the natural environment to recover from the damage caused by acidification? Does it really matter whether emissions are reduced by 70 or 80 per cent, or whether the reduction has been achieved by 2010 or 2015? Such questions are bound to be asked in the forthcoming negotiations for a super-NOx protocol under the Convention on Long Range Transboundary Air Pollution (see article, pp. 4-5). They will also come up within the European Union in connection with the proposed directive for national ceilings on emissions.

The effects of various emission scenarios can be simulated by using advanced computer models for so-called dynamic modelling. Although the idea is relatively new (the method is still in course of development), it has already produced useful results, and a number of emission scenarios have now been analyzed in an international project that has been coordinated by the Finnish Environment Institute.¹

One of its conclusions is that both the timing and the size of the reductions will determine the rate at which ecosystems will respond. In the short term, up to thirty years or so, it is the timing that is most important. The quicker the target levels for reduction are achieved, the more rapid will be the recovery of the chemical status of surface waters and soils. If the target year is postponed, accumulation of the depositions of acidifying substances will increase, thereby postponing recovery as well. It seems that delay in recovery will have the worst effect in places where the damage to surface waters (expressed as chemical change) is already greatest – that is, in Norway and Sweden.

In the longer term (more than thirty years) the size of the reductions is more important than their timing. A general conclusion of the report is that a stringent abatement strategy will yield a twofold advantage – resulting both in faster response in the ecosystems, and a better situation for the environment in a long-term perspective.

In the negotiations for the 1994 sulphur protocol, 2000 was aimed at for the target year. Because of the exceptional structural and eco-

nomic problems that the countries of central and eastern Europe were then facing, it was agreed that these countries could have a later target year, say 2005. But then it turned out, towards the end of the negotiations, that a number of countries would only sign the protocol if they, too, could postpone reductions – in some cases to 2005, in others to 2010. Several countries also wanted to reduce their emissions less than had been calculated to be necessary, at an earlier stage in the proceedings, for the achievement of environmental aims. Some countries did both – delayed the timing, and lowered requirements for reduction.

Because of these changes (inevitable perhaps in international bargaining), and because some countries refrained from signing the protocol, it became a much weaker document than had originally been aimed at. That is one reason why it would still be highly cost-effective, as well as absolutely necessary, to get the European emissions of sulphur down still further. There should therefore be a self-evident need to consider such reductions when negotiating the new super-NOx protocol.

Dynamic modelling has shown the importance of ensuring that the emission reductions to which countries commit themselves will both be sufficiently large and carried out quickly. Otherwise the damage to the environment will only be aggravated.

There can therefore be no grounds for attempts to postpone reductions of emissions by claiming that it is not precisely known how quickly the damage will decline. Postponement would not only be unwarranted but also irresponsible. We have neither the right to allow the damage to get worse, nor leave the solution to future generations. The motto for current negotiations should therefore be: The more and quicker the emissions are reduced, the better.

CHRISTER ÅGREN

¹*Integrated monitoring: Environmental assessment through model and empirical analysis* (1998). By M. Forsius et. al. Published by the Finnish Environment Institute, Helsinki, Finland.

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to be about 30 per cent in twenty years. That means to meet that demand I'd have to build a motorway equivalent from London and Leeds with 150 lanes on it. That is bad for our economy, bad for our health, and disastrous for our environment and that's why I believe people are ready to accept our radical approach."

All municipal bodies in Britain are to set up, in collaboration with citizen and business groups, local five-year plans to promote safety in transportation, as well as give better protection to the environment and provide greater accessibility – with a thought especially to children, the elderly, and handicapped persons.

There is to be a central authority, named the Commission for Integrated Transport, to see that the aims of the government's policy are actually carried out.

Among the economic instruments that are proposed is, as mentioned, the tax on company parking places – as a disincentive to commuting by car. Legislation has also been announced to make it possible for municipal governments to use road charges as a means of reducing congestion as well as discouraging car commuting. The income could be used to improve public transportation.

"The White Paper is an important step in the right direction – towards a society which depends on high-quality public transport rather than on car use. But it is not the Great Leap Forward we still need to see," declared Roger Higman of Friends of the Earth, add-

ing: "Plans for local authorities to fund and implement local transport strategies are very welcome. We hope to work with the best local councils to help set an example to the rest. Next, we need the Government to set clear targets for traffic reduction."

Finally it worth noting that the white paper is a set of principles. The details will come in a series of daughter documents, to be published this autumn. It means that the white paper cannot really be judged until all the daughter documents are available.

MAGNUS NILSSON

¹ *A New Deal for Transport*. Read more on internet: www.detr.gov.uk (UK Department of the Environment, Transport, and the Regions). The white paper is available from the DETR website as well as from H.M. Stationery Office. Price £16.50. Fax. +44-171 873 8200.

Overjoyed

A road-policy review, issued by the British government a few days after publication of the white paper, confirms that only 37 out of 147 roadbuilding projects that had been inherited from the previous conservative administration are to go ahead. Friends of the Earth, which has been campaigning for such a shift for more than ten years, is said to be "overjoyed." Although it remains critical of several of the remaining projects, it notes that dozens of wildlife sites will now be saved from destruction. By using the available resources for traffic management and improvement of public transportation the problems of congestion could, FoE contends, be better dealt with than by building more roads.

Further information on Internet: www.foe.co.uk (Friends of the Earth).

Making 'em pay what it costs

THE increasing volume of traffic is causing ever more congestion, environmental pressures, and accidents on European roads. Different charging systems are also creating huge competitive distortions between modes of transport, within individual modes, and between countries. In view of all this, the EU Commission has now issued a white paper,¹ in which it is proposing a new, harmonized approach to the way all commercial modes of transportation are to pay for use of the infrastructure. The Commission estimates that the savings from its proposals would amount to at least 50 billion euros a year.

The charges should, in the view of the Commission, reflect the marginal cost of using the infrastructure (that

is, the extra cost to the community of having one more vehicle on the road). The costs that are now invisible – for congestion, noise, pollution, accidents – should be taken into account.

The proposal is that the Commission should, as a first stage, in collaboration with experts from the member states, have agreed by the year 2000 on a system by which the marginal costs should be calculated. Then, between 2001 and 2004, the principles arrived at should be put into effect for roads, railways, ports, and airports. Some pieces of legislation, such as a proposal from the Commission for airport charges, are already under discussion.

¹ White Paper on Fair Payment for Infrastructure Use. COM(98)466.

ON THE FOLLOWING PAGES

Super-NOx protocol 4

Work is now proceeding on this protocol for counteracting the effects of nitrogen pollution: ground-level ozone, acidification, and eutrophication. Using new analyses from IIASA, negotiations for a protocol will start next January.

Climate and air quality 6-7

Agreement was reached in June as to how the EU countries are to share between themselves the commitments made at Kyoto. The environment ministers also agreed on new air-quality standards.

Vehicles and fuels 8

A compromise between the Council of Ministers and the EU Parliament, concerning emission limits for motor vehicles and quality standards for fuels, will in effect upstage proposals from the Auto Oil program.

Fuels' sulphur content 10

A controversy between North and South – with the southern EU members questioning even the need for a directive – led to later dates being set for limits to the sulphur content of liquid fuels, as well as more generous exceptions than the Commission has proposed.

Amended LCP directive 11

The EU Commission has finally put forward a proposal for amendment of the directive on large combustion plants.

Acidified lakes 12

A coordinated survey of the lakes in Scandinavia, Scotland, Wales, and north-west Russia has showed acidification everywhere, and particularly in Norway and Wales.

Environment for Europe 14

The conference at Aarhus in June was the third of a series of meetings of environment ministers from all the countries of Europe.

Emissions trading 15

An assessment of the first year of the US acid rain program has revealed not only overcompliance in 1995 but also that the costs of reduction would have been greater without emissions trading.

Eastern Canada 16

Even after fulfillment of the agreement between Canada and the US to reduce emissions of SO₂, a large area of eastern Canada will still be exposed to acid depositions in excess of the critical loads.

LRTAP CONVENTION

For a multi-pollutant protocol

FOR SOME YEARS preparations have been going on for a so-called super NOx protocol under the Convention on Long Range Transboundary Air Pollution, and last September the Working Group on Strategies – the negotiating body for the Convention – agreed on a timetable on which to proceed. It is to have four week-long sessions next year, the first in January and the last in early September. The aim is to have a protocol ready for signing before the end of 1999 – which would coincide with the 20th anniversary of the Convention.

There has been general agreement for several years that this new protocol should aim at counteracting several of the effects of nitrogen pollution: the formation of ground-level ozone, acidification, and eutrophication. To do so effectively it will need to cover not only nitrogen oxides but also volatile organic compounds and ammonia. But as acidification is one of the key problems, sulphur emissions will have to be considered too. It is still not settled however whether sulphur emissions could best be further reduced by including them in the new

protocol or by revising the sulphur protocol of 1994.

Like the 1994 sulphur protocol, the new super-NOx one will be based on the critical-loads principle. The essence of that approach is that emission reductions are negotiated according to the general effects of air pollution, rather than by exacting an equal percentage of reduction

from each country. The goal is to reduce the emissions in a cost-effective manner to levels where, ultimately, the critical loads will not be exceeded.¹

Parallel work

The negotiating for a super-NOx protocol is proceeding parallel to work within the EU for a new directive for national emission ceilings for the same four pollutants, applying to all fifteen member countries. This directive will lean on the acidification and ozone strategies (see AN 2/98, p. 5-8), and a proposal is expected from the Commission next March. Both sides have emphasized that they are aiming at compatibility and consistency between the two working processes – which should not be too difficult, since both use largely the same data base and depend on the same methodology as well as on the services of the same consultants – the International Institute for Applied Systems Analysis, IIASA.

A presentation of the analysis made for the EU's ozone strategy appeared in Acid News 2/98, where reference was also made to the

Ratified at last

The sixteenth country's ratification of the sulphur protocol under the Convention on Long Range Transboundary Air Pollution was received on May 7 – thus enabling it to come formally into effect on August 5. This protocol, which was signed in Oslo as far back as June 1994, prescribes the reductions of sulphur dioxide that various countries will have to make by 2000 and 2010. It is estimated that when all have fulfilled their commitments, in 2010, the European emissions of sulphur will have dropped by 60 per cent, from 1980 levels.

Which countries have signed, and which have ratified the protocol, can be seen on Internet: www.unece.org/env/protocol/94s_st.htm.

fourth interim report from the IIASA. In May a fifth interim report² came from that institute, extending the analysis to include acidification and eutrophication, as well as ozone. The geographical scope was moreover enlarged to cover the whole of Europe (not only the EU). Some of the input data for the modelling (such as data on emissions from individual countries and energy scenarios) was also updated.

