NO. 3, OCTOBER 1999

Acid News

FOUR IN ONE

New protocol on the way

EARLY IN SEPTEMBER the representatives of more than thirty countries agreed in Geneva on a new, so-called multi-effects protocol to the Convention on Long-Range Transboundary Air Pollution. The aim is to noticeably lessen acidification, eutrophication, and the formation of ground-level ozone – by setting national ceilings for emissions of the four pollutants that are the cause of all this, namely sulphur dioxide, nitrogen oxides, volatile organic compounds, and ammonia. The ceilings are to be binding, and each nation must have brought emissions down under it ceilings by 2010.

It will now be possible for the Convention to celebrate it 20th anniversary by gathering together a large number of environmental ministers to sign the protocol in Sweden, at Göteborg, on December 1.

Although the preparations for the new protocol have been going on for the last five years, actual negotiations to obtain definite commitments from the various countries only started last January (see AN 1/99). The negotiating body for the Convention, the Working Group on Strategies, has subsequently gone through three week-long sessions, the last of which took place between August 26 and September 3.

Last year, in order to facilitate negotiations, the convention countries agreed on what was called a guiding scenario as a means of starting the process. The aims embodied in that scenario correspond closely with those in the EU Commission's proposal for a directive on national emission ceilings for four pollutants, the NEC directive (AN 2/99, pp.8-9). They differ in that the convention protocol covers eutrophication as well as acidification and ground-level ozone.

The last meeting of the negotiators dealt with two matters of principal importance: the levels for the various countries' ceilings, and national commitments in general.

To begin with, each country was allowed to present its ideas on the ceilings it should have in comparison with those of the guiding scenario. In most cases they turned out to be way above the scenario figures. Some countries even proposed figures that were higher than those in the reference scenario, showing how much emissions might be expected to drop as a result of measures already taken. An estimate was then made, by using the IIASA's RAINS computer model, of the environmental conse-

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

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THE SECRETARIAT

The 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

Strange behaviour

THE NEW MULTI-EFFECT protocol to the Convention on Long-Range Transboundary Air Pollution certainly represents an advance. Thanks to extensive, skilfully prepared work it became possible to attain something that had seemed almost utopian when started in the summer of 1994: to work out an agreement involving environmental quality targets to combat four different kinds of environmental effect and including requirements for reducing emissions of four pollutants.

It is all the more deplorable to have to recognize that most of the participating countries are unwilling to take the necessary steps to cut down emissions even to the extent required to meet the modest targets for which they themselves had voted barely half a year ago.

Environmental demands are ever more frequently met with the excuse that "we as a country cannot proceed alone," followed by others such as "it would impair our international competitiveness," or "it would be pointless, since anything we could do would have so little effect on the general situation." The final escape is usually "the problem can only be solved by international agreement."

The Convention on Long-Range Transboundary Air Pollution came about precisely to overcome this reluctance. Under it, too, many countries have laid down great effort to reach concrete proposals for internationally agreed measures. Although they fail to have global application, these measures nevertheless affect the greater part of the "international competition" (the Convention is supported by forty countries in Europe and North America).

After five years of data gathering, analyses, meetings of experts, and negotiations, a plan of action emerged. Its environmental aims are clearly expressed, and all the countries have had a hand in setting the targets. It has moreover been based on a thoroughgoing analysis of cost effectiveness, spreading commitments so as to attain its aims at the lowest possible cost. On top of all this, an analysis of the economic benefits was made, showing that the overall gain would be most likely to exceed the outlay five times over.

What then was the response of the various countries to the plan? At the final meeting for negotiation in Geneva, several countries, including Portugal, Belgium, France, and Italy, laid claim to national ceilings for emissions that were higher than those in the plan. Portugal's figures for all four pollutants were moreover higher than they would be as a result of current legislation and the country's existing commitments. Still more astonishing, perhaps, was the fact that not even those countries that are normally active in these matters – such as Sweden, Norway, the Netherlands, Germany, and Austria – were prepared to give full backing to the proposed ceilings.

The reasons for this seemingly strange behaviour on the part of the participants are many. Some countries are using the Convention as a means of demonstrating their opposition to some proposed EU legislation (especially the NEC directive). Some, too, have given way to the powerful lobbying by industry against stricter environmental requirements. The Confederation of European Industry (UNICE) claimed for instance in a press release dated August 13 that the new protocol (then only in draft) would impose unrealistic demands on industry.

Some countries consider that they have already done more than others, and so do not want to do anything further until the others have caught up with them. A further reason, unfortunately all too common, is that many countries have simply not done their homework (although they do not care to admit it). They have not dug up the necessary information and analyzed what they actually could do. Consequently they have failed to gain popular support for any more advanced measures.

The debate on national ceilings in the EU will probably be going on for a year or two more before any directive is decided upon, so there is still time for each country to make a proper analysis of its own situation. In any case, after five years review and revision are envisaged both for the protocol to the Convention and to the EU directive on ceilings. Work in preparation for this ought to start right away. And to ensure wide support for further measures to reduce emissions, public awareness and knowledge of the problems will have to be improved.

CHRISTER ÅGREN

AIR POLLUTION

Very different trends for sulphur and nitrogen

BETWEEN 1980 and 1996 the emissions of nitrogen oxides in the EU only dropped by 4 per cent. Reduction is being hindered by the ever increasing consumption of petrol and diesel fuels in road traffic. Emissions have actually risen in some countries, according to a report[1] just published by the statistical office of the EU, Eurostat.

The increasing trend has been particularly marked in Italy and Spain, where NOx emissions have risen by 26 and 29 per cent respectively – as a reflection of growing prosperity and increased car ownership. Because of the time needed to replace existing vehicles with new ones equipped with catalytic converters, the full effect of these devices has yet to be felt.

A brighter picture emerges in regard to the emissions of sulphur dioxide, the per capita figure for which went down in the EU by 61 per cent between 1980 and 1996 – practically fulfilling the EU's aim of cutting them by 62 per cent by 2000. The largest cut was made in Austria (88 per cent). The only country in the EU showing a rise in emissions was Greece, where they increased by 36 per cent. Over half of the EU emissions of SO_2 in 1996 came from the burning of fossil fuels, mostly in power plants.

Road transportation consumed some 40 per cent of the petroleum products in the EU in 1996. On an average, each citizen was then consuming 621 kg oe (oil equivalents) of petrol and diesel, as compared with only 467 kg in 1985. Apart from Luxembourg, where people from other countries come to fill up because of the cheap fuel, the highest consumption per head was in Sweden (722 kg oe), and lowest in Portugal (440 kg).

According to Eurostat, this report represents a first attempt to compile environmental pressure indicators for the EU. For this the views of 2300 experts were obtained through collaboration with the environmental directorate of the EU Commission, enabling sixty indicators to be presented.

[1] *Towards environmental pressure indicators for the EU.* 36 euro, 181 pp. Available from the Office for Official Publications of the European Communities or its national sales points.

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quences of the countries' proposals for ceilings. Hardly surprisingly, they came closer to the reference scenario than to the guiding scenario. In other words, they were far from coming up to the environmental targets that had been agreed upon barely half a year earlier.

Later in the meeting there was a *tour-de-table*, in which some countries put forward better (i.e. lower) figures for their emission ceilings, while others – as an expression of disappointment of the general lack of enthusiasm for doing anything serious – proposed higher figures for their ceilings. The final result can be seen from Tables 1 and 2.

Area where depositions will exceed the critical loads will be almost doubled

Putting it briefly, it may be said that the figures for sulphur emissions are 34 per cent higher in the draft protocol than in the guiding scenario, and 10 per cent higher for each of the other three pollutants. This will in turn mean that the area of Europe where depositions will exceed the critical loads for acidification will be almost doubled, going up to 15.2 million hectares as against the 7.9 million hectares set as the interim target. The exposure of the population to ozone levels above the critical level of 60 ppb would be nearly 40 per cent higher (Table 3).

