

Acid News



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SHIPS' EMISSIONS

A proposal for wider control

THE CONSIDERABLE EMISSIONS of sulphur and nitrogen oxides from international shipping is a matter that has usually been given little attention, and usually when it has been taken up, it has been considered too difficult to handle. But according to a recent study¹ by Per Kågeson, a solution is possible, at least for north European waters.

Unless something is done about emissions from ships, and assuming that the EU countries really do reduce their emissions from land by 2010 as proposed in a directive for national ceilings, emissions from shipping in the northeastern Atlantic and the North and Baltic seas

will be equivalent to almost half of the total EU emissions of sulphur, and more than a third of those of nitrogen oxides (see table on page 3).

The figures for shipping, high though they are, apply only to ships in international trade. They do not include emissions from ships plying in inland and territorial waters. These last appear in the statistics of each country.

Some attempt at controlling emissions from ships in international trade has been made since the beginning of the decade through the IMO, the International Maritime Organization (a UN body). The outcome in 1997 was however only an

ineffectual annex to the MARPOL convention (see AN 4-5/97).

The year after, though, a promising remedy appeared in the system of differentiated harbour and fairway dues that was introduced in Sweden. These are so designed as to make it advantageous for shipowners to run their vessels on low-sulphur oil and install equipment for controlling emissions of nitrogen oxides (see AN 1/99, pp. 12-13).

It turns out from Per Kågeson's study that this Swedish system has already had an appreciable effect, especially in reducing the emissions of sulphur. Estimates from the Na-

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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

What's stopping them?

AT THE COUNCIL MEETING in Luxembourg on October 12 the EU environment ministers gave their countries' views, in a *tour de table*, on the proposed directives for national emission ceilings and ground-level ozone. Practically all supported the interim environmental-quality targets on which these directives are based. Some of those representing Mediterranean countries were however guarded, claiming an exceptional situation as regards ozone in their countries.

That very same day the Commission presented two reports on the actual situation for ground-level ozone, from which it appeared that current concentrations often exceed by far the protection thresholds for saving people's health and vegetation. Both the highest concentrations and the greatest number of days on which the threshold had been overstepped occurred in the Mediterranean area, and particularly in Italy, Spain, and Greece.

A week or so later, at a meeting of the Council's environment working group, the Commission made known the results of an analysis that it had made to evaluate the effects of the new multi-effect protocol emanating from the Convention on Long-Range Transboundary Air Pollution. It was immediately obvious – just as we reported in Acid News 3/99 (pp. 1-5) – that this protocol would be totally inadequate for the attainment by 2010 of the interim environmental-quality targets proposed by the Commission. And this applies not only to the effects of ozone, but also to those of acidification.

The only way to achieve the desired environmental aims will be to further reduce the emissions of acidifying and ozone-forming air pollutants – at least to the extent proposed in the directive for NECs, national emission ceilings. But not a single EU country has shown itself prepared to go full out in accepting the terms of the directive and reduce its emissions for all four pollutants (sulphur dioxide, nitrogen oxides, volatile organic compounds, and

ammonia). Also with regard to the multi-effect protocol of the Convention on Long-Range Transboundary Air Pollution, it is precisely the Mediterranean countries that are hanging back and least willing to cut down emissions to the extent needed.

The same countries are also dragging their feet in regard to the revision of the LCP directive for reduc-

ing emissions of sulphur and nitrogen oxides from large combustion plants. If that directive is to have any real effect in the next 10-20 years, it will also have to be made to apply to existing plants, not only to new ones. This has been clear to the European parliament, which is in fact debating a bill for it. Its proposal has however been categorically rejected not only by Spain, Italy, Portugal, and Greece, but also by Great Britain and Ireland.

All the air pollutants encompassed by the NEC and LCP directives, as well as the multi-effect protocol, fall into the transboundary category, capable of being transported over thousands of kilometres in only a few days. Every country will therefore have to do its part in curbing them. The situation is especially paradoxical in regard to ground-level ozone, since it is just those countries that are worst affected, and so would have the most to gain, that are refusing. It seems astonishing, to say the least, that governments in the Mediterranean countries should apparently be so indifferent to the well-being both of their electors and the environment. It is perhaps surprising, too, that the public in these countries should seem to be so unaware of what is happening and are not protesting.

This state of affairs could also be interpreted as the sign of a weakness in international environmental politics. It doesn't make sense that a few countries should be able to stand in the way of measures that are needed for improving the environment all over Europe.

CHRISTER ÅGREN



ON THE FOLLOWING PAGES



The ferry Aurora, plying between Sweden and Denmark, was one of the first to be equipped with SCR for reducing NOx emissions. The vessel on page one is the Cellus, carrying sawn goods for Södra forest products company. Equipped for SCR as well as running on low-sulphur oil.

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Few countries have shown willingness to reduce emissions sufficiently to meet the aim of the proposed directive for national ceilings. There is also similar though less reluctance in the case of large combustion plants.

Multi-effect protocol 5

Although the emissions of the four pollutants are expected to fall, the proposed reductions will be insufficient for attaining even the preliminary aims for 2010 that were agreed earlier this year.

Europe's forests 6

A general trend for the worse is observed in almost all species. The most extensively damaged forests are in central and eastern Europe.

Ozone 11

Concentrations lie frequently above the threshold for the protection of human health, particularly in the Mediterranean countries. But the situation has been even worse for vegetation.

Protocols 12

Far from all the countries that have signed the various protocols are fulfilling even the minimum requirements. To maintain the Convention's credibility, much better compliance will be needed.

Children in cities 14

Children are more at risk than adults from the effects of air pollution. In many of the world's largest cities, where the pollution is worst, the average age of the population is less than sixteen years.

EMEP monitoring 16

Latest reports show the downward trend for emissions of acidifying air pollutants to be continuing, with great reductions for sulphur dioxide in particular.

Heavy-duty vehicles 19

In America the EPA is proposing standards to drastically reduce the emissions of a number of noxious substances from heavy-duty vehicles, with even more stringent ones to follow. The agency is also aiming at sulphur in motor fuels.

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tional Maritime Administration show them to have come down by 60 per cent since 1990. That figure however includes the emissions from ships whose owners had voluntarily gone over to using low-sulphur oil before the national system started.

Although only eleven vessels have so far been certified as "clean" in respect of nitrogen oxides, the Administration still expects that by January 1, 2001, the NO_x emissions from ships calling at Swedish ports will be down by 45 per cent from 1995.

That this system of differentiated dues should be so successful in cutting down emissions can be largely explained by the fact that most of the traffic goes along fixed routes. The effect would however be greatly improved if like systems were to be adopted by other countries. The trouble is that many countries exact no fairway dues at all.

Kågeson proposes to remedy this through an EU directive requiring member and candidate countries to

introduce fairway dues that accord with the distance travelled. Using fairway dues only would be better, he says, than trying to differentiate existing harbour dues, because fairway dues can be made non-negotiable and completely transparent.

Kågeson admits that a white paper from the EU Commission, on infrastructure charging, calls for all modes of transportation to pay their marginal costs, including those for damage caused by emissions of pollutants. Since however none of the others yet do it, an environmental charge on shipping should for the time being be differentiated in such a way, he says, as to be revenue neutral.

It will be important, if fairway dues are to have the desired effect, to relate them to the amounts of pollutant emitted. They should be set at such a level as to make it worthwhile for owners to switch to low-sulphur fuel and invest in equip-

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European emissions of SO₂ and NO_x in 1990 and 2010. Million tons.

	1990		2010	
	SO ₂	NO _x	SO ₂	NO _x
EU countries	16.3	13.2	3.6 ¹	5.9 ¹
Non-EU countries	21.6	10.2	9.9 ²	7.3 ²
International shipping	1.6	2.3	1.6	2.3
Sum total, Europe	39.5	25.7	15.1	15.5

¹ Projection in the European Commission's proposed directive for national emission ceilings.

² Projection in the multi-effect protocol of the LRTAP Convention.

Shipping...

Continued from page 3

ment for thorough cleaning of the exhaust gases from nitrogen oxides – at least in the case of ships plying regularly within the due-paying area.

If it is feared that making the system apply only to ports northeast of a certain line would distort competition between those lying on either side of that line, says Kågeson, some geographical differentiation of the dues might be considered. Any negative effects could be avoided by a stepwise levelling down of the dues in a southwesterly direction.

Failing a full international system, the next-best solution would, in Kågeson's view, be for other countries with a seaboard to follow Sweden's example by introducing either differentiated fairway or port dues, or both. The more countries that do this, the greater will be the incentive for shipowners to change to a more environmentally friendly mode of operation. There is however a disadvantage in the Swedish system in that it does not take account of the distance travelled and that its cost-effectiveness is to some extent lessened by various fixed or negotiable discounts.

Kågeson insists that all countries would benefit from a reduction of the emissions of sulphur and nitrogen oxides from ships in international trade. According to estimates made by the IIASA research institute in 1996, if the proposed EU environmental-quality target for acidification were to be achieved solely by applying technical measures to land-based emission sources, the annual cost by 2010 would come to 7 billion euros. With cost-effective measures applied to shipping in the assumed area – the Baltic and North seas and the northeastern Atlantic – the cost could be reduced by 30 per cent, to 5 billion euros.

There would thus be an opportunity either for achieving the same aim at greatly reduced cost or for setting the sights for still further environmental improvement.

PER ELVINGSON

¹ *Economic instruments for reducing emissions from sea transport.* By Per Kågeson. Published jointly by the Swedish NGO Secretariat on Acid Rain, European Environmental Bureau (EEB), and European Federation for Transport and Environment (T&E). An eight-page digest of the study is also available. See back page of this issue.

EUROPEAN UNION

Stalling on ceilings

ONE OF THE MAIN ITEMS on the agenda when the EU environment ministers met in Luxembourg in October was the proposed directive on national emission ceilings (NECs). Although all the EU member countries seemed to be in favour of the proposal – to set interim targets for restraining acidification and the formation of ground-level ozone during the period up to 2010, and to ensure results by means of mandatory emission ceilings – so far few countries have shown any great willingness to reduce emissions to the extent needed to fulfill the aim.

The most unwilling are Portugal, Spain, France, Italy, and Greece. Countries on the northern fringe of Europe, such as the Netherlands, Sweden, and Denmark, are more positively inclined, but even they

say they would have difficulty in achieving the reductions proposed by the Commission.

Also under discussion was the Commission's proposal for a new daughter directive on ground-level ozone. Attainment of the target values for concentrations in 2010 will depend however on fulfillment of the terms of the NEC directive.

Both proposals have now come before the European parliament, which will make its views known in a first reading scheduled for February or March next year. Only after that will the Council of Ministers try to reach a common position.

Note. Both proposals have been reported fully in previous issues of Acid News, especially No. 2 and 3, 1999.