A number of measures have also been taken for improving the quality and robustness of the analysis – some being in response to the EU Council Conclusions of December 1997 regarding the acidification strategy. Measures relating solely to the ozone problem, such as the so-called compensation mechanism, were reported in Acid News 2/98. Some changes have been made in regard to acidification and eutrophication, the most important being the adoption of a new methodology for gap-closure (see box).

The fifth interim report examines some new scenarios, including updated ones for the baseline – the reference scenario, REF – and for the maximum technically feasible reductions (MFR). There are new scenarios optimized for the AOT60 (health-related) and AOT40 (vege-

Table 1. Area and percentage of ecosystems not protected from acidification.

	1990		REF 2010		MFR 2010	
	1000 ha	per cent	1000 ha	per cent	1000 ha	per cent
EU 15	38,620	25	10,378	7	2,570	2
Non-EU	56,903	12	10,988	2	1,659	0
Europe	95,523	15	21,366	3	4,230	1

Table 2. Area and percentage of ecosystems not protected from eutrophication.

	1990		REF 2010		MFR 2010	
	1000 ha	per cent	1000 ha	per cent	1000 ha	per cent
EU 15	73,111	48	49,449	32	21,551	14
Non-EU	100,318	-	61,366	-	21,737	-
Europe	173,429	29	110,815	18	43,288	7

tation-related) ozone targets, and for acidification and eutrophication targets, respectively, and finally one jointly optimized for ozone, acidification, and eutrophication in a single scenario. It is important to bear in mind that the results of these scenarios must continue to be regarded as preliminary and illustrative, since the updating and revising of the input data is still going on.

As baseline, the IIASA has used the REF scenario, showing the expected levels of emissions in 2010

(on the assumption that already adopted national and international legislation, as well as other commitments, will be fully implemented). It serves as the starting point for optimizations, and also for calculating the additional costs for other scenarios. While in line with the methodology used in the EU for its acidification and ozone strategies, this differs somewhat from the approach taken so far within the Convention.

Acidification

It should be noted that the figures in Table 1, summarizing the latest information on the area of ecosystems that are not protected from acidification (where critical loads are being exceeded), are based on provisional critical-loads data from last May, which have since been slightly revised for some countries.

Using the accumulated-excess approach for gap closure in the acidification scenarios, it was found that when moving from 1990 emissions to MFR, the lowest attainable gap closure was about 90 per cent – although leaving out two sensitive grid squares in South Norway would bring the figure to 96 per cent.

From among several acidification scenarios that it investigated, the IIASA selected one as central. The target in this case was to be a 90-per-cent gap closure of the AAE (Average Accumulated Excess – see box for explanation), with an absolute ceiling for depositions of 170 acid equivalents per hectare. The two sensitive grid cells in South Norway were to be ignored. The emission reductions that would be needed to attain the target would

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Improving methodology

Whereas the gap-closure approach employed in the sulphur protocol of 1994 was based on depositions of sulphur in excess of the critical loads, that used in the EU acidification strategy refers to the area that will be protected. Since in the latter case optimization is aimed directly at the environmental quality target, this method is more transparent, and so easier to understand. In both cases however only a limited part of the information relating to the exceeding of critical loads is being used for optimization. Thus low critical-load values for single, even small ecosystems can have a considerable effect on optimization.

As a means of overcoming this difficulty, a new approach has been developed. Known as "accumulated excess," it was tried out for the latest IIASA report. It sums up all deposition in excess of the critical loads for all ecosystems in each of the map's grid cells, and expresses the sums as acid equivalents (aeq) per grid cell and year. The aim of gap closure will then be to reduce this accumulated excess. In order to make comparisons between grid cells, the accumulated excess can be divided by the ecosystem area of each cell, resulting in what is called

the *average accumulated excess (AAE)*, expressed as aeq/ha/yr.

Although the accumulated excess method for gap closure may prove to be an improvement in methodology, it can be somewhat misleading, since the high degree of gap closure it attains (90 per cent or more) can give the impression that a final solution of the problem is much closer than is actually the case. Even when gap closures well above 90 per cent are attained, there will still be large areas where the critical loads are being exceeded. It is consequently highly important, as each scenario is investigated, to show the resulting area protection country by country.

So as not to let optimization be unduly affected by extreme situations for which the model is not designed, a so-called "model-confidence" interval has been introduced. For acidification and eutrophication it was set at the natural background deposition plus 5 acid equivalents per hectare a year (aeq/ha/yr). Before optimization is done, that figure is added to the critical loads. When optimizing the ground-level ozone targets for AOT60, a model-confidence interval of 0.4 ppm-hours has been used.

Members agreed on burden sharing

But a comprehensive strategy for the EU as a block still has to be worked out

IT TOOK THREE DAYS for the EU environment ministers, when they met in June, to agree on how EU commitments under the climate convention were to be shared out among the member countries. In sum, the commitments now agreed upon, which will be legally binding, fulfill the promises made at Kyoto last December – namely to cut the emissions of a basket of six gases to 8 per cent below their 1990 levels by 2008-2012.

The table shows what the member countries have now agreed to, together with the provisional commitments each made prior to the Kyoto meeting – when a total emission reduction of 10 per cent between 1990 and 2010 was to be shared out among them (although under partially differing suppositions). Several countries will now have less demanding targets to meet, but those that were allowed to increase their emissions have all had the amounts cut down.

At the June meeting three countries – the Netherlands, Denmark, and Finland – took the attitude that the national commitments should only be enforceable if certain measure for the EU as a whole had first been adopted – battling for instance for an EU tax on energy. The idea failed however to gain the approval of a majority of the members, although strong support for “common and coordinated policies and measures” at the EU level was later expressed in a ministerial statement.

That statement sets out some common measures that the Council wishes the Commission to bring forward, with a view to making substantial progress on them before the EU ratifies the climate protocol. But because of objections by some member countries – notably Britain and Spain – the list did not include an EU tax on energy.

The Danes issued a declaration of their own, stating that they could manage a 17-per-cent reduction through national measures, but achieving their 21-per-cent commitment would require measures at the EU level.

It is worth noting that Germany, Britain, and Austria all have more

Final burden-sharing agreement
(percentage change from 1990 levels).

Country	Agreed target	Provisionally agreed in 1997
Belgium	-7.5	-10
Denmark	-21	-25
Germany	-21	-25
Greece	+25	+30
Spain	+15	+17
France	0	0
Ireland	+13	+15
Italy	-6.5	-7
Luxembourg	-28	-30
Netherlands	-6	-10
Austria	-13	-25
Portugal	+27	+40
Finland	0	0
Sweden	+4	+5
UK	-12.5	-10

far-reaching aims than those to which they are committed under the EU agreement. The Germans have said that they stand by their determination to reduce the most important gas in the basket – carbon dioxide – by 25 per cent be-

tween 1990 and 2005. Britain promises a 20-per-cent reduction from 1990 to 2010, as does Austria for the period 1988 to 2005. One could of course speculate on the reason for these divergences, but it is not unlikely that these countries will want to use their “surpluses” for emissions trading with others that may have difficulty in meeting their targets.

During the coming spring the Commission is to develop a more comprehensive strategy for attacking the climate problem, taking account of the member countries’ national strategies and the outcome of the next conference of the parties under the climate convention in November (see below).

PER ELVINGSON

Sources: **Environment Watch: Western Europe**, June 19, 1998. **Official Communiqué from the Council Meeting**, June 17, 1998. The latter can be found at the Council’s website: <http://ue.eu.int/newsroom>.

Read more about the Kyoto agreement in *Acid News* 1/98, p.4.

CLIMATE CONVENTION

Little progress in Bonn

AT THE MEETING of the subsidiary bodies to the UN climate convention this June, little progress was made towards resolving open issues in the Kyoto protocol. Although emissions trading, the further definition of carbon “sinks,” and the participation of developing countries dominated the proceedings, decisions on these and other issues were for the most part postponed until the next conference of the parties to the convention, November 2-13, in Buenos Aires.

The EU countries, with the support of others from central and eastern Europe, are said to have striven for a ceiling to put a limit to the extent to which countries’ commitments could be met by the use of “flexible mechanisms,” such as emissions trading. The proposal

met with strong opposition, however, in particular from the United States, Canada, Australia, Japan, Russia, and Norway.

As expected, much attention was given to the possibilities of developing countries taking on binding commitments in future – which will be important for US ratification of the protocol. Most of the developing countries continue however to maintain that the matter should not even be discussed until the adequacy can be seen of the industrialized nations’ commitments and their implementation.

Source: **Environment Watch: Western Europe**, June 19, 1998.

For more information, visit the Climate Convention’s website: www.unfccc.de.

Emissions of carbon dioxide from cars

AT THE END OF JULY the EU Commission and ACEA, the European carmakers' trade association, reached an agreement as to how much cars' fuel consumption must be reduced.

The carmakers have agreed that by 2008 the average new car sold in the EU shall not emit more than 140 grams of carbon dioxide per kilometre (which amounts to a reduction of 25 per cent from 1995 levels, when the average was 186 g/km). In 2003 the possibilities are to be considered of attaining by 2012 the figure that the Council of Ministers had wished to see reached by 2005 or at the latest 2010, namely 120 g/km. That would correspond to a consumption of 5 litres of petrol or 4.5 litres of diesel per ten kilometres.

Certain conditions are attached to the agreement. One is that the non-European car manufacturers must make similar commitments, another that fuel of adequate quality will be generally available. Proper fuel will be necessary for the introduction of more fuel-efficient engines. The carmakers see such engines, together with a greater proportion of diesel vehicles, as the most likely way of attaining the agreed emission levels.

The "voluntary" agreement between the Commission and the carmakers was actually reached only under threat, the Council of Ministers having said last December that unless progress was made in the negotiations, they would call for mandatory standards (see AN 2/98). The Commission can now formally endorse the deal at the end of October, it being highly unlikely that the Council will raise any objections. But the Parliament had previously called for legislation compulsorily limiting fuel consumption to 3 litres per 10 kilometres from 2010.

Environmentalist organizations have been quick to point out that the agreement will be insufficient for the attainment of EU aims in regard to climate, one reason being the expected increase in road traffic during the next few decades.

Source: **Environment Watch: Western Europe**. August 7, 1998.