It view of this poor outcome, it was agreed to give the countries the possibility of coming forward with improved (i.e. lower) figures for their

Table 1. Emissions levels from the REF and guiding (G5/2r) scenarios. "Draft" = the figures put forward by the various countries at the meeting of the Working Group on Strategies on September 3, 1999 (1000 tons).

	Sulphur dioxide			Nitrogen oxides			Volatile Organic Compounds			Ammonia		
Country	**REF**	**Draft**	**G5/2r**	**REF**	**Draft**	**G5/2r**	**REF**	**Draft**	**G5/2r**	**REF**	**Draft**	**G5/2r**
Austria	40	39	35	103	107	91	205	159	142	67	66	66
Belgium	193	121	76	191	184	127	193	144	103	96	74	60
Denmark	90	55	60	128	127	113	85	85	85	72	69	69
Finland	116	116	116	152	170	152	110	130	110	31	31	31
France	448	400	219	858	860	704	1223	1100	989	777	780	642
Germany	581	550	463	1184	1081	1081	1137	995	995	571	550	413
Greece	546	546	546	344	344	344	267	261	261	74	73	73
Ireland	66	42	36	70	65	55	55	55	55	126	116	116
Italy	566	500	290	1130	1000	902	1159	1159	1030	432	419	356
Luxembourg	4	4	3	10	11	8	7	9	7	7	7	7
Netherlands	73	50	50	280	266	266	233	191	157	136	128	104
Portugal	141	170	141	177	260	144	144	202	102	67	108	65
Spain	774	774	747	847	847	726	669	669	648	353	353	353
Sweden	67	67	67	190	168	159	290	241	241	48	58	48
UK	980	625	499	1186	1181	1181	1351	1200	1101	297	297	264
Sum EU15	*4685*	*4059*	*3348*	*6850*	*6671*	*6053*	*7128*	*6600*	*6026*	*3154*	*3129*	*2667*
Albania	55	(55)	55	36	(36)	36	41	(41)	41	35	(35)	32
Belarus	494	480	494	316	255	290	309	309	298	163	158	140
Bosnia-Herz.	415	(415)	162	60	(60)	53	48	(48)	48	23	(23)	22
Bulgaria	846	856	378	297	266	266	190	185	185	126	108	105
Croatia	70	70	23	90	87	87	111	90	86	37	30	29
Czech Rep.	366	283	283	296	286	188	305	220	156	108	101	101
Estonia	175	(175)	175	73	(73)	73	49	(49)	49	29	(29)	29
Hungary	546	550	296	198	198	137	160	137	137	137	90	77
Latvia	104	107	104	118	84	118	56	136	56	35	44	35
Lithuania	107	145	107	138	110	134	105	92	105	81	84	72
Norway	32	22	18	178	156	142	195	195	195	21	23	21
Poland	1397	1397	722	879	879	654	807	800	475	541	468	468
FYR Maced.	81	(81)	81	29	(29)	29	19	(19)	19	16	(16)	15
Moldova	117	135	38	66	90	64	42	100	42	48	42	41
Romania	594	918	148	458	437	328	504	523	500	304	210	227
Russia Russian PEMA	2344	(2352) 635	2186	2653	(2653) 265	2653	2786	(2786) 165	2723	894	(894) 49	894
Slovakia	137	110	92	132	130	115	140	140	140	47	39	39
Slovenia	71	27	14	36	45	34	40	40	40	21	20	16
Switzerland	26	26	23	79	79	76	144	144	144	66	63	63
Ukraine	1488	1457	1457	1433	1222	1222	851	797	770	649	592	588
Yugoslavia	269	(269)	217	152	(152)	152	139	(139)	139	82	(82)	64
Sum Non-EU	*9734*	*9930*	*7073*	*7717*	*7327*	*6831*	*7040*	*6990*	*6347*	*3463*	*3151*	*3078*
Total Europe	**14419**	**13989**	**10421**	**14567**	**13998**	**12884**	**14168**	**13590**	**12373**	**6617**	**6280**	**5745**

Note: Emissions for the draft scenario for some countries that are not expected to become parties to the protocol (i.e. Albania, Bosnia-Herzegovina, Estonia, FYR Macedonia, and Yugoslavia) have been set at the REF-level (paranthesis in the table). Emissions from international shipping are not shown in the table.

ceilings. They will have just one month, until October 14.

The new protocol also contains binding requirements in the form of emission limit values (ELVs) both for stationary and mobile sources, as well as for fuel standards. The ELVs for large combustion plants are very similar to those put forward last year by the EU Commission in its proposal for a revision of the LCP directive (see AN 3/98, p.11). In the case of the protocol however, the text provides a loophole making it possible for the countries to evade the requirements. It says that as an alternative to the mandatory application of emission and fuel standards, a country "may apply different emission reduction strategies that achieve equivalent overall emission levels for all source categories together." There are also binding emission standards for existing (as opposed to new) sources, but for them there will be a longer respite, and the same "outs" will apply as for the above.

There is an annex to the protocol aimed at bringing down the emissions of ammonia, too, through some measures for agriculture that are more or less binding.

The United States and Canada had to be dealt with separately, since North America is not included in the advanced modelling that is being done for Europe and serves as a base for negotiations. Firstly, these two countries will only have to make commitments for SO_2, NOx, and VOCs, the reason being that they are agreed that they have no prob-

lems from transboundary movements of reduced nitrogen compounds. Secondly, it is assumed that they will want to take advantage of the possibility of confining their commitments to reduce emissions to so-called PEMAs (Pollutant Emission Management Areas). Thirdly, no commitments for emission ceilings (for a whole country or for PEMAs) can yet be proposed for them, since they are unlikely to have concluded their bilateral negotiations on these matters until sometime next year.

A country may apply different strategies to achieve equivalent levels

Russia, too, has used the possibility of defining a PEMA, in this case making it include two regions in the northwestern part of the country – Kola/Karelia, Leningrad/Novograd-Pskov – and also Kaliningrad, making a total area of at least 500,000 sq kilometres. Any commitments Russia may make will thus only apply to these parts of the country.

CHRISTER ÅGREN

For details of the basic analysis for the new protocol, see a) previous articles in Acid News (available on www.acidrain.org), and b) the following reports from International Institute for Applied System Analysis.

- *Emission reduction scenarios to control acidification, eutrophication and ground-level ozone in Europe*. Part A: Methodology and databases. Part B: Emission reduction scenarios (November 1998).
- *Limiting Marginal Costs of Emission Reductions* (March 1999).
- The outcome of the analysis is summarized in the *Draft Report for the Working Group on Strategies* (June 1999),
- The analysis of the environmental results of the decisions taken at the last meeting to negotiate the new protocol appears in *Draft Analysis* (September 1999).

IIASA's reports are available on the internet at www.iiasa.ac.at/~rains.

Table 2. Emission levels[1] in 2010 according to the reference scenario (REF), the countries' bids for the new draft protocol (Draft), and the guiding scenario (G5/2r), with percentage reductions from the emission levels of 1990.