PHOTO: GERMAN MINISTRY FOR ENVIRONMENT

... and LCP-standards

LAST APRIL the first reading took place in the European Parliament of a bill for stricter standards for emissions of SO₂ and NO_x from large combustion plants (see AN 2/99, pp. 6-7), and this autumn the matter has been further discussed in the Council of Ministers, with the aim of reaching a "common position." While most countries are willing to accept the Commission's proposals for stricter requirements for plants not yet built, there is still quite a large number that is definitely against parliament's proposal that

they should apply to existing installations as well.

As in the case of the NEC directive, the greatest resistance comes from southern Europe, and especially from Spain, although Britain and Ireland are also against the proposal. France and the Netherlands seem disposed to agree to curbs on emissions from existing plants, while nevertheless rejecting the Parliament's proposal. As current chairman of the EU, Finland is trying for a common position by the time of the Council meeting in December.

Clear shortcomings of new protocol

After five years of negotiations a multi-effect protocol to curb European emissions of air pollutants finally became signed in early December, although doubts remain as to its adequacy.

AS REPORTED in the last number of Acid News, in September more than thirty nations agreed on a so-called multi-effect protocol to the Convention on Long-Range Transboundary Air Pollution. Now officially named the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone, it was formally adopted and signed by twenty-seven countries at the time of the meeting of the Executive Body of the Convention in Göteborg, November 29 to December 3. At the same time, four more countries declared their intention of signing the protocol in the near future.

At the last round of negotiations in September, several countries expressed dissatisfaction at the generally feeble aims of the protocol – and especially at the altogether too high ceilings for emissions in the case of a number of countries. Consequently it was agreed to allow every country the possibility of proposing new ceilings for its emissions by October 14 – a possibility that was taken only by Belgium and Sweden. The latter proposed to lower its ceiling for nitrogen oxides from 168,000 to 148,000 tons a year, and for ammonium from 58,000 to 57,000 tons, while Belgium offered reductions from 121,000 to 106,000 tons for sulphur dioxide, and from 184,000 to 181,000 tons for nitrogen oxides.

Provided that the signatories to the protocol actually stick to the ceilings set for them, and that emissions in the non-signatory countries do not increase, the European

emissions of sulphur dioxide, nitrogen oxides, volatile organic compounds, and ammonia may be expected to fall at least to the levels indicated in the table. As could be seen from the projections of the effects of the new protocol (AN 3/99, p.3), the proposed emission reductions are far from sufficient for achieving the preliminary aims for 2010 that were agreed in January 1999. Compared with what will be needed to come up to the internationally agreed long-term aim – no more exceeding the critical loads for pollutants anywhere – they are of course even more inadequate.

All this underscores the need of continued activity to bring down the emissions of these pollutants still further. That can naturally be done both within the framework of the Convention and elsewhere. It says in fact in the new protocol (Article 10) that there are to be reviews, and that the first “shall commence no later than one year after the present Protocol enters into force.”

It will therefore also be important that the signatories ratify the protocol without undue delay (ratification by sixteen countries is needed for it to come into effect). Previously it has taken anything from two to almost six years to get the Convention's protocols ratified.

CHRISTER AGREN

The address of the Convention's homepage is www.unece.org/env/lrtap. The new protocol appears as Document EB.AIR/1999/1 and 2, available both as text file and pdf file.

Expected emission reductions by 2010, alternatively from 1980 and 1990 levels. For the present members of the EU (EU15), the non-EU members (non-EU), and both together. Emissions from international shipping are not included.

	Sulphur dioxide		Nitrogen oxides		VOCs		Ammonia	
	1980-2010	1990-2010	1980-2010	1990-2010	1980-2010	1990-2010	1980-2010	1990-2010
EU15	85%	75%	49%	50%	53%	56%	16%	15%
Non-EU	61%	49%	15%	31%	22%	28%	22%	20%
Europe	73%	61%	36%	42%	41%	44%	20%	18%

Sources: EMEP and EB.AIR/1999/1



New pamphlet

The new multi-effect protocol is described, with all its promises and shortcomings, in a 12-page pamphlet published jointly by the Swedish NGO Secretariat on Acid Rain, the European Federation for Transport and Environment, and the European Environmental Bureau.

It sets forth the commitments made by each country, the expected overall effects on the environment, and the points to be considered in view of forthcoming revision. It also discusses the usefulness or not of international agreements of this kind.

Single copies can be obtained free of charge from the Secretariat (address in the masthead on page 2).

Breakthrough for STT

The new technique for cleaning nitrogen oxides and particulate matter from the exhaust gases of heavy-duty vehicles, reported in AN 3/99, has had its first commercial breakthrough. Volvo Buss, the world's leading bus manufacturer, with annual sales of 10,000 vehicles, is the first to have signed a contract with STT, licensing it to use the system on its buses.

Turn comes for new power plants

Following a review of the emission standards in the Clean Air Act, the US Environmental Protection Agency is proposing tighter ones for emissions of nitrogen oxides from new plants. According to the EPA the revised limits should result in a cutting of the projected growth in NO_x emissions by 42 per cent, or 45,800 tons less per year than they would be with present standards.

The proposal favours plants with a high efficiency, and is intended to be fuel-neutral (making no difference what kind of fuel is used). The idea appeals to the Natural Gas Supply Association, but not to the National Mining Association. As a representative of the latter says:

“Coal use would be discouraged because all new coal-fired units would need to install expensive Selective Catalytic Reduction technology. In contrast, units burning natural gas wouldn't have to install any new control technology.”

Source: Reuters, September 9, 1999.

Emissions from trucks

On November 16 the EU Parliament staged a second reading of a proposal for new emission standards for heavy-duty vehicles. It passed the text agreed on by the environment ministers, while rejecting all the changes proposed by its environment committee, such as moving the date for introduction of the limit of 2 grams NO_x/kWh forward to 2006.

... and motorcycles

The tightening down of emission standards for cars and trucks means that the relative amount of pollutants from motorcycles will be increasing. A study published by the Umweltbundesamt, the German environmental agency, shows the country's 3.2 million motorcycles to be responsible for 10 per cent of the transport sector's emissions of volatile hydrocarbons, despite only answering for 2.5 per cent of the total travel distance. The agency is therefore urging that EU should hurry on with the work it has already begun to introduce emission and noise standards for motorcycles.

ENDS Daily, October 4, 1999.

Declared unsustainable

In a strategy agreed in October, the EU ministers of transport made it clear that they considered continued growth in traffic to be incompatible with sustainable development.

The point of their strategy was to merge environmental aspects into transportation policy. The EU countries and the Commission are urged in to work out packages of measures that take in such things as increased taxes and charges, town and country planning, mass transportation, and IT solutions.

The strategy will be laid before the meeting of the EU heads of state, who had ordered it, in Helsinki in December.

Loosening up

Between 1970 and 1998 the railways' share of freight traffic in the EU declined from 30 to 14 per cent, and lately ever more calls have come for breaking up the national railway monopolies in order to allow more competition. A proposal to this effect was put forward at the meeting of the EU ministers of transport in October. The committee for the permanent representatives of the member countries (COREPER) is to work out a proposal for presentation at the meeting of the Council in December.

T&E Weekly No. 20, October 1999.



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EUROPE'S FORESTS

General trend for worse

DURING THE annual forest survey in the summer of 1998, some 127,000 trees, spread over 5700 sample plots in a network covering most of Europe, were examined for defoliation. Of this number 24 per cent were assessed as damaged – meaning that they had lost more than 25 per cent of their leaves or needles in comparison with reference trees of the same species.

Of the four most common species in Europe – Scots pine (*Pinus sylvestris*), Norwegian spruce (*Picea abies*), European oak (*Quercus robur*), and beech (*Fagus sylvatica*) – the one most damaged was European oak. The most extensively damaged forests were found in the Czech Republic, Slovakia, and the southern parts of Poland and Belarus.

The number of trees with thinned crowns was about the same in 1998 as in the previous year. Since however the number of trees and sample plots tend to vary from survey to survey, the general trend can be more accurately judged from an examination of the 64,000 so-called "common sample trees," which have been rated every year since 1992.

As can be seen from the chart, the extent of defoliation varies over time. A general trend for the worse is however observable in almost all species. There are also geographical variations, which do not appear in the chart. A degree of recovery has for instance been seen in Scots pine in some parts of eastern Europe, while European and sessile oak (*Quercus petraea*) are now found to

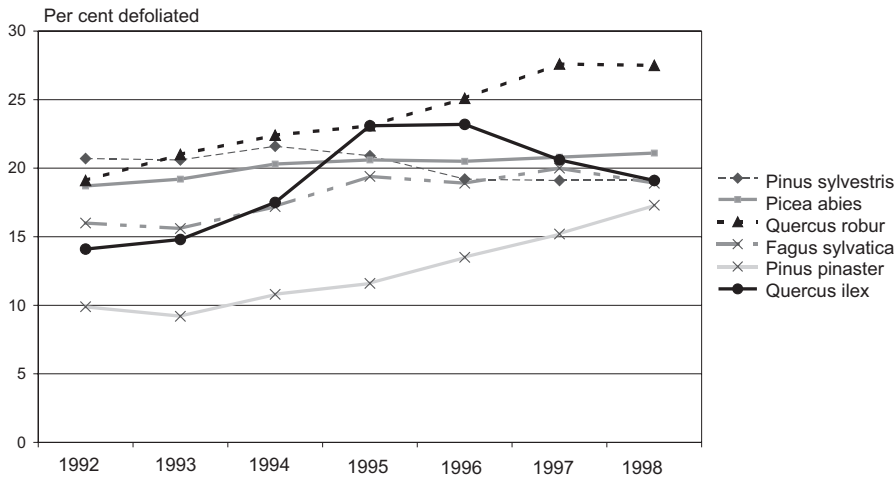
be in very much worse state in western Europe.

Alongside the all-Europe survey from which the above figures are drawn, most countries have made surveys of their own on essentially the same lines, but with a greater number of sample plots. The results from these latter are shown in the table.

Scientists still cannot say exactly why defoliation is gradually getting worse. Trees lose leaves and needles on account of stress, but stress may come from many causes. It may be natural, as from drought, fungi and insect attack, or be caused by human activities leading for instance to raised concentrations of ground-level ozone, or change in nutrition as a result of depositions of acid and nitrogen. All these factors can act in combination, but which or any of them will have the greatest effect will vary considerably from time to time.

This does not however prevent researchers from trying to trace the extent of human influence. From pilot studies it now appears that:

- There is a geographical connection between crown thinning and depositions of sulphur and nitrogen.
- There is a similar connection between large fallouts of acidifying substances, acidified forest soils, and fairly extensive tree damage.
- Acid depositions exceeded the level at which adverse effects on forests can be expected at 15 per cent of the places where the soil chemistry was tested.



Defoliation (trees with a crown thinning of >25 percent) in the subsample "common sample trees," 1992 to 1998.

□ Ozone can be assumed to have been a major factor contributing to the signs of forest decline that can now be seen, especially in southern Europe.