AIR QUALITY

Some standards ready

THIS JUNE the EU environment ministers agreed on a new directive for air-quality standards – covering sulphur dioxide, nitrogen dioxide, PM₁₀ (particles with a diameter of less than 10 micrometres), and lead. It is intended that the new limit values shall apply from 2005, except in the case of nitrogen dioxide, where the starting year is to be 2010. The ministers have, by and large, kept to the proposals presented by the Commission last October (see AN 2/97, pp.7-9, and 4-5/97, p.5). Differences concern:

□ The annual limit value for PM₁₀, which has been increased from 30 to 40 micrograms per cubic metre (µg/m³). The most serious and controversial change. The number of times this value may be overstepped was also increased, from 25 to 35 times a year.

□ Nitrogen dioxide (NO₂). The number of times a year that the hourly limit value may be exceeded was increased from 8 to 24. As a concession to the EU Parliament, an alert threshold of 400 µg/m³, measured over three hours, was brought in.

□ Lead. Contaminated industrial areas will be allowed an extra five years – until 2010 – to meet the new limit of 0.5 µg/m³.

□ The provisions concerning public access to information about air quality, which were somewhat improved.

The Commission was requested to provide a review of all standards in 2003. It would be especially desirable, according to the ministers, to have the PM₁₀ standards for 2010, which are now only indicative, made mandatory. The ministers also wanted the Commission to

consider setting standards for the smallest particles (PM_{2.5}).

Since the proposed limit values have been arrived at on somewhat different grounds from the previous ones, direct comparisons are difficult to make. On the whole, however, the proposals do represent a distinct tightening of existing standards. Previously, for instance, there had been no limit value for the PM₁₀ fraction. The new values will, if adopted as now proposed, mean that all the member countries will have to take steps to bring down the concentrations of nitrogen dioxide and particles, especially in urban environments. It may also be difficult for some countries to meet the standards for sulphur dioxide and lead.

The proposed directive, with the ministers' "common position" (as it is called) included, will now go before the EU Parliament for a second reading, to be followed in all likelihood by adoption by the Council of Ministers this December.

Further proposals for air-quality standards are now on the way. At the end of this year or the beginning of next the Commission will be putting forth ideas for ozone, benzene, and carbon monoxide. Also scheduled for the new year is work on new limit values for polycyclic aromatic hydrocarbons (PAHs), nickel, cadmium, arsenic, and mercury.

Sources: **Environment Watch: Western Europe**. July 3, 1998. AIR MAIL 11. August 6, 1998.

Note. The proposal is in the form of a daughter directive to the framework directive on ambient air quality assessment and management (96/62/EC) that was adopted by the Council of Ministers in September 1996.

Standards for vehicles and fuels

Emission limits and quality requirements are now set to come into force

AS A RESULT of a compromise between the Council of Ministers and the EU Parliament, the emission limits for new cars and light commercial vehicles, as well as the quality requirements for petrol and diesel fuel, will be tightened within the Union in two stages: slightly in 2000, more heavily in 2005. In overall effect the agreement will mean much stricter requirements than those proposed by the Commission in the three directives coming out of the Auto Oil project (see box).

As regards the emission limits for passenger cars set for 2000, the Parliament had to accept the Council's view that accorded with the Commission's proposals (AN 4/96), even though it would have liked to impose stricter limits on the emissions of nitrogen oxides from diesel-driven cars. On the other hand the Parliament did gain acceptance for its desire to have the requirements for 2005 made compulsory, which in the Commission's and the Council's proposals would only have been indicative. The new emission limits for cars are shown in the table.

Some further requirements have also been added to the Commission's proposal. There will for instance be emissions tests for cold starts from 2002, and from 2000 all new petrol-driven cars must have on-board diagnostic systems to oversee the performance of the vehicles' pollution-abatement equipment. The same will apply to diesels three years later.

Another addition will make car manufacturers responsible, as in Sweden, for the continued functioning of the cleaning equipment for the exhaust gases. It means that from 2000 this will apply in

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the case of all new cars for distances up to 80,000 kilometres or during their first five years. From 2005 the scheme will apply for 100,000 kilometres or five years. Failure to meet the requirements will have to be repaired by the car-maker.

As regards light commercial vehicles the Council accepted mandatory standards for 2005. In return, the Parliament accepted the limit values for 2000 and 2005 already foreseen in the Council's common position.

There was a similar compromise on the quality requirements for fuels. The Parliament accepted the limits proposed by the Council in its common position (see AN 3/97, pp.6-7). In return it gained agreement for making the values for sul-

phur, benzene, and aromatics compulsory from 2005. These would have been indicative in the Council's proposals. Controversy was greatest over the sulphur content, and here the changes have been great – in particular for diesel fuel, where there will have to be a reduction of 90 per cent from the present level (500 ppm). The figures will be:

	2000	2005
Petrol	150 ppm	50 ppm
Diesel oil	350 ppm	50 ppm

The sulphur content is important on two accounts: it affects the formation of the small particles that are damaging to health, as well as the functioning of the catalyzers, such as by shortening their durability. Then, too, the so-called de-NOx catalysts, which are likely to be needed if diesel-driven cars are to meet the emission requirements for 2005, must have fuel with a very low sulphur content. Moreover low-sulphur fuel will ease the introduction of more fuel-efficient engines. Member countries with "severe socio-economic problems" may however be granted dispensation from

Emission limits for new cars in the EU from 2000 and 2005.

P = petrol-driven. D = diesel-driven. Unit: g/km. Present limit values, if any, are given in brackets.

	Carbon monoxide	Hydrocarbons (HC)	Nitrogen oxides (NOx)	Combined HC + NOx	Particulates (PM)
2000	P: 2.3 (2.2) D: 0.64 (1.0)	P: 0.20 D: -	P: 0.15 D: 0.50	P: - (0.5) D: 0.56 (0.7)	P: - D: 0.05 (0.08)
2005	P: 1.00 D: 0.50	P: 0.10 D: -	P: 0.08 D: 0.25	P: - D: 0.30	P: - D: 0.025

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the sulphur requirements for three years from 2000 and two from 2005.

Benzene in petrol will be limited to 1 per cent from 2000 as against 5 per cent today. The maximum content for aromatics must be 40 per cent from 2000 and 37 per cent from 2005 (the current market average is around 40 per cent). Whenever a producer proposes to market fuels that will meet the specifications for 2005 already from 2000 onwards, member states will have to permit it. And member states will, as originally proposed, be allowed, with the agreement of the Commission, to apply still stricter requirements, than those now coming into force, for especially polluted areas.

One great reason why the Parliament fought so hard to get the requirements for 2005 definitely agreed upon was that it will enable the member countries to introduce tax incentives to encourage industry to meet the standards for 2005 as soon as those for the first stage have become mandatory in 2000.

Also in the agreement is a review paragraph saying that the Commission should, before the end of 1999, put forward proposals for a number of other fuel parameters, to apply from 2005. But it seems that the Commission's Auto Oil II project has now been driven into a backwater – since according to pro-

gram the outcome of its research would mainly have been to provide a basis for the requirements for 2005, which have now been agreed upon.

While expressing relative satisfaction at the compromise between the Council and Parliament, environmentalists have nevertheless pointed out that the requirements might have been stiffer in several respects. But as Frazer Goodwin of the European Federation for Transport and Environment has noted: "We now have to shift the focus to reducing pollution from the existing traffic on the roads."

PER ELVINGSON

The whole text of the communiqué from the Conciliation Committee, as well as background articles and commentary, can be found under the heading *Current news* on the Secretariat's website: www.acidrain.org.

Call for better fuels

Lead car manufacturers have stepped up pressure on the oil industry to make high-quality fuels widely available in order to help reduce vehicle pollution. A World-Wide Fuel Charter proposed by European, American, and Japanese car manufacturers in June calls for a radical improvement in the quality of fuels as a means of reducing exhaust emissions and improving vehicle performance. In particular, carmakers want the sulphur content of both petrol and diesel fuel to be reduced to 30 ppm in "advanced" markets such as the EU.

The aims of Auto Oil

The Auto Oil program is a joint research project that was started in 1993 by the EU Commission together with the trade associations of the carmakers and the oil industry. One of its aims was to find the most cost-effective way of attaining the targets for air quality by 2010 through technical solutions (see AN 4/96). At the time it was something new for the Commissions to first set up targets and then work out the requirements for meeting them. Usually the requirements had been set with a view to the available technology and what was considered economically feasible – not from the possibility of attaining a definite goal.

After completion of the research, the Commission declared its intention of proposing new directives for: 1. Fuel quality. 2. Emissions from passenger cars. 3. Emissions from light commercial vehicles. 4. Emissions from heavy goods vehicles. 5. Road worthiness testing.

Proposals for the first two were put forward in June 1996 (AN 4/96), and for

the third in March 1997 (AN 2/97). All three have now become part of the compromise agreement between the EU Parliament and the Commission. The fourth was presented in December 1997 (AN 1/98), and the fifth is said to be due later this year.

Strict requirements for vehicles and fuels will obviously be necessary if the EU member countries are to fulfill the commitments they are about to make in respect of various air pollutants (see article p.7). When presenting the first two directives in 1996, the Commission was of the opinion that the whole series would, together with the measures that had already been agreed upon, lead to a 65 per-cent reduction between 1995 and 2010 of the emissions of nitrogen oxides from road traffic. Volatile organic substances (VOCs) and particles would be cut by 70 per cent. It thought that with similar reductions in other sectors, the targets for air quality would have been attained in most cities by 2010.

Directive for national emission ceilings

Among the matters discussed at a meeting of the EU Commission with experts from the member countries in July were refinements to the acidification strategy, the forthcoming ozone strategy, and the new directive for national emission ceilings (NEC). The Commission also explained the way it proposed the scenario analysis should be done for underpinning the NEC directive, and how rigorous the environmental targets were to be. Another meeting of experts, principally to discuss that directive, is to be held in Brussels in the middle of October.

Since the preparatory work has been proceeding more slowly than anticipated, the Commission is not expected to present the ozone strategy and its proposal for a NEC directive before March 1999.

CO₂ from road transport increasing

Emissions of carbon dioxide from road transport have increased within the EU by 11 per cent since 1990, according to new figures from Eurostat, the union's statistical office. It estimates that Finland is the only country where emissions have dropped (-3 per cent) over the last eight years. Denmark, Ireland, Spain, and Portugal all show increases of 34 to 37 per cent, while transport-related emissions in Greece have increased most: 60 per cent.

Further information can be found on internet: europa.eu.int/eurostat.html.