	Sulphur dioxide			Nitrogen oxides			Volatile Organic Compounds			Ammonia		
	REF	Draft	G5/2r	REF	Draft	G5/2r	REF	Draft	G5/2r	REF	Draft	G5/2r
EU15	4685 71%	4059 75%	3348 80%	6850 48%	6671 49%	6053 54%	7128 54%	6600 57%	6026 61%	3154 14%	3129 15%	2667 27%
Non-EU	9734 52%	9930 51%	7073 65%	7717 25%	7327 29%	6831 34%	7040 25%	6990 25%	6347 32%	3463 13%	3151 21%	3078 22%
Europe	14419 61%	13989 62%	10421 72%	14567 38%	13998 40%	12884 45%	14168 43%	13590 45%	12373 50%	6617 13%	6280 18%	5745 25%

[1] Emission levels for some countries that are not expected to become parties to the protocol (i.e. Albania, Bosnia-Herzegovina, Estonia, FYR Macedonia, and Yugoslavia), as well as for Russia (outside its Pollutant Emission Management Area, PEMA) are what they would be according to the REF scenario. None of the figures include emissions of SO_2 and NOx from international shipping.

Table 3. Environmental improvements. Situation 1990 and calculations for 2010 according to the reference scenario (REF), the countries' bids for the new protocol (Draft), and the guiding scenario (G5/2r).

	Acidification[1]				AOT60[2]				AOT40[3]				Eutrophication[4]			
	1990	REF	Draft	G5/2r	1990	REF	Draft	G5/2r	1990	REF	Draft	G5/2r	1990	REF	Draft	G5/2r
EU15	36963	6434	5360	3486	1260	466	398	298	12412	7183	6806	5714	66778	48554	47724	38954
Non-EU	56315	10907	9818	4398	305	103	81	48	9453	5917	5360	4528	98498	68037	60743	55407
Total	**93278**	**17340**	**15178**	**7884**	**1566**	**570**	**479**	**346**	**21864**	**13100**	**12166**	**10242**	**165276**	**116591**	**108467**	**94360**

[1] Area of ecosystems with acid depositions above their critical loads for acidification (1000 hectares). [2] Cumulative population exposure index (million persons x ppm x hours). [3] Cumulative vegetation exposure index (1000 km^2 x excess x ppm x hours). [4] Area of ecosystems with nitrogen depositions above the critical loads for eutrophication (1000 hectares).

Less CO_2 from new cars

Korean and Japanese car makers have agreed with the EU Commission to reduce the emissions of carbon dioxide from their new cars. In October a year ago the European manufacturers had undertaken to see that the average new car sold in the EU in 2008 would not emit more than 140 grams of carbon dioxide per kilometre of running. That would amount to a reduction of 25 per cent from 1995 levels. The Koreans and Japanese will however have an extra year, to 2009, to reach the same result.

Cleaner tractors

As expected, in June the EU environment ministers arrived at a "common position" in regard to the Commission's proposal for a directive to reduce air pollution from agricultural and forestry tractors (see AN 2/99, p.6). The proposal will now go to the EU Parliament for a second reading.

Emissions from heavy vehicles

The rules for emissions from heavy vehicles agreed upon by the EU environment ministers in December 1998 (see AN 1/99, p.8) were formally adopted as a "common position" on April 22. The Commission has subsequently worked over the proposed directive, which in its original form was less strict. This has also now gone to the parliament for a second reading, most likely this autumn.

Reminder

At the time of the meeting of the Council of Ministers in June, European environmentalist groups handed over a symbolic cheque for 45 billion euros to some of the EU countries' ministers of transport. The payers were supposed to be the various countries' citizens, and the amount to correspond to the subsidies that are now being paid every year to civil aviation within the union (see AN 2/99, p.16). The supposed recipients were airports and airline operators in the EU. The aim was to try and persuade the ministers to opt for a truer cost of flying.

An **Action Day on Aviation and Environment** will take place in the end of October. See Coming Events on back page for details.

NATIONAL EMISSION CEILINGS

Commission passes proposal for directive

RATHER SURPRISINGLY, on June 9 the EU Commission passed its proposal for a new directive on national ceilings for emissions of acidifying and ozone-forming air pollutants. A proposal for a new daughter directive on ground-level ozone was agreed upon at the same time (see opposite page). As was reported in AN 2/99, both these directives were planned to be adopted in mid-March, but had to be shelved indefinitely when the Commission unexpectedly resigned.

Welcomed by environmentalists

The new move was welcomed by six organizations representing environmentalist, health, and consumer interests in a joint statement. They pointed out however that the proposals could be further improved, and the environmental quality targets achieved at a lower cost, if other than expensive end-of-pipe solutions were sought. "Using policies to achieve fuel switching, modal shift, and improving energy and transport efficiency will allow greater pollution cuts at lower cost. This will realize a triple dividend of improved economic efficiency, lower greenhouse-gas emissions, and lower pollution levels," said Frazer Goodwin of the European Federation for Transport and Environment.

The fact that the directive has now been adopted by the Commission means that the aims se-331(th)-331aJnae1aJ1w 22 awere292((now292(aow29 the directive
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Interim targets proposed

Ground-level ozone and its precursors can cross national frontiers, which is one of the reasons why the limit values have not been made binding in the proposal for a directive for this pollutant.

Ground-level ozone is found in high concentrations all over Europe, causing extensive damage every year both to crops and human health. While the situation is worst, as far as one can tell, in Italy and northern France, strongly raised concentrations occur every summer almost everywhere. (See AN 1/99, p.7.)

Transboundary problem

No country can solve its ozone problem alone. The concentrations in one country are often to a great extent traceable to emissions of NOx and VOCs in other countries. (Ground-level ozone is formed under the influence of sunlight from nitrogen oxides, NOx, and volatile organic compounds, VOCs.)

This is why there were no binding limit values for ozone concentrations in the Commission's proposal for a directive. Instead it gives only long-term objectives and target values for the year 2010. For the same reason air-quality standards have been included in a package consisting principally of proposals for national emission ceilings for all countries. See article opposite.

New limit values

The limits that the Commission is proposing for ground-level ozone are:

FOR HUMAN HEALTH. The eventual aim is that the WHO guide value of 120 $\mu g/m^3$ shall not be exceeded anywhere in the EU. The same will serve up to 2010 as a target value which may not be exceeded on more than 20 days in any year. In some cases it is now being exceeded on 50-60 days.

FOR VEGETATION. The long-term aim here is to set the same limit value for critical exposure as that already adopted in the Convention on Long-range Transboundary Air Pollution. In other words, the total exposure above a threshold value of 40 ppb (80 $\mu g/m^3$) may not exceed 3000 ppb-hours during the three-month growing period from May to July. As a target value up to 2010 the same threshold may not be overstepped during more than 8500 ppb-hours. In northern France, the worst-hit region in 1990, the threshold was overcrossed by 17,000 ppb-hours.

Ground-level ozone. Present concentrations far exceed the proposed target values

Average for several years

Since the concentrations of ozone are dependent on the weather, and thus vary considerably from one year to another, the proposed limits for health and vegetation are to be taken as average values for three and five years respectively. The Commission believes the temporary targets for 2010 will be reached if the directive on emission ceilings goes through.

As in the existing ozone directive of 1992, the new proposal also sets limits for the concentrations at which the public are to be warned or merely informed. The proposed "alert threshold" will be 240 $\mu g/m^3$, and the level for information 180 $\mu g/m^3$.

The EU member countries will also be obliged to investigate the possibilities of taking short-term steps to reduce peak levels. The Commission is to reconsider the directive in 2004 and see what can be done to get closer to its final aims.

As in the case of the directive on emission ceilings, a number of European environmentalist, health, and consumer organizations have issued a joint statement welcoming the Commission's proposal for dealing with ground-level ozone.

Interim targets too low

But just as they think the sights ought to be raised for emission ceilings, they claim it should also be possible to improve the interim targets for ozone for 2010. They would therefore like to see the number of days in which the threshold limit could be overstepped reduced. Some industrial interests on the other hand want the guide value for health to be raised, from 120 to 160 $\mu g/m^3$.