Dr Martin Lorenz, who heads the all-Europe survey and works at the

Results from national forest-damage surveys, 1996-98.

Percentage of trees in Classes 2-4 (defoliation >25 per cent).

	1996	1997	1998
Albania	—	—	10
Austria	8	7	7
Belarus	40	36	30
Belgium	21	17	17
Bulgaria	39	50	60
Croatia	30	33	26
Czech Rep. ¹	72	69	49
Denmark	28	21	22
Estonia ²	15	11	9
Finland	13	12	12
France	18	25	23
Germany	20	20	21
Greece ³	24	24	22
Hungary	19	19	19
Ireland	13	14	16
Italy	30	36	36
Latvia	21	19	17
Lithuania	13	14	16
Luxembourg	38	30	25
Moldova	41	—	—
Netherlands	34	35	31
Norway	29	31	31
Poland	40	37	35
Portugal	7	8	10
Romania	17	16	12
Slovak Rep.	34	31	32
Slovenia	19	26	28
Spain	19	14	14
Sweden	17	15	14
Switzerland	21	17	19
Ukraine	46	31	52
U.K.	14	19	21
Yugoslavia	4	8	8

¹ Until 1997 only trees older than 60 years were assessed. ² 1996-97 conifers only. ³ Excluding maquis.

Institute for World Forestry in Hamburg, Germany, comments:

"I hope that our report still leaves no doubt that defoliation has a lot of causes, but it has indeed been possible over the years to collect ever more indications for the plausible assumption that air pollution is involved. The data from forthcoming integrated evaluations should cast new light on this issue."

He does not, however, expect any immediate answer, for the simple reason that "if one tries to assess forest condition by only one parameter – in other words, defoliation – it is not surprising that one find a wealth of possible causes."

"It is however likely," he says, "that we will end up with the identification of some regions where the relationship between air pollution and defoliation is clearer than elsewhere."

The writers of the executive report consider it important that the surveys should continue, and that Level II monitoring – taking in such things as soil chemistry and critical loads – should be used to try and get a clear picture of cause and effect. Since ozone, moreover, has been proved to be damaging to trees, they want to see intensified attempts to assess its effects.

PER ELVINGSON

Sources: *Forest Condition in Europe. 1999 Executive Report* and *Forest Condition in Europe. Results of the 1998 crown condition survey. 1999 Technical Report*. Both available from the Federal Research Centre for Forestry and Forest Products, Leuschnerstr. 91, D-21027 Hamburg, Germany. Internet: www.dainet.de/bfh/inst1/12/icpforf.htm

Sounding it out

In September 1998 thirty or so French cities organized a car-free day. This year sixty-six towns in France did the same, and were joined by ninety-five others, including Rome, Naples, Florence, Turin, and Genoa in Italy. In Switzerland, Geneva and a number of neighbouring towns went car free, as did twenty-one in the Netherlands.

Already last year distinctly less noise and much cleaner air could be registered in France as a result of keeping cars off the streets. But maybe the greatest effect of car-free days lay in making people aware of what cars are doing to our cities, and what life would be like without them.

In a French opinion poll this year 80 per cent said they thought car-free days were a good idea, and 44 per cent thought there should be one every week. In the Netherlands three out of four of those polled wanted one car-free Sunday every month.

Now if the French environment minister Dominique Voynet has her way, the next step will be a car-free day all over Europe. At any rate she has got the EU Commission to take 1 million euros from the LIFE fund to make preparations for one in September 2000.

Lots of ideas and suggestions for arranging car-free days and suchlike can be found on Internet: www.ecoplan.org/carfreeday/.

Easing off

Romano Prodi, EU Commission chairman, has laid down that candidate countries for admission to the Union must in general abide by single-market rules immediately on entry – but may be allowed a few years in which to arrange to meet environmental requirements. Compared with the attitude of the previous commission, this represents a distinct easing off – the last one having been of the opinion that there should be no exceptions. As it is, all candidate countries are likely to want them. Hungary has already put in a request for twenty.

In its report on EU expansion, published on October 13, the Commission noted that none of the candidate countries was very far advanced in complying with EU environmental laws. Poland, the Czech Republic, and Hungary were especially criticized for tardiness in this respect, while Slovenia, Lithuania, and Latvia received praise for "notable progress" since the last survey in 1998. A special warning was issued to Bulgaria: The EU would not allow formal accession to begin unless the country agreed to an acceptable deadline for closure of its nuclear reactors.

ENDS Daily, October 14, 1999.

Making a bid for cleaner air

To bring an improvement, FoE is concentrating on a review of the electricity supply industry

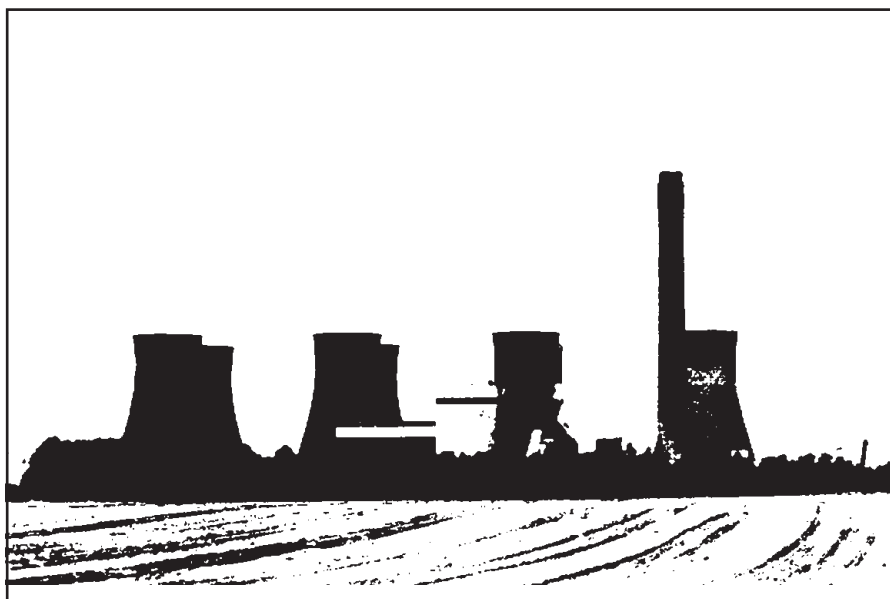
In the eighties, the UK was known as the "Dirty Man of Europe" because of its emissions of acid gases and its reluctance to control them. Environmentalists are trying to ensure that this image will be a thing of the past, concentrating just now on the government's review of the electricity supply industry.

In that review the idea of a general retrofitting of FGD equipment to coal and oil-fired power stations was rejected on the grounds that it would be unlikely to be cost-effective on plants with low load factors, and would moreover threaten the diversity of the country's energy supply as well as jobs in its coal industry. The suggestion is now that each generator should "be encouraged" to have at least one of its plants equipped for flue-gas desulphurization and "endeavour" to run that plant more intensively than others not so equipped.

As regards nitrogen oxides, on the other hand, the government – evidently impressed by the effect of low-NO_x burners in halving the emissions from power stations since 1990 – sees a potential for further reductions in the requirements proposed by the Environment Agency for upgrading with new types of NO_x burner.

The government's attitude is reflected in its opening, and subsequently revised, bids in respect of the Multi-Effect Protocol under the Convention on Long-Range Transboundary Air Pollution, where it started by offering to make all the small reductions that are required for NO_x emissions but only 58 per cent of those for SO₂, and none for VOCs and ammonia. It later increased its offer for SO₂ to 74 per cent of the required total, and proposed 60 per cent for VOCs, while still making no offer at all for ammonia.

Friends of the Earth maintain that the government had greatly underestimated the cost-effectiveness of retrofitting FGD, saying that the figure of £5000 submitted by the generating companies as the cost of eliminating one ton of SO₂ is seriously flawed. For one thing it inflates the Environment Agency's estimate of £3000 per ton for a plant operating



DRAX © CHRISTIE AGREN

on low load and retrofitted with wet-limestone FGD, the system widely used in Britain. For another,

The government had underestimated the cost-effectiveness of retrofitting FGD

the figures represent not only a low load factor but also a short lifespan for the power stations – possibly as low as 5-7 years.

There is however growing evidence that power-station lives will be extended beyond 2010 – the end as-

sumed by the Environment Agency when making the calculations in 1996 that led to the conclusion that widespread retrofitting of FGD constituted "excessive costs" and should therefore not be required.

With a revised lifespan, allowing a further 15 years of operation after retrofitting, the cost per ton of SO₂ removed by wet-limestone FGD from plants operating on low load would drop to £1000. With seawater scrubbing, which could be used at non-sensitive coastal locations, it would fall even lower, to £725, according to official calculations.

As evidence of the possibility of extended lifespans began to emerge, Friends of the Earth proposed that the Agency reconsider its conclusions in regard to FGD, with the result that the generators are now having to submit updated assessments for the "A" limits for all power stations that are likely to operate at a load factor of more than 40 per cent after October 2001.

The A limits apply to individual power stations, and take into account the local effect of their emissions. There are also "B" limits, concerning the total of emissions from a generating company's plants, with account taken of their combined effect. The sum of the A limits for any one company will be greater than the B limit. Any station can be operated up to its A limit, provided the

UK emission levels 2010 (kt), according to various scenarios and bids.

	REF ¹	G5/2r ²	UK ³	UK ⁴
SO ₂	980	499	700	625
NO _x	1186	1181	1181	1181
VOCs	1351	1101	1351	1200
NH ₃	297	264	297	297

¹ According to the reference scenario in the multi-effect protocol (LRTAP Convention).

² The protocol's central negotiating scenario.

³ UK bid in negotiations in May 1999.

⁴ Revised UK bid, in the final protocol.

that the overall emissions do not exceed the B limit.

Friends of the Earth's case has been strengthened by the findings of the House of Commons Trade and Industry Committee on coal, which wrote:

"... it is not our impression that the generators have had to make vast investments in abatement technology in order to meet these [emission] limits ... Compared to the widespread use of FGD in Europe, notably Germany, we strongly deprecate the continued failure of British generators to invest in FGD. We have some sympathy for the Environment Agency's view that, if some older coal plants are indeed to run beyond 2010 as is now apparently suggested, it cannot be forever acceptable to dismiss FGD as excessively expensive, even if the plants concerned would have low load factors."¹

They have also been able to use evidence from UK generators to counter concerns about diversity of energy supply and jobs in the UK coal industry. Eastern Generation for instance wrote to the Environment Agency regarding the company's decision to retrofit FGD to its West Burton power station:

"The only practical alternative to the approach of fitting an FGD operating on UK coal is to use low sulphur coal, although this option is limited in its sulphur abatement potential. Since there is insufficient low-sulphur fuel for all five Eastern power stations, it would have to be imported and this would result in the requirement to close UK pits. This process is irreversible and future fuel procurement options would therefore be limited to imports, with potentially serious implications for the security of fuel supplies."²

Despite this mounting evidence in favour of more FGD in the UK, the generators continue to resist the A limit reviews. They argue that they never explicitly claimed that power stations lives would end in 2010, but then present cost calculations based on that assumption. They argue that commercial uncertainty about power-station lives makes the retrofitting of FGD inappropriate. They argue that the UK is on target to meet its existing international treaty agreements, and therefore additional FGD is not needed. They argue that the local impact of SO₂ is not relevant. And they even argue that, in putting forward proposals to further cut UK emissions, the Environment Agency is undermin-

ing the UK government's negotiating position on the EU Acidification Strategy. Friends of the Earth has rebutted all of these in writing to the Environment Agency.