Energy efficiency

A policy paper¹ from the Commission estimates that EU energy consumption could be reduced cost-effectively to 18 per cent below 1995 levels by 2010 through a set of "win-win" measures. It also suggests that the present rate at which energy efficiency is improving – 0.6 per cent a year – should be boosted by a further 1 per cent. Among the priority actions suggested are new mandatory energy-efficiency requirements for a range of appliances and equipment, and legislation to promote public purchasing of energy-efficient equipment and buildings. Strangely, transportation is hardly mentioned at all in the Communication, which is a preparatory paper for an EU-wide action plan, aiming at reducing the emissions of greenhouse gases within the union.

¹ Energy Efficiency in the European Community – Towards a Strategy for the Rational Use of Energy. COM(98)246.

Limiting sulphur in fuels

Differences between north and south led to weakening of the Commission's proposal

AT THE MEETING of the Council, June 16-17, the EU environment ministers agreed on a number of changes to the Commission's proposal of 1997 for a directive¹ to limit the concentrations of sulphur in liquid fuels (see AN 3/97, pp.8-9). The aim of the directive is to control the emissions of sulphur dioxide, so as to cut back acidification, reduce the effects on human health, and lead to less corrosion of the materials of buildings and other structures. In 1993 about 20 per cent of the EU emissions of sulphur – nearly 3 million tons – came from the burning of heavy fuel oil. Gas oils and so-called refinery fuels accounted for a further 1-2 million tons.

Because the proposal for a directive was presented simultaneously with that for an acidification strategy, attention came to be concentrated, perhaps unfortunately, almost exclusively on the acidifying effects on ecosystems. The result was a tendency on the part of the member countries to split into two groups, a northern and a southern. Whereas the northern group was eager for action, the southern one questioned the usefulness or even the need for the directive.

Maintaining that they themselves had no trouble from acidification, the southern group asked why they should have to pay for dealing with something that mainly concerned northern and central Europe. The fact that the Mediterranean countries often suffer from harmful concentrations of sulphate particles as well as SO₂, they have often preferred not to mention. But analyses made in the process of developing an acidification strategy have shown that even taking only acidification into account, it would be cost-effective to lower the sulphur content of heavy fuel oils in the cases of all member countries except Spain, Portugal, and Greece.

When putting forward its views on the Commission's proposal for a directive in May, the EU Parliament had urged a tightening of the requirements in a number of ways (see AN 2/98, p.8). But the outcome of the Council's deliberations was that in most respects the requirements had become less strict than

in the Commission's original proposal. According to the Council there should be:

- A limit of 1 per cent for sulphur in heavy fuel oil from January 1, 2003. (The Commission had proposed starting from January 2000, and the Parliament from 1999.)
- A derogation permitting member countries that make no significant contribution to acidification to



authorize the use of heavy fuel oil with a sulphur content of up to 3 per cent. (The Commission had wanted 2.5 per cent, and the Parliament 2 per cent.)

- A limit of 0.2 per cent sulphur in gas oils, including marine gas oils. This only means that the present limit (set in directive 93/12/EEC) will continue to apply, although there would be a new limit of 0.1 per cent as from January 1, 2008. (While the Commission was content to let the 0.2-per-cent limit continue, Parliament wanted to see the 0.1 limit introduced already in January 1999.)

- A derogation that will allow member states not contributing to acidification to permit the use of gas oils with a sulphur content of 0.1 to 0.2 per cent. (The Parliament wanted it to stop at 0.1 per cent.)

- An extra paragraph charging the Commission to consider the measures that should be taken to lessen the acidification resulting from the use of marine bunker oils at sea, and, "if appropriate," to deliver proposals by the end of 2000. (The Commission had had no proposals for dealing with the effects of marine bunker oil. Parliament on the other hand proposed a limit of 1.5 per cent for sulphur from January 1, 2000.)

- A period of 24 months for imple-

mentation of the directive. (Not in the Commission's proposal.)

As will be evident from all this, the southern group of member countries succeeded in getting both later dates for the introduction of stricter limits and much more generous exceptions than the Commission had proposed. The northern countries did on the other hand gain acceptance for their proposal to lower the limit for sulphur in gas oils in a second stage, from 0.2 to 0.1 per cent.

Like the Commission, the Council was of the opinion that the directive should rest on Article 130s of the Treaty, allowing member countries to impose still stricter requirements if they so wish. Parliament on the other hand wanted it to be based on Article 100a, which would not only give the Parliament more say in the process of decision making, but also limit the freedom of member countries to make stricter requirements for their own territory.

It still seems difficult to gain international agreement for measures to control the emissions of air pollutants from shipping. As has been reported in Acid News (Nos. 4-5/97 pp.1-4, and 1/98, pp.9-10) there are no technical difficulties and it would also be cost-effective. Simplest, perhaps, would be the use environmentally differentiated harbour and fairway dues. The Council chose however to sidestep the matter, referring it back to the Commission, which will have two years in which to make some specific proposals.

What the Council achieved in June was a political agreement on the text of the directive. A so-called common position on the result will be formally adopted in due course. The directive is then likely to be passed into law early in 1999 at the latest, after having undergone a second reading in Parliament.

CHRISTER ÅGREN

¹Proposal for a Council Directive relating to a reduction of the sulphur content of certain liquid fuels and amending Directive 93/12/EEC. It was published simultaneously with that for an acidification strategy in March 1997 as Document COM(97)88 final.

Amended directive on the way

THE EU COMMISSION has finally presented a proposal for amendment of the directive¹ of 1988 for limiting the emissions of air pollutants from large combustion plants (LCPs). The emission limit values, ELVs, for sulphur dioxide and nitrogen oxides that are now proposed for future plants amount roughly to a halving of current values. On the other hand nothing has been proposed for existing installations, which will continue to answer for an overwhelming proportion of the emissions from this sector in the next few decades. The directive, as now proposed, will thus have very little effect on the total of emissions of these pollutants.

The plants now concerned are, as in the existing directive, LCPs with a thermal input of more than 50 megawatt (MW_{th}). In 1990 these were emitting 63 per cent of all the SO₂ and 21 per cent of the NO_x that were being let out in the present fifteen member countries of the union.

According to the original directive, the Commission should have presented proposals for amendments three years ago. But revision has taken time, so it was only this July that it was able to put forward proposals for changes. The new version still rests on Article 130s of the treaty establishing the European Community, which means the requirements are minimum standards – in other words, the member countries are free to impose stricter ones if they so wish.

These are the principal changes now proposed by the Commission:

- Stricter emission limit values for SO₂, NO_x, and dust for all new plants coming into operation from

January 1, 2000. As in the earlier directive, these values vary with the size of the plant and the type of fuel burnt. In general the requirements are, as can be seen from the table, stricter for large plants than they are for smaller ones.

- The scope of the directive has been extended to include gas tur-

Environmentalists, as well as some EU member countries, are likely to be strongly critical of the fact that the Commission's proposal does not include measures for dealing with emissions from existing plants

bines, with limit values for NO_x. This is because the Commission believes the proportion of gas turbines used in the generation of electricity will increase from 20 per cent (1995) to 50 per cent in 2010.

- Special limit values are now set for biomass fuel, with more closely defined operating procedures for plants using a mixture of fuels, including biomass.

- As a means of promoting effectiveness in the use of energy, the authorities that grant operating permits will be required to "ensure that there is provision for the combined generation of heat and electricity where this is technically and economically feasible."

- A strengthening of the requirements relating to the monitoring of emissions and compliance with the emission limit values, as well as improvements in the reporting of emissions data.

According to the Commission, the total cost of the proposed changes for the period between 2000 and 2010 will be less than 2 billion ecus. This figure rests both on assumptions concerning additions to capacity in the energy sector, and on estimates of the extra cost of substituting the proposed new ELVs for the old. As regards SO₂, the extra cost is estimated to lie between 400 and 800 ecus, per ton of emission, for large plants, and 1000-2000 ecus for smaller ones. It is also estimated that it would be less than 500 ecus per ton for NO_x, if the proposed ELVs can be attained by the use of so-called primary measures alone, as will be the case for most installations. Where primary measures will have to be complemented by flue-gas denitrification, the cost may be as high as 1500-2000 ecus per ton. The cost for gas turbines is estimated to lie between 250 and 500 ecus per ton of NO_x that would be eliminated, depending on the size of the turbine.

Assessments have also been made of the benefits. Implementation of the Commission's proposals could lead to reductions of SO₂ and NO_x emissions by altogether 1 million and 4 million tons respectively during the ten years from 2000 to 2010, corresponding on an average to 100,000 ton and 400,000 ton a year. Some of the gains from these reductions have also been assessed in terms of money. It turns out that the gains, in the way of greatly less harm to humans and the environment, will far outweigh the costs.

Environmentalists, as well as some of the EU member countries, are likely to be strongly critical of the fact that the Commission's proposal does not include any measures for dealing with emissions from already existing plants. As reported in AN 1/98 (p.6), one draft that had been discussed with experts from the member countries did include such measures – and so

Continued on page 12

Proposed new emission limit values, ELVs, expressed as milligrams per cubic metre (mg/m³). Plant size in megawatts thermal input (MW_{th}).

Plant size →	Sulphur dioxide			Nitrogen oxides		
	50-100	100-300	>300	50-100	100-300	>300
Solid fuels	850	850-200 ²	200	400	300	200
Liquid fuels	850	850-200 ²	200	400	300	200
Biomass	200	200	200	350	300	200
Natural gas¹	35	35	35	150	150	100

¹Specifically for gas turbines using natural gas, the limit value in most cases being 50 mg NO_x/m³.

²Linear decrease.

Continued from page 11

would have been in line with what the Commission itself was proposing in its acidification strategy. Analyses made for that strategy showed it would be cost-effective to bring down the emissions from existing LCPS, both of SO₂ and NO_x, markedly in almost all the EU countries.

Both the acidification strategy, and one that is awaited for bringing down the concentrations of ground-level ozone (see AN 2/98, pp.5-8), comprise targets for environmental quality that should be hit by 2010. If the revised LCP directive is to contribute appreciably to the attainment of these aims, it would have to contain measures for controlling emissions from existing plants too.

Under the directive on integrated pollution prevention and control (96/61/EEC), as from 2007 the emissions from existing plants are to be regulated through permits given by local authorities. As reported in AN 2/98 (pp. 11-14) and elsewhere, it is not at all clear how this directive will actually be interpreted and applied.