Finland, which will be chairing the EU during the autumn, had already put the ceilings directive on the ministerial council's agenda, for preliminary negotiation, this summer. It decided however that the daughter directive on ozone should not be taken up, at least for the time being. It is thought that this is because the proposed target values for ozone in 2010 are closely tied in with the awaited national ceilings for emissions of NOx and VOCs.

There is thus an apparent risk that the ozone directive will be laid aside until the Council of Ministers has reached at least some general agreement as to the levels for those ceilings.

PER ELVINGSON

Note. The Commission's proposal in regard to concentrations of ozone in the air is in the form of a daughter directive to the Air Quality Framework Directive of 1996, to which there is already another daughter directive for sulphur dioxide, nitrogen oxides, particulate matter (PM_{10}), and lead. This last was passed in April this year, and another, for carbon monoxide and benzene, is now being negotiated. Work has recently been started, too, on daughter directives for polyaromatic hydrocarbons (PAHs) and heavy metals.

IN BRIEF

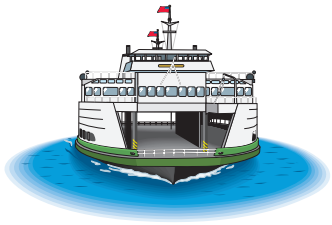
Screwing down on motor fuels

By all accounts Germany will be increasing its taxes on petrol and diesel fuel by 6 pfennigs per litre each year for the next four years – as part of Stage 2 of the tax shift that has been agreed between the SPD and Die Grünen and will be coming before the Bundestag this autumn. This will, if the bill is passed, amount to a continuation of the rise of 6 pfennigs per litre dating from April this year.

Included in the deal is also a proposal for a tax differentiation based on the sulphur content of motor fuels. As from November 1, 2001, the tax would be 3 pfennigs per litre lower for fuels containing less than 50 ppm of sulphur. Then from January 2003 the limit would be lowered to 10 ppm.

According to an EU ruling from last year, as from 2000 the sulphur content of petrol and diesel fuel may not exceed 150 and 350 ppm respectively. In 2005 the limit will be lowered to 50 ppm for both. The present limit for diesel is 500 ppm.

ENDS Daily, August 26, 1999.



Acidification and NOx in Norway

Between 1990 and 1998 the Norwegian emissions of nitrogen oxides increased by 3 per cent – in contrast to the 30-per-cent reduction called for in the new multi-pollutant protocol under the LRTAP Convention. The present figure came out last June in a report from the Norwegian Pollution Control Authority, which has considered forty-six measures for reducing emissions and come to the conclusion that the most important are catalytic reductions aboard ships, low NOx burners on offshore gas turbines, NOx rinsing in the metallurgical industries, and more efficient road transportation. It also says that while reductions of up to 75 per cent would be technically feasible during the same period, the cost of such reduction was left unconsidered.

According to a separate study made by the same authority, the critical loads for acidification are still being exceeded over almost a fifth of the country, even though the acidity of the lakes has fallen by more than 25 per cent since 1985.

ENDS Daily, July 1, 1999.

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ROAD FREIGHT

Now being taxed too low

But new system would enable each country to set whatever kilometre charges it likes for any stretch of public highway.

Following the creation of the internal market, freight carrying by road has increased explosively in the European Union – one important reason being that the heavy vehicles are being taxed too low, which can in turn be explained by the fact that it is almost impossible for a single country to have higher taxes on vehicles and fuel than its neighbours. Consequently it is the country that cares least for the environment that sets the pace.

Many, and not least the EU Commission, have raised their voices for a system of taxation that would be both just and effective. And now there is the technical means for making this possible.

In a report to T&E, Per Kågeson and Jos Dings call for changes in the technical requirements for heavy vehicles that will be necessary if each EU member country is to be in position to set taxes unilaterally.

The backbone of the proposed system would be a combination of satellite positioning (either the American GPS or the GNSS that is in process of development within the EU) with GSM telephones. Some further arrangements would have to be made in the road network for the purposes of surveillance. By coupling such techniques with a complete digital road atlas each country would, in principle, be able to set whatever kilometre charges it likes for any stretch of highway.

A new EU organization would be needed for collecting the charges and distributing the takings properly between the countries. For this purpose it could well copy the Eurocontrol system for civil aviation, which is already distributing route charges from aircraft crossing national borders.

Kågeson and Dings claim that with their solution each country should, in principle, be able to set any kilometre charges it likes without affecting either competition or the free movements of goods. Switzerland, which is neither a member of the EU nor the EES, is already on the way to introducing a national system on the lines proposed by Kågeson and Dings.

MAGNUS NILSSON

Electronic Kilometre Charging for Heavy Goods Vehicles in Europe. By Per Kågeson and Jos Dings. T&E 99/6. Available from the European Federation for Transport and Environment, Bd. De Waterloo 34, 1000 Brussels, Belgium. E-mail. t+e@arcadis.be.

EU ENERGY TAXING

Blocked by Spain's resistance

Netherlands propose that some countries could come to special agreement

SPAIN CONTINUES to put up strong resistance to a common minimum level for the taxation of energy in the EU, despite the repeated attempts that have been made to arrive at a compromise during the spring under the German chairmanship. This means that the matter is blocked, since any decision on harmonized taxes will require full unanimity. Finland, which has now taken over the EU chairmanship, intends however to go on pursuing it.

The Netherlands has proposed that those countries that are in favour of a common minimum level would continue negotiations within the EU, but come to a special agreement among themselves if it should appear impossible to reach unanimity.

The proposal for a directive that is here in question was put forward by the Commission in 1997. It is considered an important part of the EU strategy for cutting down emissions of greenhouse gases. The minimum levels that are proposed in the directive are however lower than those already in place in several of the member countries.

Source: **ENDS Daily**, July 13, 1999.

GREENHOUSE GASES

U.S. gains from reducing more than required

IN THE UNITED STATES the emissions of greenhouse gases could be reduced twice as quickly as called for in the Kyoto protocol, with a saving of $43 billion a year and the creation of more than 870,000 new jobs by 2010, according to a study made by the Tellus Institute on behalf of the World Wildlife Fund.

At present the United States answers for half of all the emissions of carbon dioxide in western industrialized nations. Internally it is often claimed that it would damage the economy to reduce emissions of greenhouse gases according to the commitments made in the Kyoto protocol of 1997 (which Congress has not yet ratified).

Instead of 7 per cent as required in the protocol, a reduction of 14 per cent is however possible – while yet yielding the above gains – if a mix of measures were undertaken to promote efficient and non-polluting technologies in transportation, industry, power generation, and commercial and residential buildings.

The needed steps would include giving incentives for the production of more fuel-efficient vehicles and energy-saving equipment, the elimination of regulatory impediments, the setting of new efficiency standards for buildings, cars, household appliances, and office equipment. Intensified research would also be needed, as well as improvements in land use and infrastructure. Tax reforms and cutting of subsidies to polluters would also have to be a part of the package.

The greatest job increases would, according to the study, be in services and construction, although there would also be large gains in education, manufacturing, transportation and communications, agriculture, and finance. The gains would be spread relatively widely and evenly across the country.

The measures proposed in the report would lead to less pollution generally, as well as having a substantial effect on the health of many Americans. The emissions of sulphur dioxide would be cut in half, and those of nitrogen oxides and particulates by about 25 per cent each.

"Tackling the cause of global warming at home is not a US favour to the rest of the world, it is a matter of economic self-interest," says Jennifer Morgan, policy expert on climate change at WWF.

PER ELVINGSON

The report, entitled *America's Global Warming Solutions*, is available on internet at www.worldwildlife.org/climate.

Printed copies can be ordered from WWF-US, 1250 Twenty-fourth Street, NW, Washington DC 20037, USA. E-mail: climate.campaign@wwfus.org.