In addition to reviewing the power station A limits, the Environment Agency has also been consulting on proposals to implement the government's objective of increasing competition in the UK electricity supply industry. This objective has already seen the sale of power stations to reduce the market domination of two companies – PowerGen sold Fiddlers Ferry (2 GW) and Ferrybridge (2 GW) to Edison Mission Energy, and National Power sold Drax (4 GW) to AES. However, the Environment Agency is now devising a system of emission controls that will further increase competition by allowing one company to take production away from another. It is doing this by linking each company's overall emission limit (the portfolio B limit) to the provision and use of FGD equipment.

The Agency is proposing temporary increases in the B limit for any company retrofitting additional FGD equipment or using it in preference to its unabated plant. As the amount of electricity generated from coal-fired stations is fairly constant, increasing B limits will allow a more efficient company to take production away from a competitor without causing any overall increase in emissions. An emission limit per unit of electricity generated prevents a company that has lost production from using its "surplus" B limit to burn dirty fuels.

The Environment Agency anticipates that its proposal could cut SO₂ emissions to significantly below their current target of 365 kt by 2005. Friends of the Earth are therefore awaiting the results of the consultations before pressing the UK government to incorporate them into future bids that would equally significantly lay to rest the "Dirty Man of Europe" label.

LESLEY JAMES

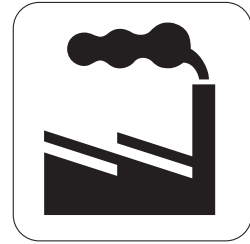
Acid Rain Campaigner, Friends of the Earth (England, Wales and N. Ireland)

References

¹ The Fourth Report of the House of Commons Trade and Industry Committee; *Coal*; Vol. 1, March 1998.

² *Response to Environment Agency's 1998 Consultation Paper and a Review of Best Available Techniques Not Entailing Excessive Cost (BATNEEC)*. Eastern Generation, January 1999.

Now being prosecuted



AFTER TWO YEARS of investigation, the EPA has now started to prosecute the owners of thirty-two coal-fired power stations, maintaining that they have illegally permitted the emission of huge amounts of sulphur and nitrogen oxides, and demanding high penalties.

In the words of EPA administrator Carol M. Browner: "As a result of one of the largest enforcement investigations in EPA history, we are today taking action to cut illegal and excessive air emissions from thirty-two coal-fired power plants throughout the eastern half of the United States."

The cause lies in the Clean Air Act. When passed in the seventies, that act only set standards for new plants, yet to be built. Existing ones could continue without any cleaning of the flue gases until they became obsolete – but only on condition that no significant changes were made, such as increasing plant capacity, increasing the burning of coal, or making modifications to prolong the life of the plant, unless the owners had sought permits and taken steps to install the best available devices for pollution control.

The EPA claims that the companies cited in these lawsuits had spent hundreds of millions of dollars in modifying plants, increasing their life and increasing their pollution. They had done this without applying for permits, without giving public notice, and without installing pollution-control technology.

The emissions from the named plants are calculated to amount next year to 2.2 million tons of sulphur dioxide and 660,000 tons of nitrogen oxides. With modern control technology they could be cut down by 85-95 per cent. The EPA has warned that its investigations have not ended, and that further lawsuits may follow.

Source: EPA press release. November 3, 1999.

Sulphur emissions declining

But if the country were to follow international recommendations they could be halved

ALTHOUGH the requirements set for the power producers in Poland's national plan for reducing emissions of sulphur dioxide, adopted in 1996, should result in a great improvement, they are less stringent than those recommended in the second international protocol for sulphur. A main reason, according to Jürgen Salay in a recent study¹, is that the power industry has changed its attitude from reactive to proactive – thus making way for acceptance of its views in the making of the national plan.

Between 1987 and 1994 the emissions of sulphur dioxide from the power sector dropped by 37 per cent. As explained by Salay in an earlier study (see AN 2/97), this was largely due to restructuring of the industry and improvements in efficiency brought about as a result of increased coal prices and the withdrawal of subsidies, but also to the use of better-quality coal, with a lower sulphur content, in consequence of stricter emission standards.

By 1994, when Poland signed the second sulphur protocol, these relatively simple, inexpensive methods for reducing emissions had been largely exhausted, and more needed to be done. In signing the protocol, Poland had undertaken to reduce its emissions by 60 per cent between 1980 and 2010 (although it still has to ratify the protocol).

The protocol sets emission limit values for all stationary sources, both to come and already in existence. The requirements differ somewhat from those in the present Polish standards. For new plants they will be in some ways stricter, in others more lenient. For existing plants they are however altogether stricter, albeit only in the form of recommendations.

Salay sees both the signing of the protocol and Poland's candidature for admission to the EU as evidence of a much greater willingness within the power industry to cut down its emissions of air pollutants than it showed in the early nineties. Seeing the way developments were taking, it moved in advance and presented the Ministry of Industry and Trade

with a plan to enable Poland to meet its obligations both as signer of the



with a plan to enable Poland to meet its obligations both as signer of the

tion for about half the country's generating capacity. If Poland were to apply the standards that are recommended in the second sulphur protocol for existing plants, the emissions of sulphur dioxide would drop to about 300,000 tons by 2004. The cost of the national plan is estimated to be around US\$ 1.8 billion.

Salay concludes that environmental protection has become an integral part of its development strategy for the Polish power industry, and that the industry has itself become a lobby group exercising considerable influence on the government's policy for the environment. Because of its importance to the country's economy the power industry is in a strong position *vis à vis* the environment ministry.

PER ELVINGSON

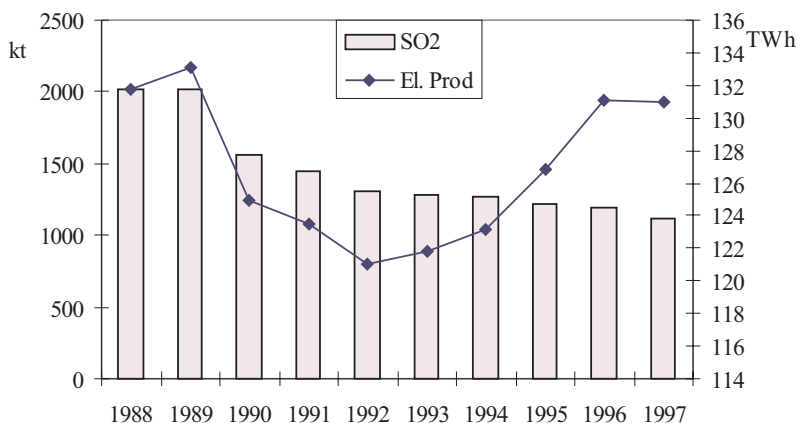
protocol and member of the EU.

Then came 1996 with the national plan in September of that year, corresponding to a large extent with the power industry's proposals. It involves reducing the emissions from power plants from 1.2 million tons in 1996 to 750,000 tons by 2004, to be achieved in part by installing equipment for flue-gas desulphurization and fluidized bed combus-

"The Second Sulphur Protocol and its Implications for the Polish Power Industry." In *Energy Use, Efficiency Gains and Emission Abatement in Transitional Industrialised Economies*. By Jürgen Salay, Department of Environment and Energy System Studies, Gerdagatan 13, 223 62 Lund, Sweden.

PHOTO: © WALDEMAR KOMPALA

By 1997 the emissions of sulphur dioxide from power generating in Poland had fallen by 45 per cent since 1988. The drop after 1994, despite greatly increased output, was due to the installation of flue-gas cleaning equipment. By the beginning of 1998 such equipment had been installed at eight plants burning lignite and at twenty fired with hard coal, with a total capacity of 6 MW. At present about half of Poland's emissions of sulphur dioxide come from the production of power.



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OZONE

Excessive concentrations

IN THE EU, ozone is still a threat to people's health as well as to vegetation. The concentrations measured at more than 1400 stations have lately been well above the levels set for the protection of humans and vegetation in the current EU directive (92/72/EEC). This can be seen in the final figures for 1998 and some preliminary ones for the summer of 1999, presented by the Commission this October.

Last year the threshold for the protection of human health – 110 micrograms of ozone per cubic metre ($\mu\text{g}/\text{m}^3$) of air, as an eight-hour average – was overstepped on an average during 20 to 60 days in the Mediterranean countries, and on 10 to 35 occasions in the central parts of the EU, and here and there elsewhere on up to 80 days.

Although there appeared to be some slight improvement in the summer of 1999, the threshold for health was frequently overcrossed in central EU, and even the limit of $180 \mu\text{g}/\text{m}^3$, 1-hour average, at which the public has to be informed, was exceeded in most countries. In some places in Italy, Greece, France, and Spain there were more than 40 alerts.

In 1998 concentrations above the threshold value for warning the public ($360 \mu\text{g}/\text{m}^3$, 1-hour average) were reported from eight places in three member states: Greece, Italy, and France. To reduce individual exposure to such high concentrations, people were advised to avoid heavy physical activity on those days.

The situation was even worse for vegetation, the threshold value of $200 \mu\text{g}/\text{m}^3$, 1-hour average, being frequently exceeded. In 1998 concentrations above that value were reported from 94 stations in thirteen countries on more than 200 days.

Last summer the information threshold ($180 \mu\text{g}/\text{m}^3$) was being crossed everywhere except in Ireland, Denmark, Sweden, and Finland. The situation was worst in Italy, Greece, France, and Spain, where information had to be sent out regarding high levels of ozone on 40-68 days between April and August. Although the $360 \mu\text{g}/\text{m}^3$ level was never passed, and there was some indication of a slight downward trend in peak values during the last two years in the central parts of Europe, there is nothing to suggest that people are being less exposed overall.

A proposal for stricter limit values for ozone has recently been put forward by the EU Commission, together with a strategy for a substantial reduction of concentrations (see AN 3/99, p.7).

References:

- Exceedance of EC Ozone Threshold Values in Europe in 1998.
- Air Pollution by Ozone in the European Union. Overview of the 1999 summer season (April-August).

Both reports can be downloaded from the website <http://europa.eu.int/comm/dg11/air/ozonerep.htm>. They are also available from national salespoints for EU publications.

IN BRIEF

Creating jobs

Stage 2 of the German ecotax reform was finally accepted by the Bundestag in November (see AN 3/99, p.8). It will come into effect at New Year.