The Commission is now working on a directive that will set national emission ceilings, which will be mandatory, for SO₂ and NO_x (as well as for VOCs and ammonia). These ceilings, which are to apply for each country's total emissions, will integrate with the targets for environmental quality that are to be set for 2010 in accord with the acidification strategy and the coming one for ozone. The directive for national ceilings will of course, when and if adopted, indirectly also affect emissions from existing combustion plants. The Commission says it will probably be presenting a proposal early next year.

To come into force, the revised LCP directive will have to be accepted by the Council of Ministers, the EU legislative body. The views of the European Parliament will, in accordance with the so-called co-operation procedure, also have to be taken into consideration. Since this process usually takes a couple of years, it would seem overoptimistic to suppose that the new rules will in fact start to apply from January 1, 2000.

CHRISTER ÅGREN

¹Directive 88/609/EEC on the limitation of emissions of certain pollutants into the air from large combustion plants.

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NORTHERN LAKES

Acidification shown in wide survey

BOTH IN NORWAY AND WALES a quarter of the lakes are being subjected to fallouts of acid that are greater than they can tolerate, and the situation is not much better in Sweden, Finland, and on the Kola Peninsula – according to a coordinated survey made in the autumn of 1995 in all these countries, as well as in Scotland, Denmark, and Russian Karelia.

The survey covered almost 5700 lakes selected at random out of a total of about 155,000 with a surface area of more than four hectares. Scientists looked particularly at the degree of acidification of the water and the availability of nutrients, but also at the amounts of metals in the lakewater.

The average sensitivity of the lakes to acidic deposition was found to be about equally low in Sweden,

Norway, Finland, Russian Karelia, and the Kola Peninsula, but somewhat better in Denmark, Scotland, and Wales.

The proportion of lakes in each country that are getting acid depositions in excess of the critical loads varied somewhat. Norway was not only found to have the highest proportion, 27 per cent or 10,000 lakes. It was also here that the critical loads were being most greatly exceeded – the reason being the high depositions of acid in combination with very low critical loads, especially in the southernmost parts of the country. Despite the critical loads being relatively high in Wales, the proportion of lakes where they were above the critical level was almost as high as in Norway – in this case 24 per cent. This is mainly because of the high deposition levels.

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The relatively high number of lakes suffering in the same way on the Kola Peninsula – 3500, 17 per cent – can be explained by the huge emissions of sulphur dioxide from the smelter works in the area. Both in Finland and Sweden the critical loads were being exceeded in 9 per cent of the lakes (3000 and 6000 respectively). Because of the low number of lakes that were sampled in Scotland, Karelia, and Denmark, the figures there are not regarded as statistically reliable.

This adds up altogether to some 22,000 lakes, or 14 per cent of the total in northern Europe. Caution is however required in reading the figures.

□ The calculations have only taken account of the acidifying effect of sulphur. But at least in the cases of Scotland, Wales, South Norway, and parts of Sweden, nitrogen compounds will also have a distinct acidifying effect.

□ The calculations are also highly dependent on the environmental state that is considered critical. With somewhat altered assumptions, there would for instance be an increase in the number of acidified lakes in Sweden – from 9 to 20 per cent – or even to 40 per cent if nitrogen compounds were included as an acidifying factor.

This study will provide a mass of material for reference in any study to find out where matters are trending. But as the methods that have been employed are to some extent new, comparisons with the results of previous national surveys are hardly possible. It appears however from a statistical reworking of the Swedish material, that in Sweden at least a certain recovery has taken place. Since the last national survey, made in 1990, the sulphate content of lakewater has fallen on an average by 40 per cent, while alkalinity, as a measure of the lakes' ability to resist acidification, has increased – slightly, yet statistically proven. The explanation is probably to be found in the lessening in the acid fallout that has followed as a result of big cutbacks in the emissions of sulphur that have taken place in Europe during the last decade.

Sweden is the only country among those surveyed where liming is done on any large scale, as a means of counteracting the acidification of surface waters. Following the 1995 survey, it has been concluded that there are 6700 lakes in the country

with a pH value in the water of less than 6, but that improvement has occurred in 6800 lakes as a result of liming. It is thus likely that without liming there would have been 13,500 acidified lakes in Sweden, or 24 per cent of all the country's lakes

*In Sweden at least
a certain recovery
has taken place*

with a surface area of more than four hectares.

For the first time an inventory of the benthic fauna was made for a large number of lakes and streams all over Sweden. Since the sensitivity to acidification varies between different groups of organisms, this should have made it possible to get a picture of the situation over a longer period, whereas chemical samplings of the water only show the situation at the time they are made. It proved difficult however to

use biological indices as indicators of the lakes' state of acidification. Species composition tended to vary more with the lakes' geographical location than with the degree of exposure to acidification. Nevertheless it did appear that the species composition in 40 per cent of the lakes was such as to indicate that they were acidified – in other words, species that are known to be sensitive to acidification were missing.

PER ELVINGSON

There is a full account of the multi-national survey in an article entitled *Northern European Lake Survey, 1995* in the magazine *Ambio*, Vol. 27, No.2, March 1998. The results of the Swedish studies are also fully described in *Riksinventering 1995. En synoptisk studie av vattenkemi och bottenfauna i svenska sjöar och vattendrag*. Rapport 4813, 1998. In Swedish only, but with an English summary. Published by Naturvårdsverket, 106 48 Stockholm, Sweden.

There is also basic reading about the acidification of surface waters in the Secretariat's booklet *Acidification and Air Pollution: Still With Us* (1997).

Birds and acidification

IT HAS LONG BEEN KNOWN that snails and other invertebrates with a great need of calcium suffer when the environment becomes acidified. Studies have now testified that the reproductivity of several bird species will be adversely affected if their supply of calcium-rich food diminishes.

The females' process of eggshell formation becomes disturbed. When the appearance of defective and weakened eggshells was first

brought to notice in connection with acidification in the end of the seventies, it was assumed that the birds were absorbing too much aluminium – of which the mobility increases in an acidified environment. But scientists soon realized that the availability of calcium (or rather, the ratio of calcium and aluminium) was an important factor. The calcium theory was bolstered when a Dutch scientist early in the nineties tried adding calcium (in the form of mollusc shell in a feeding automat) to the diet of breeding great tits. This practically ended the problem of defective eggshells.

After it had been reported in 1994, there came several studies showing that calcium deficiency hindered successful hatching for a variety of bird species in the Netherlands, Britain, Norway, and Canada. Among the affected species in Norway were dippers and grey wagtails. While the extent of the problem is uncertain, it may well be very great, especially in areas with intensive acid fallout and soils that are naturally poor in calcium.

Source: *pH-Status* (a Norwegian newsletter focused on acidification and liming) No. 1, 1998.

Thinner eggshells in Britain

The eggshells of four thrush species have become thinner by 2 to 11 per cent in Britain since 1850. Rhys Green of the Royal Society for the Protection of Birds in Edinburgh, who has examined the eggs in museum collections, thinks the thinning of the shells must be due to acidification having reduced the amount of calcium in the birds' food. Green also quotes a German study, published in the *Journal für Ornithologie* earlier this year, reporting that the eggshells of birds living in areas where soils are highly acidic were 2.7 per cent thinner than those of birds in lime-rich areas.

New Scientist, April 25, 1998.

Europe's environment

Despite reductions of the emissions of a number of pollutants, the situation in respect of ten of Europe's twelve most urgent environmental problems remains static or has actually worsened – according to a report¹ presented to the meeting at Aarhus by the European Environmental Agency.

This is in part because the effects of the reductions have not yet had time to show up in the environment. But in many cases the scale of the measures to reduce pressures on the environment has, in the EEA's words, "been too limited, given the size and complexity of problems."

Transportation is pointed out as the sector where developments are especially disturbing. The movements of freight by road in the whole of Europe have increased by 54 per cent since 1980 (as measured in ton-kilometres), and car use, as measured in passenger-kilometres, by 46 per cent since 1985 (that figure is for the EU only). The number of airline passengers has increased by 67 per cent since 1985. As a result there are increases in congestion, air pollution, and noise.

This fact-packed report, which covers 44 countries, is a sequel to the first one to deal extensively with the problems of the all-European environment. Entitled *Europe's Environment: The Doris Assessment*, that first report was issued in connection with the previous pan-European meeting of environment ministers, in 1995. Updated reports are now to be issued every year.

¹ *Europe's Environment: The Second Assessment*. 293 pp. 70 ecus. ISBN 92-828-3351-8. Available at all national salespoints for EU publications. There is a 40-page summary in all the EU languages as well as Icelandic and Russian. Free of charge from EEA, Kongens Nytorv 6, 1050 Copenhagen K, Denmark. Fax. +45 33 36 71 99. E-mail: information.centre@eea.eu.int. It is also available on the EEA website: <http://eea.eu.int>.

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PAN-EUROPA

Environment for Europe conference

AS EXPECTED, the proposal for a convention on access to information, public participation, and access to justice in environmental matters was adopted and signed at the Environment for Europe ministerial conference at Aarhus, Denmark, in June. Also adopted were two protocols aimed at limiting the spread of heavy metals and persistent organic pollutants, as well as a rather harmless final declaration.

The Convention, now officially named the Aarhus Convention, has already been described in *Acid News* (2/98). It was signed by a large number of countries, but not by Germany and Russia, despite both these countries having striven hard, during the negotiations that preceded the meeting, for a toning down of the convention's text. Russia was not represented at the meeting, but has nevertheless declared its intention of signing later. Germany, which was the only EU member to refrain from signing, said it would revert to the matter after consultation with the federal states.

The protocols for limiting the spread of heavy metals and persistent organic pollutants (POPs) were passed without much discussion. The former seeks to curb emissions of lead, cadmium, and mercury from industrial sources, combustion processes, and incineration of waste. That for POPs imposes restrictions on sixteen pesticides and industrial chemicals, as well as dioxins, fu-

rans, and polycyclic aromatic hydrocarbons (PAHs), but leaving open the possibility of other substances being added later. These two protocols were also reported more fully in the last number of *Acid News*.

The Aarhus conference was the third in a series of meetings of environment ministers from all the countries of Europe. The two previous ones had been held at Lucerne (1993) and Sofia (1995). The next Environment for Europe conference is planned to be held in 2002 in one of the NIS countries (newly independent states of the former Soviet Union).

Note. The final declaration from the conference, press releases, and other matter can be found on internet: www.mem.dk/aarhus-conference.

Baltic cooperation

One aim of Baltic Agenda 21, the plan of action that was adopted by the foreign ministers of the countries bordering on this sea at their annual meeting in June at Nyborg, Denmark, will be to have halved the area's emissions of carbon dioxide by 2030. The Baltic Agenda was hammered out during two years of cooperation between the governments, non-governmental organizations, and business interests from the whole Baltic Sea region. It sets out objectives for a sustainable development in sectors such as agriculture, forestry, energy, and transportation.