EUROPEAN UNION

Energy tax to cut emissions would also create new jobs

A TAX ON ENERGY would do much to relieve unemployment, according to the Fraunhofer Institute in Germany – creating up to 1.9 million new jobs.

The institute has looked at the costs and benefits of measures to tackle global warming – including greater efficiency in manufacturing processes, the use of combined heat and power (cogeneration), technologies for renewable energy, energy-efficient domestic appliances, better insulation of buildings, improved fuel economy for cars, and better-insulating windows – and found that they would all help to boost employment.

It has also come to the conclusion that while making domestic appliances more efficient and introducing better insulation standards would create more jobs in the short run, the other measures would trigger "important long-term effects due to their high innovation potential."

A review of employment effects of European Union policies and measures for CO_2 emission reductions. May 1999. Commissioned by WWF from the Fraunhofer Institute for Systems and Innovation Research, Germany.

EUROPE'S ENVIRONMENT

Viewing the situation for the year 2010

The EU environmental agency, seeing few signs of recovery to date, examines prospects in the light of decisions already taken.

ALTHOUGH there have been some cases of success, little sign of environmental recovery can be seen in Europe even after twenty-five years of effort. If no fresh steps are taken, the environment will remain under even harder pressure through the growth of sectors such as transportation, manufacturing and other industry, recreation, and tourism.

Despite some improvements in the way of more efficient and cleaner technologies in industry, ever increasing production and consumption will mean ever greater pressure on resources. The problems of emissions and waste will in turn accumulate. Economic development has in fact already begun to erode some of the successes of environmental policy, such as that from the EU directives on air quality. There is no time to be lost now in integrating environmental policy with public policy as a whole.

Although energy, too, is being used more efficiently, the overall use of energy is expected to have increased in Europe by 15 per cent between 1995 and 2010. Travel by car is likely to increase by 30 per cent, and road freight carrying by 50 per cent. All this will make it difficult to achieve the EU's aim of reducing the emissions of climate-affecting gases; instead of decreasing by 8 per cent between 1990 and 2008-12, as promised in the Kyoto Protocol, they may increase by 6 per cent. It is also thought to be unlikely that the proportion of renewables in the energy mix will be doubled from the present 6 per cent to 12 per cent as proposed by the Commission.

These warnings are based on the assumption of business-as-usual, with no fresh legislation for environmental improvement. They come from the European Environmental Agency, EEA. The analysis starts out from legislative decisions already taken in 1997 or then in the making. The sight is set on the year 2010, except for matters concerning the climate, where the aim is on 2050.

Among the favourable developments that can be discerned are reduced emissions of the substances that are conducive to acidification, eutrophication, and breaking down of the ozone layer. The EEA forecasts on the other hand increased emissions in cases that are already difficult to handle, such as climate-affecting gases and waste.

The situation in 2010 is expected to be worse as regards climate and waste. The proportion of ecosystems where depositions are exceeding the critical loads for acidification will however continue to drop – from the present 25 per cent to 7 per cent in 2010. Urban air quality is also expected to be better.

The agency emphasizes that there will always be considerable uncertainty when it comes to foreseeing the future, not least on account of socio-economic developments. Problems connected with human health are especially difficult to anticipate. As an example the EEA mentions the effects of air pollution, which may cause anything from 40,000 to 150,000 deaths among the adult population every year.

Although it judges the general trend to be negative, the EEA does nevertheless glimpse a number of small, positive developments in several countries, which are moreover gaining momentum. One is the increasing installation of windpower, another the growing use of the bicycle for local transportation in some cities.

Referring to the challenges and possibilities that expansion of the EU will bring, the EEA also warns of a worsening of the environment in the candidate countries when they become members of the European Union. They should be careful, it says, not to repeat the mistake western Europe made by first ignoring the environment and then having to undertake hurried programs in order to catch up.

Environment in the European Union at the turn of the century. Available wherever EU publications are sold. The full report can be found on the EEA website: www.eea.eu.int/Document/3-yearly/eu98/toc.html.

NEW REPORT

Mapping of critical loads

IN ORDER TO get an idea of the extent to which the emissions of air pollutants will have to be reduced, and the likely effects of various ways to do this, mapping of the sensitivity of ecosystems and consequent critical loads is an absolute essential. The work of the Coordination Center for Effects, about which there is now a report[1], is therefore of central importance in the negotiations for reducing emissions that are now taking place within both the Convention on Long-Range Transboundary Air Pollution and the EU.

The report gives a full account of the way the mapping is carried out, emphasizing especially the changes of method that have been made since the previous one (AN 1/98, pp.12-13). Most of its 165 pages are taken up however with the national reports (from 24 countries) on which the mapping is based.

As can be seen from the maps the report shows not only where the loads are critical, but also what the situation was in 1990 and is likely to be in 2010. There are maps, too, for eutrophication (due to atmospheric depositions of nitrogen), and ground-level ozone.

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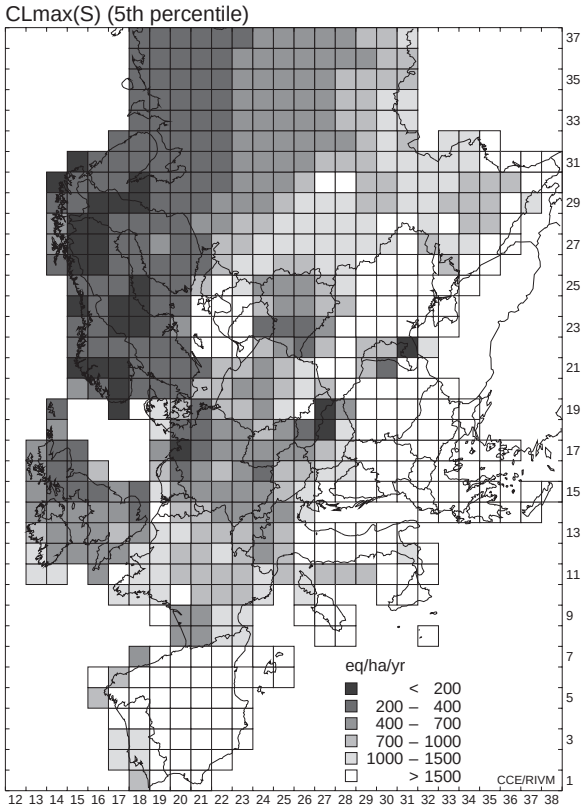
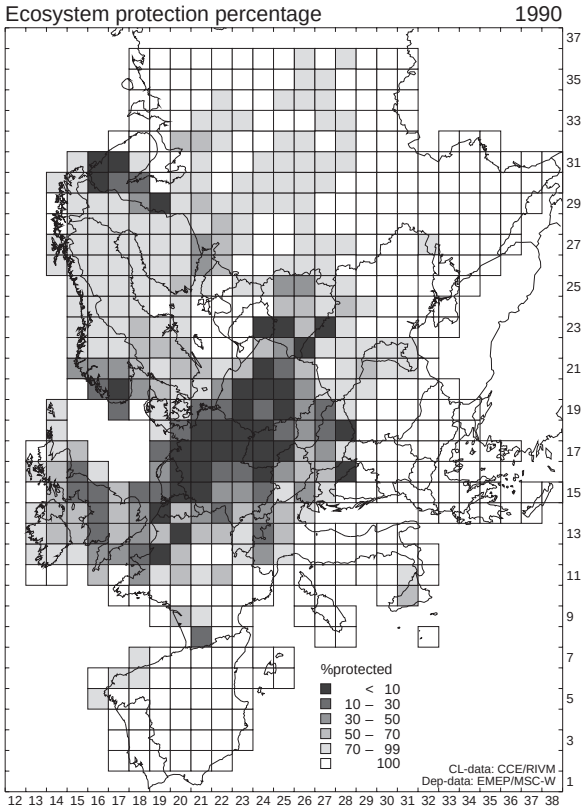
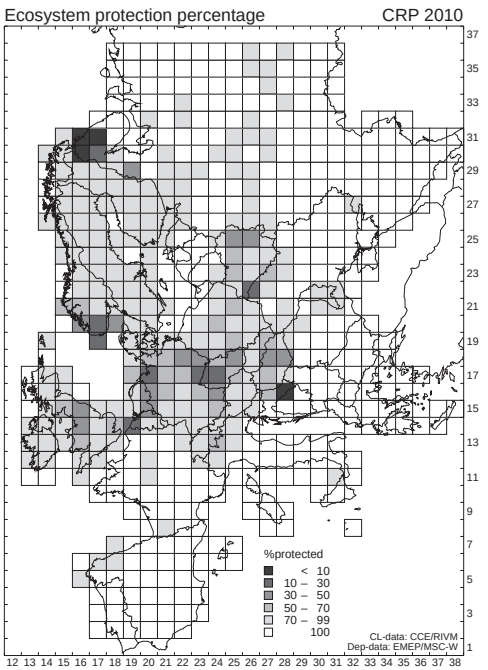
[1] *Calculation and Mapping of Critical Thresholds in Europe: Status Report 1999*. By M. Posch et al., Coordination Center for Effects. CCE, which is located in the Netherlands, is responsible for the mapping procedure under the Convention on Long-Range Transboundary Air Pollution. For copies of the report, address CCE, c/o RIVM/MNV, P.O. Box 1, 3720 BA Bilthoven, The Netherlands. Fax : +31-30-274 4435.