In September the German environment agency, Umweltbundesamt, put forward a proposal for a still more far-reaching reform, involving step-by-step advances over present policy. The result would be a 40-per-cent increase in the price of energy during the next ten years, cars could face a charge of 0.05 euro per kilometre of distance travelled, trucks 0.20 euro. Fuel prices would increase by 0.26 euro per litre if road pricing was introduced, otherwise 0.50 euro. There would also be taxes on waste and sewage. The revenue should be used to lower other taxes, with an estimated 260,000 new jobs as a result.

The benefits for the environment would be considerable. Consumption of petrol and diesel fuel should drop by 25 and 20 per cent respectively, and the overall use of primary energy by 13 per cent.

Evening up

The French have also decided to raise the tax on diesel fuel, increasing it in two stages by 0.1 euro per stage. The aim is to reduce the great difference in price between diesel and petrol.

ENDS Daily, September 17, 1999.

More for less

In Britain the climate-change levy on the use of energy in business was expected to bring in £1.75 billion and reduce the emissions of carbon dioxide by 1.5 million tons a year. See AN 2/99, p.19. Objection from industry has now led to the yearly tax total being reduced to £1 billion, but emission reductions increased to 2 million tons a year. Energy-intensive industries will be granted greater discounts on condition that they arrange for a more effective use of energy, the subsidies for which will be trebled. It is still the aim to make the taxation revenue-neutral. The income should be used to lower employers' social security charges.

The government has also said that it will be scrapping the policy of raising the prices of motor fuels annually by a fixed percentage (the fuel tax escalator, which has been in existence since 1993). In its first budget after taking office in 1997, the Labour government had raised the real annual increase from 5 to 6 per cent. It now says decision on tax rates for fuel will be set on a budget-by-budget basis.

ENDS Daily, November 11, 1999.

Varied response to commitments

To maintain the Convention's credibility, much better compliance will be needed

THIS YEAR marks the 20th anniversary of the Convention on Long-Range Transboundary Air Pollution. It will also be remarkable for the signing of a new kind of protocol – that for a control of the effects of a bunch of pollutants, the so-called multi-effect protocol. It may thus be in order at this time to examine the extent to which the countries adhering to the Convention have lived up to their commitments under previous protocols.

Just how great the effect of those protocols has been in reducing emissions is of course difficult to determine. Many other factors are involved, often with greater effect. But it should nevertheless be of interest to see how the most elementary commitments – for a defined reduction of emissions – have actually been fulfilled.

So far only the first of the protocols – those of 1985 for sulphur emissions, of 1988 for nitrogen oxides, and 1991 for volatile organic compounds – have reached their time limits, which were 1993, 1994, and 1999.

The first sulphur protocol

If the statistics are to be believed, all the countries that signed the sulphur protocol managed the minimum 30-per-cent reduction of their emissions by 1993 – although half of the twenty-one original adherents had already got so far in 1985, the year of signing. Moreover most of the European countries – including those that did not publicly support the protocol – can now claim reductions well beyond the required 30 per cent. Some, such as Austria, Finland, pre-unification West Germany, Norway, Sweden, and Switzerland, have cut down their emissions by as much as 75-80 per cent. Consequently the total of Europe's emissions of sulphur fell between 1980 and 1993 by more than 45 per cent. By 1997 they were down by 60 per cent.

The NO_x protocol

As regards NO_x the twenty-five signatories of the 1988 protocol only committed themselves to ensuring that their emissions after 1994 would remain below 1987 levels. Accord-

ing however to the most recent statistics, five countries – Belgium, France, Greece, Ireland, and Spain – failed to fulfill even that modest requirement. Some of them have submitted no emission data either for the base year or for the target year, and Belgium has yet to ratify the protocol. The total European emissions of nitrogen oxides did however fall by more than 10 per cent between 1987 and 1994.

Declaration by twelve countries

At the time of the signing of the NO_x protocol, twelve countries declared separately their intention reducing their emissions by about 30 per cent by 1998, with the choice of any one year between 1980 and 1986 as the base year. It now appears however that no more than half of them will have done so. Those are Germany, Liechtenstein, Sweden, Switzerland, and possibly Austria and Belgium. By 1995 Italy still had higher emissions than in the base year. Norway is evidently also in difficulty, its emissions in 1997 having been about the same as they were in 1986. Denmark, Finland, and France have only managed to bring down theirs by about 10 per cent, the Netherlands by 20 per cent.

The VOC protocol

According to the protocol of 1991, most of the twenty-three signatories were supposed to reduce their emissions of VOCs by at least 30 per cent by 1999 – from what they were in 1988 or any other year between 1984 and 1990. Since however there is as yet no data for the target year, there is no means of telling how well they have performed – a situation that is hardly improved by the fact that here, too, some countries have not even submitted data for the base year. Nevertheless, such data as is available suggests that Austria, Bulgaria, Denmark, Germany, Hungary, the Netherlands, and Switzerland have already hit the target. France, Greece, Italy, Portugal, Norway, and Spain on the other hand have actually increased their emissions during the nineties. In Norway they had risen by about 50 per cent by 1996, instead of remaining stabilized in accordance

with the country's national target. In Norway's TOMA (tropospheric ozone management area), VOC emissions had risen by 30 per cent, instead of being reduced by that amount. The emission figure for Europe as a whole had however come down by almost 20 per cent between 1988 and 1997.

Second sulphur protocol

The second sulphur protocol, signed by twenty-seven countries as well as the EU in 1994, only took effect in August 1998. It sets among other things national ceilings, to be met in principle by 2000, but in the case of some countries not until 2005 and 2010. Fifteen of the countries that have so far ratified this protocol had already by 1996 so reduced their emissions that they were below the ceilings for 2000.

Technical requirements

There are further requirements in several of the protocols. Those for NO_x and VOCs, for instance, call for the introduction of national emission standards based on "the best available technologies which are economically feasible" for all new stationary as well as mobile sources. Measures for controlling pollution also have to be applied in the case of existing stationary sources in countries adhering to NO_x protocol. There are also so-called technical annexes intended to serve as guidelines, giving for instance examples of what the requirements will mean in practice. The second sulphur protocol was the first to include mandatory limit values in the protocol itself.

Bad reporting

The failure of many countries to comply with the protocols' requirements as regards reporting is a distinct problem. In 1998 the implementation committee of the Convention reported that very few had been respecting deadlines, and that between 1994 and 1998 only about 70 per cent had handed in reports on strategies and policies. Such lapses naturally make for difficulties in assessing the degree of compliance.

It is nevertheless obvious that far from all the countries that have

Could be competitive

Solar cells are expensive because demand is low, but the demand is low because of the high price. This Catch 22 could however be resolved if manufacturers were to greatly increase their output and so reap the advantage of large-scale production. By making 5 million solar panels a year (equal to 500 MW) a company could bring the price down to a quarter of the present cost. Demand would then rocket, since solar electricity would come close to being competitive with conventionally produced power. Key players that could help to make a breakthrough for solar energy by boosting the demand are the authorities who regulate power and construction.

All this is the outcome of a study made by KPMG consultants this autumn for Greenpeace.

Solar Energy: From Perennial Promise to Competitive Alternative. The full report is available in pdf-format on the Greenpeace website: www.greenpeace.org.

Great potential worldwide

Wind energy could provide 10 per cent of the world's electricity requirements by 2020, create 1.7 million jobs, and reduce global emissions of carbon dioxide by more than 10 billion tons, according to a study¹ commissioned by Greenpeace, the European Wind Energy Association and the Forum for Energy and Development.


The study demonstrates that altogether 1.2 million megawatts (MW) of wind power could be installed worldwide by 2020, producing more than Europe's present total consumption of electricity. As much as one-fifth of that capacity could be placed in Europe, creating a quarter of a million jobs there.

The 1.2 million MW is equal to a fifth of world electricity consumption in 1998 (the conservative assumption of the study is that the global consumption of electricity will have doubled by 2020).

In order to achieve the 10-per-cent aim, governments should set firm targets for production, remove inherent barriers within the electricity sector and halt subsidies to fossil fuel and nuclear power, while introducing a range of legally enforceable mechanisms to promote wind energy.

Last year wind power was the world's fastest-growing source of energy, with an average growth of 40 per cent between 1994 and 1998. The greatest increases were in Denmark, Germany, Spain.

¹ Wind Force 10: A Blueprint To Achieve 10% of the World's Electricity from Wind Power by 2020.



signed the various protocols are fulfilling even the minimum requirements that they have agreed to. This has naturally troubled the Convention's administrators, who are trying to remedy matters by improving their own reporting – one example being the report¹ on which this article is based. But if it is to be effective, such information will have to be used to raise the pressure on governments that are dragging their feet. Both national and international environmentalist organizations could do much more in this respect than they have generally done.

Important in itself

Finally it would be well to emphasize that the Convention is much more than a collection of protocols. It is a living procedure, engaging hundreds or possibly thousands of scientists, government officials and others, and so accumulating a vast store of knowledge and information – thus by its very existence keeping

work for the environment moving. Its protocols are important for defining the minimum efforts required of their signatories, and with the help of the media are themselves a means of increasing public awareness of the dangers of air pollution.

Results must however be forthcoming if the process is to be kept moving. Progress in this respect can be seen in some innovative approaches, such as the critical-loads concept, as well as in ever more cost-effective protocols. But to maintain the Convention's credibility, much better compliance will be needed from the member countries, besides better reporting both of progress and failings.

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¹ *Strategies and policies for air pollution abatement. Major review prepared under the Convention on Long-Range Transboundary Air Pollution.* Report ECE/EB.AIR/65. Published in August 1999 by UN ECE, Geneva and New York.



AIR POLLUTION

Children are most at risk

Millions of them in the world's largest cities are exposed to high concentrations

Children living in large cities, especially in the developing countries, are being regularly exposed to air pollution at levels that are two to eight times higher than those set down by the World Health Organization in its guidelines for maximum exposure. More than 80 per cent of all the deaths in the developing countries that are attributable to lung infections brought on by air pollution occur among children under five years of age.

Where there are most

Such is the situation revealed in a recent report¹ from the World Resources Institute, an international research organization working mainly on matters relating to the environment and sustainability.

As an attempt to identify the regions where the risks are greatest, the authors of the report have developed an environmental health indicator, to rank countries and cities where there are the most children threatened by degraded air. These are some of the main findings from the indicator and the report in general:

Even in smaller cities

□ Because of their smaller size, and organs in a stage of rapid development, children are more vulnerable to the risks to health from air pollution. In many of the world's largest

cities, with some of the highest levels of pollution, the average age of the population is less than sixteen. The younger the population, the more life years of exposure there will be, and more gathering of physiological damage.

□ In the developing countries air pollution is responsible for at least 50 million cases of chronic cough in children under fourteen.

□ The combined effect of several pollutants is greater than a mere addition of the individual effects of each pollutant. Some of the highest risks to children occur in cities in Mexico, India, China, Brazil, and Iran.