Further information can be obtained from: Baltic 21 Secretariat, Ministry of Environment, 103 33 Stockholm, Sweden. Fax. +46-8-440 1944. Internet: www.ee/baltic21/

Assessing the first year

Without emissions trading, the reduction costs would have been greater

THE FIRST large-scale experiment with tradable emission permits, to achieve a definite environmental aim, was started in the United States through the Clean Air Act Amendments of 1990. To halve the emissions of sulphur from electric utility plants, from 1980 levels, was perhaps the most important objective of Title IV of the CAAA. An evaluation¹ of the costs and effectiveness of this acid rain program was made by MIT, the Massachusetts Institute of Technology, for 1995, the year in which the provisions of Title IV became binding.

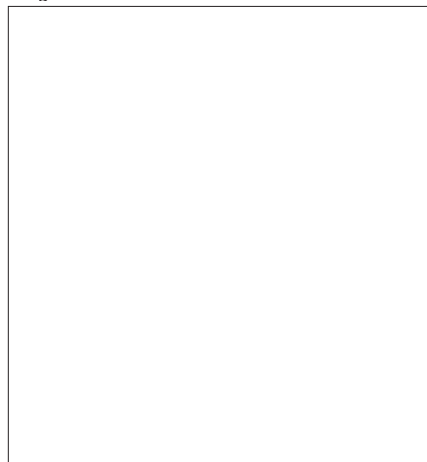
The emission target of the acid rain program is to be achieved through the use of market-based instruments. An aggregate annual cap on national sulphur emissions from electric utilities sets the number of emission allowances that will be available for allocation to electricity-generating units each year. Each allowance permits the holder to emit one ton of SO₂ in the year it has been issued or later. If it is to keep its emissions within legal bounds in a given year, a generating unit must have enough allowances, valid for use in that year, to cover all its emissions.

Each generating unit is also required to have a continuous emission-monitoring system in operation – to measure its actual emissions of SO₂ – and to report them to the Environmental Protection Agency. Each unit must have enough allowances at the end of the year, in an account kept by the EPA, to cover all its recorded emissions, or suffer significant penalties.

The program is being carried out in two stages. The first (1995-99) sets an aggregate limit on the emissions of SO₂ from a number of generating units that have been listed in the legislation. These units, with a total of 88 gigawatts of generating capacity, are located in 110 power stations owned by more than sixty utilities. The second stage, starting in 2000, will take in every generating unit of more than 25 megawatt electric capacity that is fired with fossil fuel. That will amount to more than 700 plants. From 2000 until 2009, the first annual allowances that are issued will total 9.4

million, and subsequently decrease to 8.95 million. In other words, the total of SO₂ emissions that are permitted from electric utilities will then be 8.95 million tons a year.

It turned out that the year in which Title IV took effect showed a marked overcompliance. Altogether 8.7 million allowances had been issued to the affected units, which had been emitting 10.7 million tons of SO₂ in 1985. Their emissions in 1995



were however only 5.3 million tons, or about 3.9 million tons less than would have been expected without the CAAA, and 3.4 million tons below the cap. Emissions had obviously declined significantly prior to 1995.

The decline was largely due to the effects of railroad deregulation on the competitiveness of western low-sulphur coal in the Midwest, where local high-sulphur coal had traditionally been used. The reduction of SO₂ emissions by 1995 is estimated to have been achieved about equally by retrofitting, such as by installing scrubbers for flue gas desulphurization, and by switching to lower-sulphur coal.

The total cost of achieving the 3.9-million-ton reduction in 1995 came out to be at the lower bound of earlier predictions. The authors of the MIT report estimate the annualized total cost to have been approximately \$725 million (in 1995 dollars). This would mean an average total cost of \$187 or \$210 per ton SO₂ removed, depending on whether 425,000 tons of apparently costless emission reductions are included or not. Earlier studies of compliance costs had predicted an

average total cost ranging from \$180 to \$307 per ton of SO₂ removed.

The cost of achieving emission reductions by retrofitting scrubbers came on an average in 1995 to \$265 per ton of SO₂ as compared to \$153 per ton from fuel switching. This is in marked contrast to earlier studies that estimated average total costs for scrubbing to be \$450-500 per ton. Most of the difference between the predicted and actual costs of scrubbing is said to be due to lower-than-predicted operating costs and to greater-than-expected utilization of the scrubbers.

The trading price of allowances has been about \$100 (in other words, \$100 per ton of SO₂ removed). This is much below earlier predictions, which had ranged from \$250 to \$400. There are several reasons for the disparity. Firstly, the price of allowances reflects the short-term marginal cost – not, as expected, the long-term average total cost of emission control. Secondly, mistaken expectations concerning the value of allowances are believed to have led to overinvestment in compliance measures during the first stage of the program. Thirdly, expectations of an increase in the prices of low-sulphur coal led many utilities to contract early for supplies, which resulted in an even larger supply of allowances for sale. The authors' conclusion is that the 1995 prices of allowances were almost certainly below the long-term marginal cost of emission abatement.

Earlier studies of compliance cost had predicted significant cost savings from emissions trading – although judgments differed considerably as to how much trading would occur. According to the MIT report, in fact 45 per cent of the allowances issued for 1995 were used in a manner that implied emissions trading, either among units or through time. A large number of the affected generating units acquired altogether 540,000 additional allowances to cover emissions greater than would have been permitted by the allowances they received. To compensate, other

Continued on next page

units reduced emissions in 1995 more than would have been required by the allowances issued to them. Moreover, a further 3.4 million allowances were banked (for future use). This will in effect defer for several years the more expensive emission reductions that will be required in the second stage of the program.

Despite the obvious difficulty of giving any firm figure for cost savings from emission trading, the MIT authors presents a rough estimate for 1995 of \$225 to \$375 million. The implication is that the cost of compliance would have been one-third to one-half again as costly if utilities had simply reduced emissions without taking advantage of the possibilities of emission trading.

CHRISTER ÅGREN

¹ *Emission trading under the U.S. acid rain program: Evaluation of compliance costs and allowance market performance.* By D. Ellerman et. al, 1997. Published by the MIT Center for Energy and Environmental Policy Research, 77 Massachusetts Avenue, Cambridge, Massachusetts, 02139-4307, USA. <http://web.mit.edu/ceepr/www/>

For more information on emissions trading see EPA's website: www.epa.gov/docs/acidrain/ardhome.html

Articles on the acid rain program have previously appeared in AN 3/95, 5/95, 1/96, 3/96.

Economic lighting

In the European Union, lighting accounts for 17 per cent of the domestic consumption of electricity. Using a reference scenario, researchers at Oxford¹ have projected an increase in consumption for lighting within the EU from 86 TWh a year today to 102 TWh by 2020. But they also estimate that by 2020 such consumption could be 43 per cent lower if 80 per cent of the ordinary household bulbs were replaced by CFLs (compact fluorescent lamps).

The main barriers to a wider use of CFLs are to be found in their relatively high purchase price, consumer ignorance, and confusion about suitable lamp fittings. The aim in the shorter term, say the researchers, should be to get one CFL in every home, so that people could get experience of this type of lamp. This could be most effectively done either by offering them free or at heavily subsidized prices.

¹ DELight: Domestic Efficient Lighting. Environmental Change Unit, University of Oxford, England. Tel. +44-1865 281 180. Fax: +44 1865 281 202. E-mail: administrator@ecu.ox.ac.uk.

CANADA

Still not enough to halt acidification

Even after the present program for a reduction of emissions, agreed between Canada and the US, has been fulfilled, a large area of eastern Canada will still be exposed to acid deposition in excess of the critical loads for lakes and maybe the forests.

While reporting a diminishing of acid depositions in eastern Canada as a result of measures already taken both in Canada and the United States, the Acidifying Emissions Task Group, a Canadian body, insists that much more will still have to be done if damage to the environment is to be halted.

Besides describing the current situation in eastern Canada in its report,¹ issued in October last year, the Task Group put forward proposals for what should be done, thus providing highly useful material for the work on the National Acid Rain Strategy for Post-2000 that has been expected.²

The existing programs for reducing emissions in the US and Canada are based on an agreement reached in 1991 by which each country was to reduce those of sulphur dioxide by 40 per cent between 1980 and 2010. But extensive problems will still remain even after accomplishment of that aim. Acid depositions in excess of the critical load for surface waters will still be falling over an area of 800,000 square kilometres in eastern Canada (as large as the combined areas of Britain and France). Large parts will be getting an "overdose" of more than 10 kilograms of sulphate per hectare per year (see map). It is estimated that by 2010 some 95,000 lakes will be showing damage from acidification – with a marked decrease in biodiversity as a result.

Although they are more cautious in their forecast of developments in forest ecosystems, the Group nevertheless notes there is a coincidence between areas with depositions in excess of the critical loads for soil

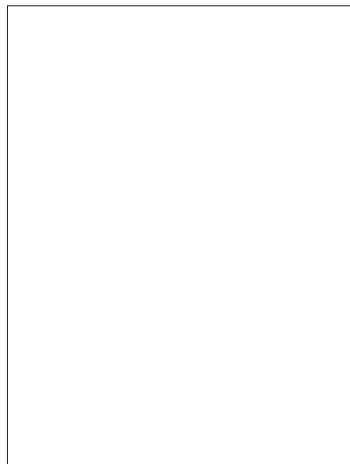
acidification and observed forest damage. Preliminary surveys suggest that acid depositions on sensitive soils may have slowed forest growth by as much as 10 per cent.

It is estimated that the depositions of acidifying substances will have to be brought down to a quarter of what they are likely to be as a result of the present programs for reducing emissions, if the environment in most of eastern Canada is to be saved from damage through acidification.

Since about half of the acid falling over eastern Canada comes from emis-

sions in the United States, effective measures will be needed south of the border as well as in Canada itself. The Canadian provinces of Ontario and Quebec may have to reduce their emissions of sulphur dioxide by as much as 75 per cent over and above the reductions that have already been made, New Brunswick and Nova Scotia by 30 to 50 per cent. Emissions of sulphur dioxide from the midwestern United States and eastwards thereof must be cut by 75 per cent below the levels currently required under the Clean Air Act Amendments.