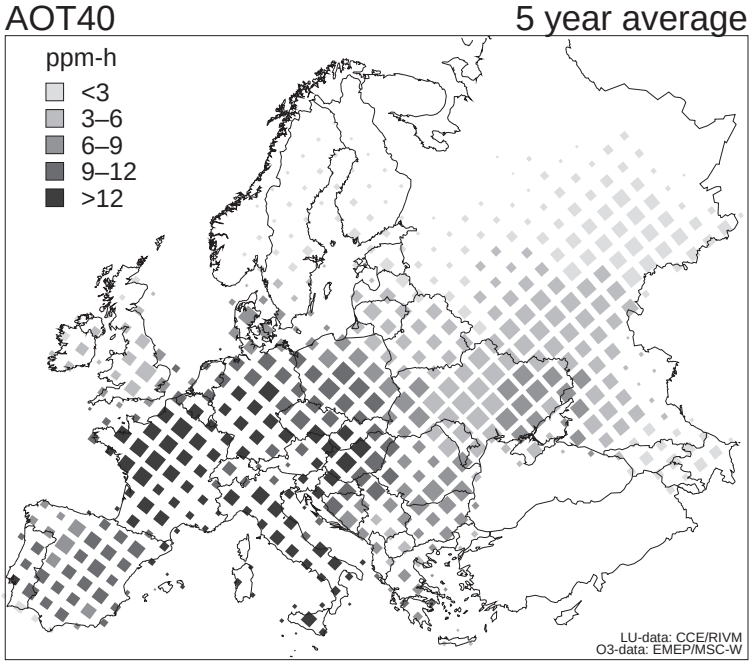
Sensitivity to acidic fallout in Europe. Given the critical limit for each 150x150 km square on the map (calculated as hydrogen-ion equivalents per hectare per year), 95 per cent of the ecosystems within that square will be safe from acidification. The darker the shading, the greater the sensitivity.



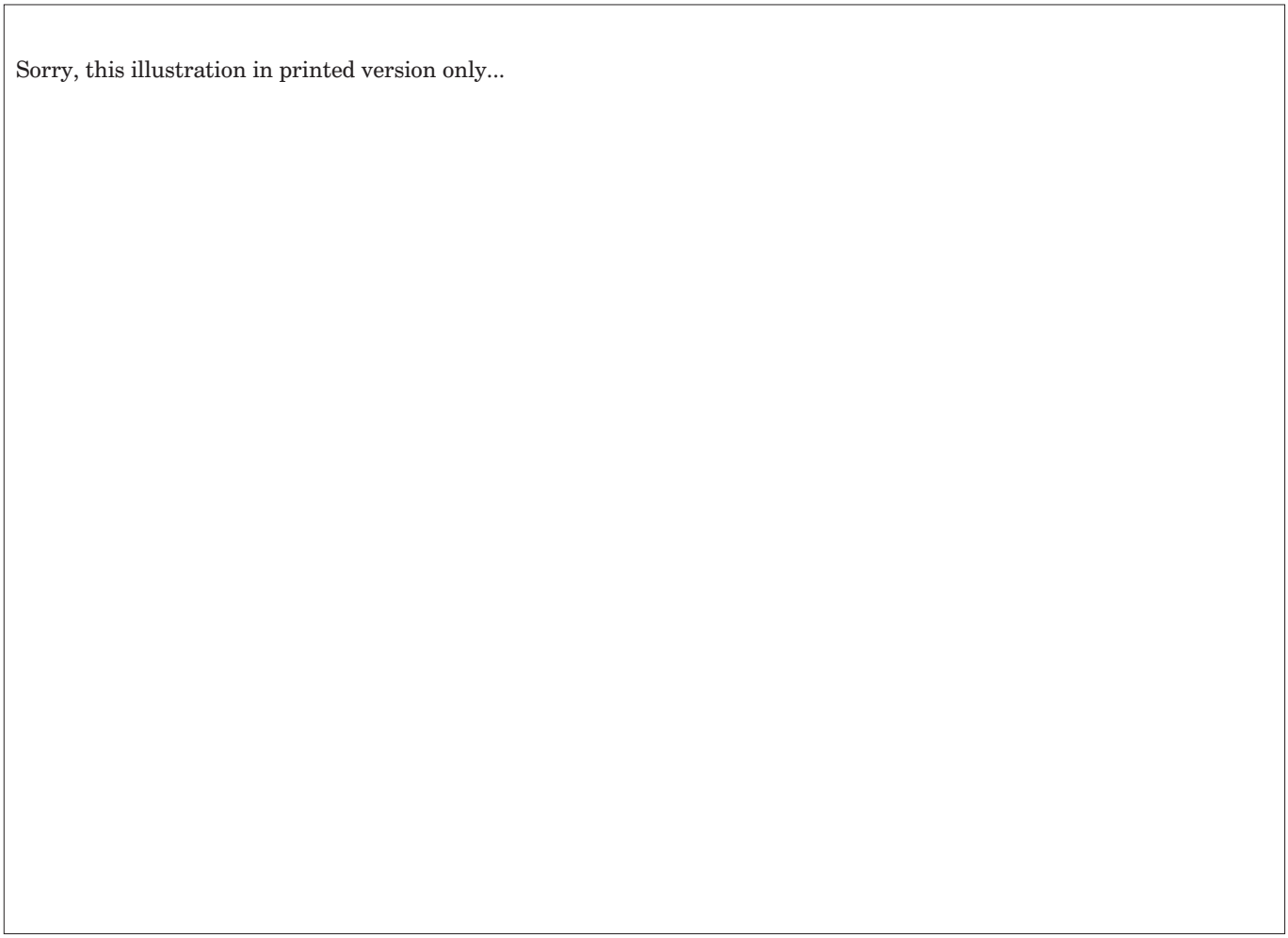
Proportion of ecosystems in each square where the critical load for acidification was being exceeded in 1990. The darker the shading, the greater the excesses.



Proportion of ecosystems in each square where the critical load for acidification is likely to be exceeded in 2010, if emissions are reduced to the extent now planned. The darker the shading, the greater the exceeding.