□ Not even smaller cities, as well as cities in developed countries generally, escape the threat of air pollution. Some smaller cities in China, for instance – such as Lanzhou at the heart of a major petrochemical industry and oil-refining centre – have the highest concentrations of particulate matter in the world.

□ Although the concentrations of air pollutants are on an average lower in the mega-cities of the developed world, the highest levels of nitrogen-oxide pollution from road traffic are found in New York, Paris, Tokyo, and Los Angeles.

□ The levels of total suspended particles (TSPs), as well as sulphur dioxide, are highest in areas with extensive coal burning.

Stricter standards needed

□ A more efficient use of energy, stricter standards for vehicles, and better traffic management are important means of controlling air pollution. Changes in these respects, as well as others such as reductions in the use of fossil fuels, can have significant effects on public health, both in the short and the long term. As shown in an earlier WRI study, as many as 70,000 premature deaths could be avoided by 2020 if the concentrations of particulate matter were reduced. The quality of life, especially in children, would also be improved.

With as many as 85 per cent of all children under the age of fifteen living in developing countries, and roughly half of them in cities, worldwide intervention to aid the developing world is, as shown by the WRI data, urgently needed.

But, the writers emphasize, such intervention is also needed in the developed world, which is still faced with severe problems. According to WHO, in Europe fine particulates are responsible for 7 to 10 per cent of all respiratory infections in children – a figure that rises to 21 per cent in the most-polluted cities.

Showing the way

In view of the projected growth of cities, the WRI authors call for collaboration between national gov-

ernments, international organizations, NGOs, and the private sector with the aim of promoting energy efficiency and reducing pollution, giving examples such as these that are already underway:

□ Mexico City has been successful in several ways in improving air quality, achieving marked reductions for instance in the ambient levels of lead – largely through the total phase-out of lead in petrol since 1997.

□ Major cities in China and India are increasingly turning to cleaner energy alternatives such as hydroelectric systems, solar panels, and wind power, besides substituting natural gas for coal.

□ In Brazil the government is actively promoting the development of less polluting forms for transportation and energy production.

□ International organizations can also play their part in supporting efforts to reduce air pollution. The World Bank, for instance, will be investing US\$ 1.1 billion over the next ten years in measures for cleaner energy production and transportation in Mexico City.

It is also pointed out in the WRI report that the same human activities that give rise to air pollution with its effects of health are threatening the climate as well. Thus measures aimed at protecting health can also help to mitigate climate change.

PER ELVINGSON

¹ *Urban Air Pollution Risks to Children: A Global Environmental Health Indicator*. By D.L. Davis and P.H.N. Saldiva. Published by World Resources Institute, 10 G Street, NE (Suite 800), Washington, DC 20002. Internet: www.wri.org. For more information contact maryh@wri.org.

A main cause of cancer

A very extensive study of toxic air pollution in cities, commissioned by the South Coast Air Quality Management District (AQMD) in California, has found motor vehicles and other mobile machinery to be one of the main sources of carcinogenic substances in the air. The average cancer risk from air pollutants in the region, omitting the effects of diesel soot, is 420 per million inhabitants. When diesel particulate is included, the average risk rises to about 1400 per million.

ENS, November 5, 1999.

Recent publications

Quantification of Effects of Air Pollutants on Materials (1999)

Proceedings of the UN ECE Workshop held in Berlin in May 1998. 250 pp. 20.00 DM. Published by Umweltbundesamt, Postfach 33 00 22, 14191 Berlin, Germany. Fax. +49-30-8903 2285.

8th Annual Report 1999: International Cooperative Programme on Integrated Monitoring of Air Pollution Effects on Ecosystems

Eds. S. Kleemola and M. Forsenius. 38 pp. 43 mark. Publication No. 325. Available from the Finnish Environment Institute, P.O. Box 140, 00251 Helsinki, Finland.

1979 Convention on Long-Range Transboundary Air Pollution and its 1998 Protocols on Persistent Organic Pollutants and Heavy Metals (1999)

Full text of both protocols together with a brief introduction. United Nations publication. Sales No. E.99.II.E.21. Available from United Nations, Sales Section, Palais des Nations, CH-1211 Geneva, Switzerland. Tel. +41 22 917 2601. E-mail: unpubli@unog.ch

The Environment in France (1999)

Abridged English version of the report *l'Environnement en France – Edition 1999*, published by the Institut Français de l'Environnement. Obtainable from IFEN, 61 Bd. Alexandre Martin, 45058 Orléans Cedex 1, France. E-mail: ifen@ifen.fr.

Transport Training Materials (1998)

By Roger Higman. 58 pp. Published by Friends of the Earth Europe and European Environmental Bureau. Available from EEB, 34 Boulevard de Waterloo, B-1000 Brussels, Belgium. E-mail: info@eeb.org, or from FoE Europe, 29 rue Blanche, B-1060 Brussels, Belgium.

Energy and the Environment in the EU: Training document for NGOs in accession countries (1998)

By J. Green. 137 pp. The same publishers and address as above.

EU Environmental Policy: Can free trade and environment go together (1999)

By M. Boye and C. Ege. 126 pp. Published by and available from EEB, address above.

National Climate Policies and the Kyoto Protocol (1999)

Although each country has to assess the opportunities and constraints to the development of policies adapted to its own situation, the OECD nevertheless here presents a framework for cost-effective national action to reduce emissions of greenhouse gases – primarily by economic devices such as more equitable pricing and emissions trading, but also by other means, including information

and education. Emphasizes the need for monitoring and follow-up.

88 pp., 120 francs. Can be ordered from OECD, 2, rue André-Pascal, 75775 Paris Cedex 16, France. E-mail: bookshop@oecd.org

Action Against Climate Change. The Kyoto Protocol and Beyond (1999)

Restricting international emissions trading would make achievement of the Kyoto targets more expensive, in this OECD view. It concludes that considerable further increase in the concentrations of greenhouse gases is unavoidable, although the resulting degree of climate change will be difficult to predict. Further knowledge will be needed if the benefits of the Kyoto Protocol are to be usefully compared to their costs.

138 pp., 120 francs. Available from OECD, address as above.

Reversal of soil and water acidification in SW Sweden, simulating the recovery process (1999)

By F. Moldan. Available from the Swedish University of Agricultural Sciences, Department of Forest Ecology, S-90183 Umeå, Sweden.

Environment in the Transition to a Market Economy: Progress in Central and Eastern Europe and the Newly Independent States (1999)

A joint publication of the OECD and the European Environment Task Force analyzing the challenges as well as the achievements in institutional strengthening and policy reform, environmental policy instruments, environmental financing and environmental management in the region. Available from OECD, address as above.

Cycling, the way ahead for towns and cities (1999)

Considering bicycling to be of key importance in the development of sustainable transportation systems, the EU Commission has published this handbook and distributed it to every city in southern Europe. Can be obtained at all retail outlets for EU publications, or downloaded as pdf-file via internet: <http://europa.eu.int/comm/dg11/cycling/>

Cutting Carbon Emissions While Making Money: Climate Saving Energy Strategies for the European Union (1999)

By F. Krause, J. Koomey and D. Olivier. Innovative thinking and policy changes could allow the EU to cut CO₂ emissions significantly below 1990 levels, while still reaping economic benefits, according to a report by the International Project for Sustainable Energy Paths.

Energy Policy in the Greenhouse Volume II, Part 2. Available from IPSEP, El Cerrito, California 94530, USA. Internet: www.ipsep.org.

Emissions in continued decline

Greatest for sulphur, but nitrogen compounds and VOCs are also going down

The downward trend for emissions of acidifying air pollutant is continuing in Europe. The latest reports¹ from EMEP, the European Monitoring and Evaluation Programme, show the man-made emissions of sulphur dioxide to have been 60 per cent lower in 1997 than they were in 1980, having dropped to 22.9 million tons. Nitrogen oxides are also continuing to decline slowly from their peak in the late eighties, by 13 per cent between 1980 and 1997. The emissions of ammonia are estimated to have declined by 18 per cent since 1980. In contrast to those for sulphur and nitrogen oxides, the data for ammonia is however highly uncertain. Volatile organic compounds dropped by 14 per cent between 1980 and 1997 (VOCs are important precursors to ground-level ozone).

The EMEP operates under the Convention on Long-Range Transboundary Air Pollution, using data supplied by individual countries. Besides the figures for man-made pollutants, its reports include data for the natural emissions of sulphur from the seas (in the form of dimethyl sulphide produced by phytoplankton) and from volcanoes.

Figures are also given for the emissions from shipping plying in international trade in the Baltic, the North Sea, and northeastern Atlantic, although they still go no farther than 1990. The estimates for the Mediterranean must be far too low, too, since no proper investigation has ever been made in those parts.

In combination with meteorological data, the emission figures provide the basis for calculations in a computer model for describing the transformation and depositions of pollutants as they travel around in Europe. A new model, called the Eulerian, has just been used for the first time, giving higher spatial resolution in the mapping by reducing the grid size from 22,500 sq kilometres to 2,500. The latest figures (1997) for cross-border transfers of sulphur and oxidized as well as reduced nitrogen compounds are shown in Tables 2, 3, and 4.

New, too, this year are country-by-country status reviews, giving information on such things as emis-

sion levels, exports and imports of pollutants, and the extent to which the critical loads for acidifying sulphur and nitrogen are being exceeded.

The EMEP data is important in showing how well or not the signers

of the Convention protocols are living up to their commitments, and also in indicating the general effect of the protocols.

CHRISTER ÅGREN

¹ *Transboundary acid deposition in Europe*. EMEP Report 1/99, and *EMEP emission data: Status report 1999*. EMEP/MSC-W Report 1/99. Both available from the publisher: MSC-W,

Norwegian Meteorological Institute, Box 43, Blindern, N-0313 Oslo, Norway. Emission tables and maps are available on the EMEP website: www.emep.int.

Table 1. European emissions of sulphur, nitrogen oxides (as NO₂), and ammonia (1000 tons a year).