The Task Group also presents an estimate of the gains to health that would accrue from reducing emission to various extents. It has been calculated that 830 premature deaths could be avoided each year, as well as 2300 emergency-room visits and more than 300,000 asthma symptom days – if emissions were reduced by 75 per cent beyond present commitments in both Canada and the US. Economists have put the gain to the community in Canada at something between



started in the mid-eighties. The Task group warns however that only a slight reduction of nitrogen emissions is to be expected under current programs, and that depositions may well “undermine some of the benefits resulting from control of SO₂ emissions.”

Next year, under the Canada-US Air Quality Agreement, a new “smog annex” is to be negotiated. Although principally aimed at containing the formation of ground-level ozone, it will also have an effect on acidification, since nitrogen oxides contribute actively in both processes.

PER ELVINGSON

¹*Towards a National Acid Rain Strategy.* By the Acidifying Emissions Task Group, October 1997. Available from Environment Canada. Fax. +1-819-953 2225. E-mail: enviroinfo@ec.gc.ca.

²According to program, the government should have presented a proposal for a strategy in the autumn of 1997. Still in September 1998 however the process was being stalled by opposition from the Provincial Government of Ontario. For continued information, visit Environment Canada’s website: www.ec.gc.ca

Predicted sulphate deposition above the critical load for acidification in 2010. Unit: kg sulphate per hectare per year.

0.9 and 8 billion Canadian dollars a year (with no account taken of any other effects than those on health).

The cost of a further 75-per-cent reduction for Canada alone is estimated to lie between \$1.6-2.1 billion a year. Compared with the cost for present programs in Europe, that per ton of avoided emission is about the same. The average cost of eliminating one kilogram of sulphur dioxide in Canada (assuming a 75-per-cent overall

reduction) would be between \$1.3 and 1.7 a year. In the United States, with the halving of the emission levels that is called for under current commitments, it would amount to US\$0.9 per kilogram of SO₂ thus eliminated.

It is evident that attention in Canada has mostly focused on sulphur dioxide – seemingly because emissions of SO₂ were mainly responsible for the depositions of acid when the attack on acidification was

Emissions of acidifying air pollutants in North America

The emissions of sulphur dioxide in Canada and the US fell by 43 and 30 per cent respectively between 1980 and 1995, and both countries are expected to have brought about a reduction of 40 per cent by 2010 (also from 1980). Between 1980 and 1995, European emissions had been reduced by 50 per cent, and are expected, under the second sulphur protocol, to have reached a 60-per-cent reduction by 2010.

North American emissions of nitrogen oxides diminished somewhat between 1980 and 1995, but are expected to still lie at present levels in 2010, if no steps are taken beyond those already agreed. In Europe the reduction from 1980 to 1995 was about 10 per cent.

	Sulphur dioxide			Nitrogen oxides		
	Million tons per year			Million tons per year		
	1980	1995	2010	1980	1995	2010
Canada	4.6	2.6	2.9	2.0	2.0	2.0
USA	23.8	16.6	14.1	21.1	19.8	20.1

Source: Data officially submitted to the UN ECE.

Seventy per cent of the emissions of sulphur dioxide in Canada come from the industrial sector – which in comparison with other countries represents a very high proportion. The explanation lies in the number of large smelters (see list). Power production accounts

for 22 per cent. Corresponding figures for the United States are 28 and 65 per cent.

Transportation is the dominant sector as regards nitrogen-oxide emissions both in Canada and the United States, contributing respectively 60 and 48 per cent. The industrial sector accounts for 25 and 18 per cent, power plants for 10 and 29 per cent.

Among the five largest point sources for sulphur dioxide in Canada in 1995 were four smelters (emissions in tons per year):

1. Copper Cliff, Ontario	smelter	236,000
2. Thompson, Manitoba	smelter	195,000
3. Flin Flon, Manitoba	smelter	184,000
4. Horne, Quebec	smelter	148,000
5. Nova Scotia Power	power station	130,000

Source: Annual Report on the Federal-Provincial Agreements for the Eastern Canada Acid Rain Program. Environment Canada, 1996.

These five sources taken together account for more than half of the emissions of sulphur dioxide in eastern Canada.

Emissions of sulphur dioxide per capita in Canada and the United States amount to 91 and 64 kilograms per annum, which can be compared with the EU average of 31 kg. The corresponding figures for nitrogen oxides where 68 and 75 kilograms in Canada and the US, and 32 kilograms in the EU.

Continued from page 5

be costing 4.5 billion ecus annually in 2010, of which 3.1 billion ecus would fall on the EU countries. The area of unprotected ecosystems in the whole of Europe would drop from the 21 million hectares in the REF scenario to 10.5 million. The area in the EU would fall from 10.4 to 6.6 million hectares. It would thus be less ambitious than the EU strategy for acidification, since that would have the result of bringing the area of unprotected ecosystems (in the EU) down to 4.5 million hectares. Some of the changes in the figures for unprotected ecosystems have however come from changes in input data (concerning national energy scenarios, emission levels in 1990 and REF, as well as new figures for critical loads).

Eutrophication

As in the case of acidification, the gap-closure approach based on accumulated excess was used here. Table 2 shows the current situation, as well as that in 2010 which would result from application of the REF and MFR scenarios. The scenarios were optimized in the same way as those for acidification, i.e. applying the same confidence interval (see box) and setting an absolute ceiling for depositions.

The chosen (central) eutrophication scenario aims at a 50-per-cent gap closure and sets the absolute deposition ceiling at 600 aeq/ha. Achieving this target for the whole of Europe would cost 6.4 billion ecus a year in 2010, and the area of unprotected ecosystems would go down from 111 to 87 million hectares. In the EU, the unprotected area would be reduced from 49 to 36 million hectares.

Joint optimization

A central aim of the present work is to make the pollution control still more cost effective. This is

being done by optimizing simultaneously for all the four environmental targets that are being aimed at, thus taking advantage of the interactions between the four pollutants. It is being tried out in a so-called joint-optimized scenario, named E10/1. This means combining the targets of the central scenarios for acidification and eutrophication (as above) with a scenario with medium aims for reducing ground-level ozone (containing targets both for AOT60 and AOT40). The targets se-

The joint strategy puts more emphasis on cutting down NOx emissions

lected for ozone are similar to those in the D7 scenario that was reported in Acid News 2/98 – with a 60-per-cent gap closure for AOT60 and an absolute ceiling of 3 ppm-hours, and a 35-per-cent gap closure for AOT40 and 10 ppm-hours absolute ceiling.

Table 3 summarizes the emission reductions that will be needed for attainment of all four targets. The additional costs for the whole of Europe are estimated to be 12.6 billion ecus a year in 2010, of which 9.2 billion will be for the EU and 3.4 billion for the other countries. About 47 per cent of the total would be for control of NOx and VOCs, 40 per cent for NH₃, and 13 per cent for reducing the emissions of SO₂. After a comparison of the costs of the single-problem scenarios and the joint-optimized one, the IIASA has come to the conclusion that the joint strategy would put more emphasis on cutting down NOx emissions, while also relaxing the demand for reductions of SO₂ and VOCs. Control of NH₃ would hardly be affected.

The degree of ecosystem protection resulting from the joint scenario, in terms both of acidification and eutrophication, was about the same, for Europe as a whole as well as the EU, as in the central acidification and eutrophication scenarios. As regards ozone, the vegetation-exposure index was slightly better in the joint scenario than in the central one for ozone, while the index for population exposure was slightly worse.

Extended analysis

In September the Working Group on Strategies agreed on the instructions for further scenario analyses, giving the number and types of scenario that are to be investigated, together with guidance as to how ambitious the aims should be. Three levels of ambition are to be investigated in connection with each environmental problem. It should be equally high for the central scenario for ozone as for the one currently favoured by the EU Commission – with a 65-per-cent gap closure and an absolute exposure limit of 2.6 ppm-hours for AOT60 and a 35-per-cent gap closure with an absolute exposure limit of 10 ppm-hours for AOT40. The level to be aimed at in the central scenario for acidification should be equivalent to a 50-per-cent area gap closure (as in the EU acidification strategy). Moreover the IIASA is to investigate six joint-optimized scenarios of varying content, using specified combinations of the single-problem scenarios, as well as the three unoptimized scenarios.

It is anticipated that the IIASA will have completed revision of the input data by September, so as to be able to carry out the scenario analyses in October. There will be an initial discussion at the next meeting of the Convention's expert group on integrated-assessment modelling (the Task Force) late in November. The IIASA's analyses will then serve as the basis for negotiations within the Working Group on Strategies when it meets in Geneva in January.

CHRISTER ÅGREN

Table 3. Emission levels with the REF and the joint E10/1 scenarios, and percentage change from the emission levels of 1990.

	Nitrogen oxides		VOCs		Sulphur dioxide		Ammonia	
	REF	E10/1	REF	E10/1	REF	E10/1	REF	E10/1
EU 15	7003 -46%	5923 -55%	7104 -47%	5915 -56%	4854 -70%	3818 -77%	2931 -13%	2447 -28%
Non-EU	6327 -37%	5751 -43%	6694 -16%	6394 -20%	9477 -56%	6979 -68%	3408 -14%	3018 -24%
Europe	14960 -40%	11674 -53%	13798 -35%	12309 -42%	15483 -61%	10797 -72%	6338 -14%	5465 -26%

¹The critical-loads approach is explained more in detail in *Environmental Factsheet No. 8*, coming with this issue of Acid News.

²*Fifth interim report to the European Commission: Cost-effective control of acidification and ground-level ozone*. M. Amann et al. 1998. International Institute for Applied Systems Analysis, 2361 Laxenburg, Austria. Internet: www.iiasa.ac.at/~rains.

Recent publications

Freight transport Europe – Switzerland: To relieve the roads and save the environment (1998)

Pamphlet published jointly by a number of Swiss organizations, urging pricing to reflect the true costs of transportation as well as development of the rail network as means of solving the problem of ever increasing freight traffic through the Alps.

8 pp. Can be ordered from Alpine Initiative, P.O. Box, 3900 Brig, Switzerland. E-mail: alpite@rhone.ch.

Climate Action Network International NGO Directory 1998

266 pp. Available from Climate Network Europe, 44 rue du Taciturne, 1000 Brussels, Belgium. Fax +33 (0)2 230 5713. E-mail: canron@gn.apc.org.

The Environment Encyclopedia and Directory 1998: A World Survey

2nd edition. 500 pp. £210. Published by Europe Publications Ltd., 18 Bedford Square, London WC1B 3JN, England. Fax. +44-(0)171-636 1664.