The accumulated exposure to concentrations of ground-level ozone over and above a threshold level of 40 ppb, five-year average (1989-90, 1992-94). The critical level for crops as well as natural vegetation has been set at 3000 ppb-hours, measured in daytime during a three-month growing season (May to July). The size of the squares is proportional to the share of arable land in each grid cell.



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NORTHEAST ASIA

Pollution is likely to increase

But great potential, in Asia as in Europe, for a more efficient use of energy

Unless they take strong measures to control their emissions of air pollutants, in only a few decades the countries of northeast Asia will be facing a very difficult situation. Already in 1990 the emissions of sulphur dioxide were strongly noticeable in northeastern China, Japan, and North and South Korea. The calculations made for sensitivity to acid fallout show that the critical loads were being exceeded in several parts of this region. The outlook would be much gloomier were it not for the great quantities of neutralizing dust that are blown in from the desert areas in the west.

No further controls

The situation will become really serious however if development continues in line with official forecasts and nothing is done to curb emissions. The use of energy is expected to go on rising, particularly in the power generating and transportation sectors, as a result of booming electrification and a steadily increasing number of private cars.

Enormous saving in money would accrue from international cooperation

Until recently it was only Japan that was actively pursuing a policy for improving air quality. Lately however there has been some progress in China too.

Under a No Further Controls scenario (NFC), presented by the authors of an article in the scientific journal *Ambio*, the emissions of sulphur dioxide will be likely to increase in northeast Asia from 14.7 million tons in 1990 to a whopping 41 million in 2020 (see table). In such case the acid fallout and the expected concentrations of sulphur dioxide in the air would cause serious damage to crops, natural ecosystems, and human health. Depositions in the most hard-hit areas – parts of South Korea and the Chinese provinces of Sichuan and Jiangsu – are calculated to exceed the limits for critical load by 100 to 200 kg per hectare annually. In other words, to be about ten times too much.

Alternative solutions

The authors of the *Ambio* article have therefore outlined three ways in which the problem might be attacked.

1. Best Available Technology (BAT). This would be the most far-reaching solution. All major point-sources of emissions, no matter

whether old or new, would have to install state-of-the-art systems for flue-gas desulphurization, and all other users of fossil fuels switch to low-sulphur types. The result would be a cutting down of emissions from the 14.7 million tons in 1990 to 4.7 million by 2020.

2. Advanced Control Technology (ACT). Flue-gas desulphurization (FGD) for all new power plants (but not for existing ones), together with some moderate fuel switching in other sectors. This would mean an increase of 40 per cent in SO_2 emissions between 1990 and 2020.

3. Basic Control Technology (BCT). More modest emission-control methods, such as limestone injection in the flue gases to be used in all new power plants in China. The limestone technology achieves only a 50-per-cent reduction of SO_2 emissions, as compared with the 95 per cent assumed for FGD. The result of this scenario would be a 73-per-cent increase between 1990 and 2020.

Improvements possible

Computer modelling shows that even with BCT there would be considerable improvements for the environment if compared with NFC, No Further Controls. Depositions would however still be so great as to constitute a serious threat to farm production over large parts of China. Under ACT the critical loads would be exceeded in much of the region, but the only serious excesses would be in central and southeastern China.

Although the BAT scenario would result in a reduction of emissions by about two-thirds, the limits for critical load would still be overstepped in some places in 2020 – and notably in southeastern China and South Korea, where there are sensitive ecosystems lying close to areas with voluminous emissions.

Not included

Then there is the matter of nitrogen oxides, which also contribute to acidification, but do not enter into the above calculations. Nitrogen oxides take part, too, in the formation of ground-level ozone, the concentrations of which can be expected to increase markedly if nothing is done to check emissions.

Coordination pays

The writers also present evidence of considerable transboundary movements of air pollutants, in the main from west to east. They underscore the great difference between the various countries as regards the cost of doing anything about the emissions, while also pointing to the enormous saving in money that would accrue from international coordination of the measures to control them. Such coordination is expected to reduce the emissions of sulphur dioxide in Europe from 37 to 16 million tons between 1990 and 2020. A falling trend is also expected in North America, from 24 to 17 million tons during the same period.

Worth it despite cost

Although the costs for improvement in northeast Asia according to the various scenarios may appear high, they only cover technical measures, as do those for Europe. Both in Asia and Europe there is however a great potential for a more efficient use of energy, for instance, which can reduce emissions at little or no cost.

No overall calculations have yet been made of the socio-economic gains that would come from reducing emissions in Asia. Calculations for Europe have shown however that even far-reaching packages of measures can be worthwhile, despite the high cost.

PER ELVINGSON

"Energy Consumption and Acid Deposition in Northeast Asia" by D.G. Streets, G.R. Carmichael, M. Amann and R.L. Arndt. *Ambio* Vol. 28 No. 2, March 1999.

Emissions of sulphur dioxide in southeast Asia in 1990 and 2020 according to the various scenarios. Million tons of SO_2.

Scenario	Year	NE China	Japan	N. Korea	S. Korea	**Total**
–	1990	11.9	0.8	1.7	0.3	14.7
NFC	2020	32.5	1.1	5.5	1.4	40.5
BCT	2020	22.3	1.0	1.5	0.7	25.5
ACT	2020	17.4	1.0	1.5	0.7	20.7
BAT	2020	3.7	0.4	0.6	0.1	4.7

IN BRIEF

A cleaner China

Starting from January, unleaded petrol with a sulphur content far below present levels is to become widely available in China. The aim is to enable three-way catalyzers to be fitted on cars, so making a move towards cleaner air.

To improve air quality and also to lessen acidification, from New Year the limit for sulphur in gas oil will be lowered too, to 0.2 per cent from the present 0.5 per cent. There are moreover plans for a great extension of the country's natural-gas network. Today coal and oil account for 75 and 22 per cent respectively of the energy supply.

Reuters, citing official Chinese sources, reports that the country is currently spending 1 per cent of its GDP on environmental improvement.

Reuters. June 30, 1999.

Air pollution in developing countries

Cooperation concerning such matters as trade is already well established between countries in Southern Asia, South America, and Southern Africa. Since the last year or so the same channels have been used to attack air pollution. Work to this end has started as a result of the RAPIDC project (Regional Air Pollution in Developing Countries) under the coordination of the Stockholm Environment Institute, with the aim of facilitating and promoting regional agreements and policy initiatives in developing countries.

There is more information in the RAPIDC newsletter, subscriptions from Howard Cambridge at SEI in York, England. E-mail: hmc4@york.ac.uk.

Well to slow down

The Umweltbundesamt, the German environment agency, has raised the possibility of speed limits on the autobahn. It states in a study published in June that a speed limit of 100 km per hour would noticeably reduce the emissions of air pollutants from road traffic – those of carbon dioxide by 3 per cent and nitrogen oxides by 5 per cent. The whole country's emissions of carbon dioxide would drop by about one-half per cent.

Check your carbon dioxide

How much carbon dioxide is emitted to the atmosphere when you fly to Brussels, the Canary Islands, or Bangkok? You can find the answer on internet. Click on a map the place from which you will start and your destination. The computer gives the answer. Try it on www.benjhm.free-online.co.uk/flying/.

IN BRIEF

Much less but still too much

Sulphur deposition onto forest land in southwestern Sweden diminished from 15 to 6 kg per hectare between 1989/90 and 1997/98. But even after this great drop they will still have to be halved again if they are to come down below the critical loads, according to the regional environmental authorities. No similar trend has been discernible for nitrogen depositions.