		Sulphur dioxide		Nitrogen oxides		Ammonia	
		1990	1997	1990	1997	1990	1997
Albania	AL	[72]	[72]	[24]	[24]	[31]	[31]
Armenia	AM	72	0.4	46	15	0.06	0.004
Austria	AT	91	57	194	172	76	75
Belarus	BY	637	208	285	189	[219]	[219]
Belgium	BE	322	240*	343	334*	104	97*
Bosnia & Herz.	BA	480	[480]	[80]	[80]	[31]	[31]
Bulgaria	BG	2020	1365	376	225	144	77
Croatia	HR	180	80	87	74	37	24
Cyprus	CY	55	47	20	23	[4]	[4]
Czech Rep.	CS	1876	701	742	423	156	81
Denmark	DK	182	109	282	248	122	102
Estonia	EE	252	119	68	45	[29]	[29]
Finland	FI	260	100	300	260	35	34
France	FR	1298	1031*	1585	1641*	700	668*
Georgia	GE	[162]	[162]	[188]	[188]	[97]	[97]
Germany ¹	DE	5313	1468	2693	1803	764	648
Greece	GR	509	543*	343	374*	[107]	[107]
Hungary	HU	1010	657	238	198	164	76
Iceland	IS	24	25	26	29	[3]	[3]
Ireland	IE	178	165	115	124	126	132
Italy	IT	1651	1322*	1938	1768*	466	461*
Kazakstan ²		[140]	[140]	[76]	[76]	[18]	[18]
Latvia	LV	119	59*	93	35*	44	17*
Lithuania	LT	222	77	158	57	84	35
Luxembourg	LU	15	8*	23	22*	7	7*
FYR Maced.	FYM	[17]	17	[6]	6	[17]	[17]
Moldova	MD	231	17	63	30	[47]	[47]
Netherlands	NL	202	124	580	470	226	145
Norway	NO	53	30	218	222	23	26
Poland	PL	3210	2181	1280	1158	508	350
Portugal	PT	362	373*	348	407*	98	97*
Romania	RO	1311	[912]	546	[319]	300	[221]
Russian Fed. ²	RU	4460	2449	3600	2379	1191	730
Slovak Rep.	SK	543	202	225	123	62	50
Slovenia	SI	194	120	62	71	24	22*
Spain	ES	2266	[2061]	1177	[1223]	353	[344]
Sweden	SE	119	69	338	280	51	64
Switzerland	CH	43	26	166	125	72	71
Turkey ²	TR	[354]	[354]	497	692*	[321]	[321]
Ukraine	UA	2782	1132	1097	455	[729]	[729]
United Kingdom	GB	3731	1656	2686	1848	333	323
Yugoslavia	YU	508	522	66	66	[90]	[90]
Baltic Sea	BAS	[228]	[228]	[352]	[352]	[0]	[0]
North Sea	NOS	[454]	[454]	[648]	[648]	[0]	[0]
Rem. NE Atl. ²	ATL	[901]	[901]	[1266]	[1266]	[0]	[0]
Mediterr. Sea	MED	[12]	[12]	[13]	[13]	[0]	[0]
Sum		39,121	22,873	25,557	20,580	8,013	6,720

The table shows national official data received at the ECE secretariat. Estimated data are given in square brackets. * 1996 figures. ¹ Including East Germany in 1990 figures. ² Part within the EMEP area of calculation.

Towards an environmentally sustainable system

AT A MEETING in Cardiff, Wales, in 1998 the EU heads of state decreed that the guiding principle for work in a number of sectors should be sustainable development. In an attempt to arrive at a common view for the whole of the European Union in regard to the need for action, as well as to the possibilities and aims for the transportation sector in particular, the Swedish Environmental Protection Agency then started, in cooperation with other Swedish authorities, a project dubbed Euro-EST, where EST stands for Environmentally Sustainable Transportation System. It is patterned on a similar Swedish project in which all the actors in the transportation field had got together and agreed on environmental aims for just that sector. One result of this move has been the following three studies.

Instruments for Sustainable Transport in Europe. Potential, Contributions and Possible Effects

By I. Skinner and M. Fergusson, Institute for Environmental Policy,

London. Bringing about an environmentally adapted transportation system for Europe will require decisions to be made not only nationally and locally but also at the EU level. This study picks out the instruments that might be used to turn transport-



ation in a sustainable direction, describing their likely effects and their cost to society. 46 pages. Price SEK 90. No. 4977.

Environmental Goals for Sustainable Transport in Europe

By M. Route and S. Andersson, Swedish Office of Science and Technology. A survey of environmental aims from more than thirty European countries and international

organizations, paying especial attention to environmentally friendly schemes for transportation. 116 pages. Price SEK 140. No. 4978.

Key Role-Players in the Process towards Sustainable Transport in Europe

By Å. Vagland and M. Viehauser, Inregia AB. A searching out of the individuals and organizations who are mostly responsible for decision making in matters concerning the environment and transportation in four European countries: Germany, Britain, France, and the Netherlands. 74 pages. Price SEK 120. No. 4979.

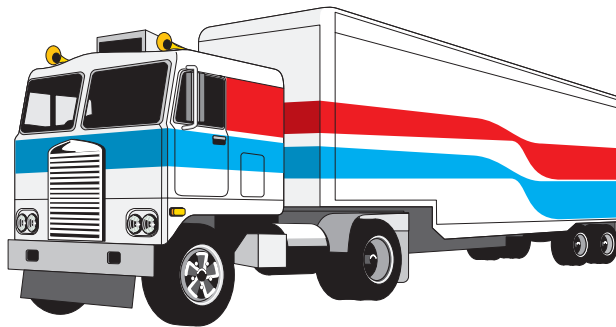
Integrating Ecology – a pathway to sustainable transport

A 4-page pamphlet, summarizing the whole Euro-EST project. Free of charge. No. 9936-1.

These publications can all be ordered from the Swedish Environmental Protection Agency, S-106 48, Stockholm, Sweden. Fax. +46-8-698 15 15. E-mail: kundtjanst@environ.se.

Table 4. Provisional reduced-nitrogen budget for Europe 1997. Depositions of nitrogen, 100 tons per year.

	AT	BE	BG	DK	FI	FR	DE	GR	HU	IS	IE	IT	LU	NL	NO	PL	PT	RO	ES	SE	CH	TR	GB	BY	UA	MD	RU	LV	LT	CZ	SK	SI	HR	BA	YU	MK	CY	REM	SUM		
AT	239	7	1	2	0	23	234	0	12	90	0	80	1	8	0	8	1	2	6	1	25	0	5	1	2	0	1	0	32	10	18	3	1	1	0	0	1	726			
BE	0	207	0	1	0	77	32	0	0	0	1	1	6	43	0	1	1	0	5	0	1	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	387		
BG	3	0	257	0	0	2	7	41	9	0	0	14	0	1	0	9	0	111	3	0	1	5	1	2	36	6	4	0	0	3	4	1	2	4	52	11	0	10	597		
DK	1	4	0	218	0	11	62	0	1	0	2	1	0	11	1	8	0	0	2	7	1	0	13	1	0	0	0	2	1	0	0	0	0	0	0	0	0	349			
FI	1	3	0	10	145	7	22	0	1	0	1	1	0	5	5	17	0	1	2	20	0	0	7	10	5	0	13	4	4	2	1	0	0	0	1	0	1	19	310		
FR	5	93	1	3	0	3181	118	1	1	0	10	96	10	31	0	4	14	1	195	1	62	0	57	0	1	0	1	0	0	3	0	1	1	1	1	1	0	12	3906		
DE	57	103	1	39	0	229	2745	1	3	0	7	28	17	267	2	68	3	1	25	7	96	0	67	4	3	0	4	1	2	45	3	1	1	1	1	0	0	3	3835		
GR	1	0	25	0	0	4	3	349	3	0	0	21	0	0	0	4	0	11	6	0	1	11	0	1	8	1	1	0	0	1	1	0	1	3	14	23	0	34	529		
HU	35	1	3	1	0	5	29	2	235	0	0	30	0	2	0	22	0	44	4	1	2	0	1	2	20	1	2	0	0	0	55	12	19	5	27	1	0	3	586		
IS	0	1	0	1	0	3	2	0	0	8	3	0	0	1	0	0	0	0	1	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26		
IE	0	3	0	1	0	18	6	0	0	0	484	1	0	3	0	0	1	0	6	0	0	0	53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	580	
IT	21	2	5	0	0	45	35	8	5	0	0	2022	0	2	0	7	3	4	37	0	31	1	2	1	3	0	1	0	5	2	13	10	9	9	1	0	22	2310			
LU	0	6	0	0	0	10	7	0	0	0	0	0	9	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35		
NL	0	73	0	2	0	27	115	0	0	0	2	1	1	382	0	1	0	0	3	0	1	0	13	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	621	
NO	1	7	1	26	3	20	36	0	1	0	5	2	0	12	101	13	1	1	5	23	1	0	32	3	2	0	5	1	1	2	1	0	0	1	1	0	2	312			
PL	21	13	4	30	2	34	292	3	19	0	2	19	1	27	2	1557	1	19	10	18	7	1	20	84	110	3	27	4	17	92	49	4	3	2	6	1	0	7	2510		
PT	0	0	0	0	0	5	0	0	0	0	0	1	0	0	0	0	297	0	64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	370	
RO	14	2	52	1	0	8	36	15	70	0	0	44	0	4	0	41	1	918	6	1	3	6	3	11	191	49	12	0	1	16	23	4	6	11	58	4	0	12	1622		
ES	1	2	1	0	0	99	5	1	1	0	2	20	0	1	0	1	114	0	1547	0	2	0	4	0	0	0	0	0	0	1	0	1	1	1	1	0	0	22	1828		
SE	2	10	0	68	20	29	77	0	2	0	3	4	1	19	24	38	1	1	6	220	2	0	27	9	5	0	11	3	5	6	2	1	0	1	1	0	0	8	607		
CH	2	5	0	0	0	67	38	0	0	0	0	47	1	4	0	1	1	0	8	0	271	0	4	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	452	
TR	3	1	37	1	0	9	9	11	42	7	0	0	32	0	1	0	16	1	50	11	0	1	1589	1	6	112	10	42	0	1	4	3	2	1	5	14	4	5	205	2204	
GB	1	18	1	5	0	100	43	0	1	0	114	5	1	23	1	4	3	0	18	2	3	0	1006	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1358
BY	5	2	3	6	2	8	36	1	6	0	1	6	0	4	1	128	0	15	3	4	2	1	6	944	192	4	52	12	40	8	6	1	1	2	4	0	0	9	1515		
UA	12	3	27	6	1	11	55	15	35	0	1	31	0	6	1	212	1	184	7	4	3	19	6	219	3515	131	167	2	9	21	30	4	4	7	19	3	0	20	4789		
MD	0	0	3	0	0	0	2	1	1	0	0	2	0	0	0	5	0	53	0	0	0	1	0	4	107	107	2	0	0	1	1	0	0	0	0	0	0	1	0	296	
RU	15	10	35	23	47	30	113	18	27	0	2	43	1	15	7	217	1	102	13	27	6	93	22	343	851	23	4789	31	43	28	19	5	4	9	20	3	1	324	7361		
LV	1	2	1	6	2	5	22	0	1	0	1	2	0	4	1	27	0	1	2	7	1	0	5	24	7	0	9	40	32	3	1	0	0	0	1	0	0	17	226		
LT	1	2	1	8	1	6	27	1	1	0	1	2	0	5	1	54	0	2	2	6	1	0	7	53	12	1	13	11	102	3	2	0	0	0	1	0	0	4	332		
CZ	52	6	1	4	0	18	202	0	9	0	0	11	1	9	0	54	0	2	3	2	6	0	5	2	4	0	2	0	1	238	25	3	2	1	1	0	0	1	664		
SK	16	2	2	1	0	5	28	1	41	0	0	13	0	3	0	59	0	9	2	1	2	0	1	3	20	1	2	0	1	29	118	3	3	2	5	0	0	2	377		
SI	17	0	1	0	0	2	7	0	4	0	0	39	0	0	0	1	0	1	2	0	1	0	0	0	1	0	0	0	2	1	52	8	1	1	0	0	1	144			
HR	17	1	2	0	0	6	13	2	24	0	0	58	0	1	0	5	1	4	6	0	2	0	0	0	3	0	0	0	0	6	6	19	65	30	13	0	0	3	288		
BA	11	1	2	1	0	6	15	2	15	0	0	47	0	1	0	7	0	4	6	0	2	0	1	0	3	0	0	0	0	8	6	4	18	70	26	1	0	5	264		
YU	10	1	9	1	0	6	19	7	41	0	0	43	0	2	0	15	0	44	5	0	2	1	2	1	12	1	1	0	11	13	3	11	26	317	13	0	19	636			
MK	0	0	5	0	0	1	2	18	1	0	0	8	0	0	0	1	0	3	1	0	0	1	0	0	1	0	0	0	0	1	1	0	1	1	21	38	0	19	126		
CY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	12	
AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	43	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	121	169	
MT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
REM	6	3	18	4	4	38	25	41	7	0	1	122	0	3	1	23	9	23	45	5	4	272	5	15	95	3	274	9	5	5	4	3	3	7	27	9	3	3616	4736		
BAS	5	14	1	191	36	32	244	0	4	0	3	6	1	28	7	122	1	3	7	130	3	0	27	18	13	0	18	16	16	12	4	1	1	1	2	0	48	1014			
NOS	6	118	1	138	1	430	318	1	2	0	45	13	2	186	20	30	4	1	32	18	9	0	575	2	2	0	3	0	1	12	2	1	1	1	2	0					