Ambiente Italia 1998

Fact-packed reports on the state of the environment, not only in Italy but also in the EU and worldwide. In Italian. 264 pp. Published by Edizioni Ambiente and Legambiente. Order from PDE, via Tevere 54, loc. Osmannoro, 50019 Sest Fiorentino (FI), Italy. Fax. +39-55-301372.

The Environmental and Social Costs of Mobility in Italy (1998)

Summary of a study made by P. L. Lombard and A. Molocchi, on behalf of Friends of the Earth Italy. 32 pp. Published by Friends of the Earth Italy, Via di Torre Argentina, 18, 00186 Roma, Italy. E-mail: amici@evolutionweb.it.

Changes in the Environment Series

A series of sourcebooks for teachers with these titles: *Acid Rain* (Grades 4-8), *Acid Rain – Life and Earth Sciences* (Grades 6-12), *Acid Rain – Physical and Social Sciences* (Grades 6-12), and *Ozone* (dealing with ozone depletion as well as ground-level ozone).

Published by Kendall/Hunt Publishing Company, 4050 Westmark Drive, P.O. Box 1840, Dubuque, Iowa 52004-1840, United States.

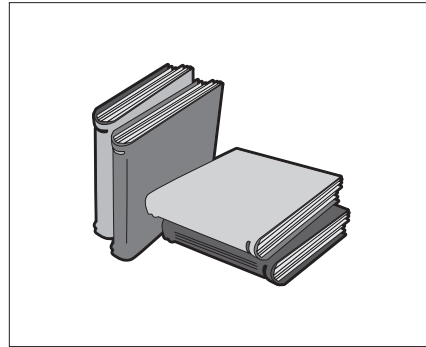
EU Energy Policies towards the 21st Century (1998)

By P. K. Lyons. Describes developments in the sphere of energy within the EU, treating the role of various actors as well as a number of controversial matters such as common EU taxes on carbon dioxide and energy, abolishing coal subsidies, and deregulation of the market for electricity.

200 pp. £425 (NGOs £125). Published by EC Inform. Fax. +44-1252 702 905.

Fueling Global Warming: Federal Subsidies to Oil in the United States (1998)

A consultant firm, Industrial Economics, was commissioned by Greenpeace International to examine the extent of government subsidies to the American



oil industry. Its findings showed it to be \$12 billion a year. The entire report is on Internet: www.greenpeace.org/~climate/oil.

Efficient Transport for Europe: Policies for the Internalisation of External Costs (1998)

Pollution, accidents and congestion all cause unnecessary welfare losses. Internalization aims to create incentives to reduce these external costs by factoring them into markets. This report reviews recent estimates of external costs, explores the mix of policies that might be used to promote internalization successfully, and estimates in terms of money the size of the incentives that would be required.

264 pp. 250 francs. Available from OECD, 2 rue André-Pascal, 75775 Paris Cedex 16, France. Fax. +31-1-4524 8003. E-mail: sales@oecd.org.

Transport Infrastructure in ECMT Countries: Profiles and Prospects (1998)

An analysis of the inland transport infrastructures, the investment forecasts and the main traffic flows in thirty European countries. 392 pp. 550 francs. Can be ordered from OECD, address as above.

Round Tables – ECMT: Infrastructure-Induced Mobility: No. 105 (1998)

As recently as a decade ago, many experts would have disputed the very existence of infrastructure-induced mobility, but the experts are no longer in any doubt that it is a very real phenomenon. This Round Table presents the data that is available to date. 312 pp. 400 francs. Obtainable from OECD, address as above.

Optimizing the fuel mix for road transport (1997)

An attempt to calculate the optimal fuel mix, from an environmental viewpoint, for Dutch road transport in the

year 2010. Published by the Centre for Energy Conservation and Environmental Technology. 78 pp. Can be ordered from MilieuBoek, Plantage Mid-denlaan 2h, P.O. Box 18169, 1001 ZB Amsterdam, The Netherlands. Fax. +31-20-62 352 03.

Speed limiters on vans and light trucks. Environmental and economic effects (1998)

An investigation of the environmental and economic effects of using speed limiters on vans and light trucks (up to 12 tons). Published by the Centre for Energy Conservation and Environmental Technology. 60 pp. Obtainable from MilieuBoek, address as above.

Cleaner fuels for cleaner vehicles (1998)

A comprehensive summary of the Auto-Oil Program, including a scientific review of the methodologies used and a description of the EU decision making procedures for matters such as this. Published by the Centre for Energy Conservation and Environmental Technology. 69 pp. Available from MilieuBoek, address as above.

Grenselös forsuring (1998)

Pamphlet (in Norwegian) describing the acidification problem in general and the available countermeasures, with emphasis on what is happening in the EU.

Europamagasinet Nr 1, 1998. Published by Europabevegelsen, Övre Slottsgate 5, N-0157 Oslo, Norway. E-mail: europa2@online.no.

Air Quality Management at Urban, Regional and Global Scales (1998)

722 pp. 180 francs. Can be ordered from Trans Tech Publications Ltd., Brandrain 6, 8707 Uetikon-Zürich, Switzerland. Fax. +41-1-922 1033. E-mail: ttp@ttp.ch. Internet: www.ttp.ch.

RAPIDC Newsletter

Regional Air Pollution in Developing Countries is a project that is being carried out by the Stockholm Environment Institute, and financed by the Swedish International Development Cooperation Agency. Newsletter intended to be the first of a series reporting on the changing situation. Requests to be put on the mailing list to SEI at York, Department of Biology, University of York, Box 373, York YO10 5YW, England. Fax. +44-1904 43 2898. E-mail: ac29@york.ac.uk.

Global Ecosystem Sensitivity Poster (1998)

The Preliminary Global Map of Ecosystem Sensitivity to Acidic Deposition, first published by the Stockholm Environment Institute some years ago (AN 3/97) has now been updated and can be obtained in a revised form from the SEI at York, address as above.

WHO WARNING

Traffic and health

LONG-TERM EXPOSURE to air pollution from road traffic is killing over 80,000 people a year in Europe, according to latest estimates from the World Health Organization. The figure is based on American studies of long-term exposure to particulate matter from automobile exhausts and refers only to adults living in urban areas. Since it is young children and the elderly that are most at risk from traffic pollution, the number for the total population could be significantly higher. According to WHO, air pollution from all sources kills 200,000-300,000 people in Europe each year.

The unpublished statistics were presented at a major conference on transportation, environment and

health in Vienna at the end of July. The meeting was in preparation for a ministerial conference in London, in June 1999, which is expected to adopt a European charter covering these matters.

Rather than focusing only on the negative impacts of transportation, WHO plans to highlight the benefits of environmentally benign modes such as cycling and walking. The UN body estimates that these forms can halve the risk of coronary heart disease and reduce the risk from diabetes, obesity, and most of the chronic diseases prevalent in the European population.

More information: WHO Regional Office for Europe. Internet: www.who.dk/london99.

On the march

Last year world generating capacity for windpower increased by 25 per cent. Germany led the field, followed by the United States and Denmark. The total installed capacity is now 8000 megawatt. Notable last year was the tendency for large energy concerns to go in for windpower. Such was the case for example with the American energy supplier Enron, but the Shell oil company also announced its intention of adding windpower to its other activities. According to a British report, the price of electricity from new wind installations in Germany is comparable with that from new coal-fired plants.

Source: *Vital Signs 1998*. Published by World Watch Institute, 1776 Massachusetts Ave., NW, Washington DC 20036, United States. Internet: www.wwi.org.

Now for the climate

The Italian government is reported to be making provision in its budget for 1999 for a tax on emissions of carbon dioxide. The tax level now being considered is said to lie between 10 and 30 lire (US\$0.01-0.03) per kilogram. Such a tax would be important in Italian strategy for attaining the country's target as a part of the EU climate commitment.

Environmental taxes were introduced for the first time in Italy in the 1998 budget, when they were laid on emissions of sulphur dioxide and nitro-

gen oxides from large combustion plants. They are 103,000 lire (\$59) per ton of SO₂ and 203,000 lire (\$116) per ton of NO_x. The income from them is expected to be 146 billion lire (\$83 million) a year.

Environment Watch: *W. Europe*. August 7, 1998.

Japan

The Environment Agency in Japan has released a study indicating that diesel cars, which make up 18 per cent of the 63 million cars registered in Japan, account for 75 per cent of the 550,000 tons of NO_x emitted by all cars each year. Diesels' share of hydrocarbon and particulate emissions is said to be 56 and 100 per cent.

Car Lines. M.P. Walsh. May 1998.

Harmful subsidies

Emissions of CO₂ in the Netherlands could be reduced by 3 to 11 per cent a year if the government stopped subsidizing certain activities that stimulate the use of energy, according to a study made for Greenpeace by the Dutch Centre for Energy Saving and Clean Technology. Each year, the study claims, the government allocates 13-25 billion guilders to measures that are harmful to the climate. Among the examples cited are the exemption of major energy users from energy taxes, and tax deductions for the cost of commuting.

Environment Watch: *Western Europe*. September 4, 1998.

Coming events

Fourth Conference of the Parties to the Climate Convention. Buenos Aires, Argentina, November 2-13, 1998. *Information:* Convention Secretariat, P.O. Box 260124, 53 153 Bonn, Germany. Fax: +49 2288151999. Internet: www.unfccc.de. E-mail: secretariat@unfccc.de.

Action Days on Air Traffic. November 6-7, 1998. Part of "The Right Price for Air Travel Campaign". *Information:* Friends of the Earth Netherlands. Internet: www.milieudedefensie.nl. E-mail: paul.de.clerck@milieudedefensie.nl.

Executive Body for the Convention on Long Range Transboundary Air Pollution. Geneva, Switzerland, December 7-11, 1998.

EU Council of Environment Ministers. Brussels, Belgium, December 7-8, 1998.

Working Group on Strategies under the Convention on Long Range Transboundary Air Pollution. Geneva, Switzerland. January 25-29, 1999.

Working Group on Strategies under the Convention on Long Range Transboundary Air Pollution. Geneva, Switzerland. March 22-26, 1999.

Working Group on Strategies under the Convention on Long Range Transboundary Air Pollution. Geneva, Switzerland. May 31-June 4, 1999.

Third Ministerial Conference on Environment & Health. London, England, June 16-18, 1999. Ministerial Conference organized by the World Health Organization. *Information:* WHO Regional Office for Europe: www.who.dk/london99/

Working Group on Strategies under the Convention on Long Range Transboundary Air Pollution. Geneva, Switzerland. August 30-September 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, Hirakawa-cho, Chiyoda-ku, Tokyo 102-8646, Japan. E-mail: acid2000@ics-inc.co.jp.

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