USA

Heavy-duty vehicles

New standards could cut emissions by 90 per cent

US emission standards for heavy-duty vehicles are to be made stricter in two stages, if a proposal presented by the EPA on October 6 is to be followed. It will mean that the emissions of a number of noxious substances from new vehicles will have to be 90 per cent lower overall than is required by present standards.

As a first stage the agency is proposing new engine standards as from 2004 for all trucks weighing more than 8,500 lbs (thus taking in the heaviest types of sport utility vehicles, SUVs). Petrol-driven vehicles would have to be 78 per cent cleaner than today's models, and diesel trucks 40 per cent (in both cases in respect of nitrogen oxides and hydrocarbons). At present the requirements are the same both for petrol-driven and diesel vehicles, but they are now to be made much stricter for petrol-driven types. Another effect of the new standards would be a cut in the emissions of particle matter by some 55,000 tons a year.

Then late this year or early next the EPA intends to propose even more stringent standards for heavy-duty trucks. Possibly taking effect as early as 2007, these would further reduce the emissions of nitrogen oxides by 75 to 90 per cent over and above the first proposal. Emissions of particulates could come down by 80 to 90 per cent.

Also in this second stage will be a proposal for reducing the sulphur content of highway diesel fuel by 90 per cent below the current level of 500 ppm – in other words, down to 50 ppm, which is also the level scheduled for 2005 in the EU. This is intended to make possible the intro-

duction of new emissions-control technology for heavy trucks. The EPA has already proposed markedly reduced sulphur levels for petrol, together with stricter standards generally for passenger cars (see AN 2/99, p.20).

Environmentalists have, according to Reuters, welcomed the EPA proposals, while at the same time urging earlier adoption. The trucking industry on the other hand is claiming that the proposed standards would be expensive and difficult to carry out within the allocated time.

The EPA's proposals and related documents are available electronically via the EPA internet site at www.epa.gov/oms/hd-hwy.htm.

To make it easier

The auto industry is stepping up efforts to get the sulphur content of petrol and diesel fuel still further reduced. The reason is that a lower sulphur content will make it easier to lower emissions. "Sulphur is the lead of the '90s, and we must get the sulphur out of the fuels to have cleaner air," said Josephine Cooper, president of The Alliance of Automobile Manufacturers (USA), at the presentation of a new website: www.lowsulfurfuel.com.

The Alliance released at the same time the results of a study showing that the cost of lowering the sulphur content will not be insuperable. Recently EPA proposed reducing it in petrol from 300 to 30 ppm (see AN 2/99), estimating the extra cost to be 2 cents per gallon. According to the auto makers' study it would only cost 2-3 cents more to bring sulphur down to 5 ppm.

Source: The Auto Channel, October 27, 1999.

Well worth it

The gains from the amendments of 1990 to the Clean Air Act that can be expressed in terms of money will, by 2010, be four times greater than the cost of the necessary measures, according to a recent evaluation by the EPA in America. The gains will be worth \$110 billion and the cost will be \$27 billion. Added to the former should also be the benefits that economists cannot yet quantify and evaluate in dollars, such as reduced damage to crops and natural ecosystems as a result of lower concentrations of ground-level ozone.

EPA press release, November 16, 1999.

Now you know

The fuel consumption of the various models of cars sold in the United States can now be found on internet: www.fueleconomy.gov.

"Choosing the most fuel-efficient vehicle within a class can save drivers at least \$1500 in fuel costs and avoid more than 15 tons of greenhouse gas pollution over the life of the vehicle as well as help reduce U.S. dependence on imported oil," said EPA Administrator Carol M. Browner when the list was presented in October.

A printed version of the list can be ordered from Energy Efficiency and Renewable Energy Clearinghouse, P.O. Box 3048, Merrifield, VA 22116, USA.

Gas guzzlers

A report from the EPA has just confirmed the trend towards ever thirstier cars in America. The average fuel consumption of a car of 1999 model is said to be 23.8 miles per gallon (equal to 0.99 litre per 10 kilometres). That is the worst figure since 1980, and well below that of the two best years 1986 and 1987, when it was 25.9 mpg or 0.91 litre/10 km. This rising trend in fuel consumption is attributed to the steadily increasing sales of light-duty trucks, which are heavier and poorer in fuel economy than ordinary cars. They now make up 46 per cent of new car sales, or more than twice their market share compared with 1983.

The EPA notes that technical advances have gone primarily to increasing engine power and overall weight. If this year's cars had the same weight and performance as the 1986 models, their average fuel consumption would be 20 per cent lower than it now is.

The US Department of Energy would like to examine the possibilities of tightening the Corporate Average Fuel Economy (CAFE) standards, but funding has been blocked by Congress for the last four years.

Light Duty Automotive Technology and Fuel Economy Trends Through 1999. Available at: www.epa.gov/oms/mpg.htm.

SECRETARIAT PUBLICATIONS

Issued this autumn

Economic instruments for reducing emissions from sea transport

Study by Per Kågeson. Reviewed in the leading article in this issue. 36 pages. November 1999.

Abating emissions from ships – a smart way to reduce air pollution

Digest of the above. Eight-page pamphlet, available in ten languages. December 1999.

Acidification in 2010 – An assessment of the situation after ten years

Study examining the outlook in the light of various assumptions as to the trend of emissions. Concludes that acidifica-

tion is likely to remain a threat even if all the proposed measures for reducing them are actually carried out. See first article in AN 2/99. 32 pages. November 1999.

Transboundary air pollution – calls for concerted action

A twelve page pamphlet, published jointly with the European Environmental Bureau (EEB) and the Federation for Transport and Environment (T&E), describing the advent of the new multi-effect protocol, with its merits and shortcomings. See page 5 in this issue. November 1999.

Still available

Acidification & Air Pollution: Still with us

By C. Ågren and P. Elvingson. An in-depth examination of acidification and other effects of air pollution. The viable countermeasures are described, as are the political aspects of the matter. 96 pages. 1997.

Environmental space for acidifying air pollutants

Study by B. Nielsen describing the consequences to the individual – his “environmental space” – if the emissions of acidifying air pollutants should be reduced to levels that nature can tolerate,

with application particularly to Poland, Spain, Great Britain, and Sweden 28 pages. 1998.

For cleaner air – it will pay to reduce acidifying emissions

A résumé of the problems arising from acidifying air pollution and what can be done about them. Eight-page pamphlet. December 1997.

Sex, Sulphur, and a Fishy Business

A film with the subtitle “A kind of twisted documentary on acid rain in Scandinavia.” A sixty-minute film viewing unconventionally the problems of acidification. 1998.

How to order

Single copies of any of the above can be had from the Secretariat (free of charge within Europe). Please call for quotation if more copies are required.

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Coming events

3rd European Conference on Sustainable Cities and Towns. Hannover, Germany, February 9-12, 2000. Organized by the International Council for Local Environmental Initiatives – Europe. *Information:* hannover.conference@iclei-europe.org.

International Conference on Incentives for Environmentally Sound Maritime Transport. Hamburg, Germany, February 16-17, 2000. *Information:* Karsten Krause, Free and Hanseatic City of Hamburg, State Ministry of the Environment, Billstrasse 84, 20539 Hamburg. Tel. +49 (0)40 428 45 -22 28. Internet: www.hamburg.de/Behoerden/Umweltbehoerde/green-shipping/

Health Effects of Vehicle Emissions. London, England, February 23-24, 2000. *Information:* Energy Logistics International. Tel. +44 1628 671 717.

Acidified Lakes in the Bohemian/Bavarian Forest – History, Present and Future. International workshop. České Budějovice, Czech Republic, March 21-23, 2000. *Information:* Jaroslav Vrba, Hydrobiological Institute AS CR, Na sádkách 7, 37005 České Budějovice, Czech Rep. E-mail: vrba@hbu.cas.cz.

2000 Future Car Congress. Arlington, Virginia, USA, April 2-6, 2000. *Information:* SAE International, Meetings Division, 400 Commonwealth Drive, Warrendale, PA 15096, USA. Tel: +1 724 772 4006. Internet: www.sae.org.

16th European PV Energy Conference and Exhibition. Glasgow, UK, May 1-5, 2000. *Information:* WIP, Sylvesterstrasse 2. 81369 München, Germany. Internet: www.wip.tnet.de.

EUROSUN. Copenhagen, Denmark, June 19-22, 2000. *Information:* Danish Solar Energy Society, DANVAK, Ørholmvej 40B, 2800 Lyngby, Denmark. Tel. +45-45-877611. E-mail: info@danvak.dk.

WREC-2000. Brighton, England, July 1-7, 2000. World Renewable Energy Congress. *Information:* A. Sayigh, World Renewable Energy Network, 147 Hilmanton, Lower Early, Reading RG64 HN, England. E-mail: asayigh@netcomuk.co.uk.

Acid Rain 2000: 6th International Conference on Acidic Deposition. Tsukuba, Japan, December 10-16, 2000. *Information:* Acid Rain 2000, c/o International Communication Specialists, Sabo Kaikan-bekkan, 2-7-4, Hirakawa-cho, Chiyodaku, Tokyo 102-8646, Japan. E-mail: acid2000@ics-inc.co.jp.