Lakes recovering

Although the lakes around Sudbury, Ontario, had been badly acidified, they are now starting to recover as emissions of air pollutants fall off. By studying microscopic algae in the lakes' sediment, Canadian scientists have been able to put together a picture of the historical development not only around Sudbury but also in the Adirondack Park, state of New York. In both cases there was found to have been heavily acidification since as far back as the 1850s. It can now be seen, after emissions have diminished, that recovery is taking place fastest in the Sudbury area. The most probable reasons are that depositions have fallen off most there (during the 70s Sudbury was one of the world's worst point sources for emissions of sulphur dioxide), and that the local lakes are better supplied with buffering substances than those in the Adirondacks.

Further reading: "Tracking Recovery Patterns in Acidified Lakes: A Paleolimnological Perspective." J.P. Smol et al. *Restoration Ecology* Vol. 6 No. 4, pp. 318-326. December 1998.

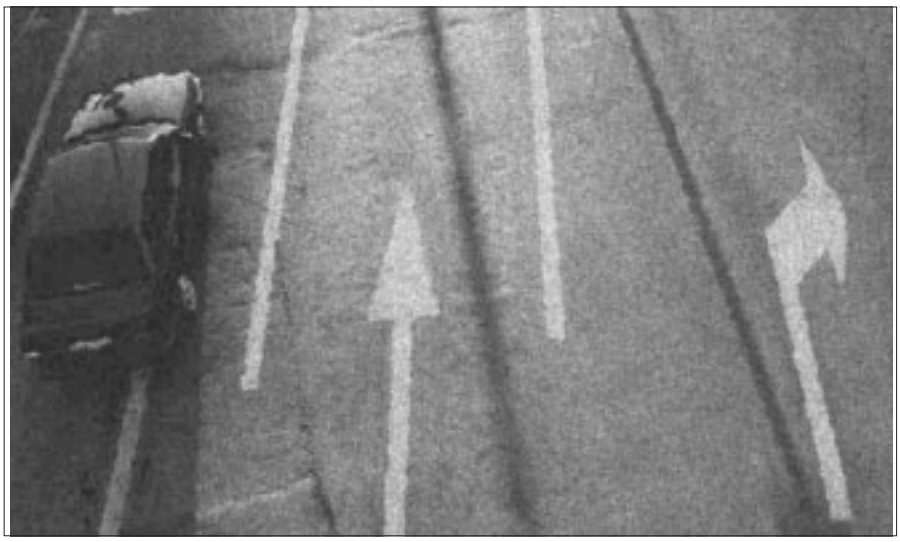
New Czech policy for environment

In June the Czech government announced a new policy for environment, calling, as regards air quality, for a revision of the country's clean air act. The aim would be in particular to cut the emissions of sulphur oxides and other pollutants from small sources. There would also be tighter limits for the NOx and VOCs released from power plants, industry, and transportation. The role of emission charges (taxes) in improving air quality would be strengthened.

For the transport sector the policy envisions a revival of railroad freight and passenger transportation as a result of newly-built corridors for high-speed trains throughout the country.

The general aim is to have attained a level in regard to the environment that would be comparable to the average level in the European Union in the mid-1990s.

Environment Watch: W. Europe. June 18, 1999.



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TRANSPORT AND HEALTH CONFERENCE

New charter adopted

If it should lead to binding commitments on the part of the countries it would mark an important advance, comments T&E.

At a conference in London in June, of ministers from fifty countries in the WHO European region, a Charter on Transport, Environment and Health was agreed, in which it says the following in regard to transportation:

"The current patterns ... in the European region, dominated by road motor vehicles, are not sustainable and have significant adverse effects on health and the environment."

The charter is non-binding, but in it the signers undertake to strive to make transportation generally sustainable to health and the environment.

They agree moreover to make efforts to implement the measures set forth in the charter, especially those concerning health, and to integrate health and environmental needs into their planning policies, current and to come. By next spring they shall have weighed the feasibility, necessity, and content of new legislative instruments to achieve these aims.

Besides the transportation charter, a protocol on water and health was agreed at the conference. This latter is legally binding. A final statement was also issued, which in addition to the above matters touched on the necessity of improving public access to environmental information and the measures required to offset the feared effects of climate change and thinned ozone layer on health.

Frazer Goodwin, policy director of T&E, the European Federation for Transport and Environment, considers the conference to have moved at least some way in the right direction. He notes however that that there are already far too many vaguely worded and non-binding documents around.

"The charter," says Goodwin, "does not only cover the same old ground of the negative impacts of transport; it also adds the positive health benefits that accrue from walking and cycling instead of motorized transport. This is important as there is now a recognition that a sustainable transport future is not some 'hairshirt' horror, but a healthier and higher quality lifestyle option."

"The charter sets forth a number of objectives in the realms of transportation, the environment, and health that the countries should strive to attain. If it should then lead to binding commitments on the part of the participants, it really would mark an important advance," he adds.

PER ELVINGSON

More information can be had from WHO Regional Office for Europe, see opposite page.

Pollution killing more than accidents

A study for the World Health Organization has examined the effects of exposure to very small particles on human health.

According to a study[1] of the conditions in Austria, France, and Switzerland that was presented at the Third Ministerial Conference on Environment and Health, arranged in London by WHO in June, the pollution from road traffic is killing more people than accidents do.

The study had examined in particular the effects of exposure to small particles (PM_{10}) on health. The main findings were as follows:

❑ Altogether one-third of the PM_{10} air pollution is caused by road traffic, and as much as 50 per cent in cities.

❑ Long-term exposure of adults over thirty years of age to air pollution from road vehicles is adding, in the three countries studied, 21,000 a year to the number of premature deaths from respiratory or heart diseases. This is more than the total annual number of deaths from traffic accidents, which were 1031 in Austria, 8300 in France, and 616 in Switzerland – or 9947 all told. The figures are however not exactly comparable. It cannot be determined *how* premature the deaths are from air pollution. It may be a matter of days or months or years.

❑ Each year air pollution from road vehicles causes 300,000 extra cases of bronchitis in children in the three countries studied, as well as 15,000 hospital admissions for heart disease, and 395,000 attacks of asthma in adults and 162,000 in children.

❑ Such air pollution is also the cause of 16 million person-days of restricted activity – days off work or with inability to carry out the usual business of daily living – among adults over 20 years of age because of respiratory disease.

❑ The total cost of these effects on health in the three countries can be put at 27 billion euros a year – if one includes the intangible costs of pain, grief, suffering, and loss of quality of life from illness or premature death, as well as the monetary costs of medical treatment and loss of production. That would be 1.7 per cent of the combined gross national product of these three countries – equal to 360 euros per individual a year.

"Road transport is the most important source of human exposure to air pollution, noise, accidents and barriers to walking and cycling, and it is increasing relentlessly. We are paying a huge price for this excessive road transport: with our money and with our health" emphasized Dr Carlos Dora from the WHO European Centre for Environment and Health.

[1] *Health costs due to road traffic-related air pollution*. Available from WHO Regional Office for Europe, Scherfigsvej 8, DK-2100 Copenhagen Ø, Denmark. Fax: +45 39 17 18 80. Internet: www.who.dk. Many of the written documents from the London conference can be found under the internet address www.who.dk/london99.

Lichens and pollution

Lichens have been used as indicators of air quality in a German school project. The findings can be read on internet: www.bionet.schule.de/aerodata/hannover.

The leaders of the project would like to extend it to Europe generally, and are therefore looking for finance and cooperation. For information, contact Sylvia Reckel, AeroData BioNet, c/o AG Bioindikation, Lister Meile 27, D-30161 Hannover, Germany. E-mail: aerodata-bionet@real-net.de

IN BRIEF

Particle traps for diesel cars

Although diesel-driven passenger cars release less carbon dioxide per kilometre than their petrol-driven counterparts, they emit far more particles and nitrogen oxides. The French PSA concern, maker of Citroën and Peugeot cars, claims however that the particle problem can be solved.

To prevent the traps used on heavy vehicles from becoming clogged, the particles must be burnt off at regular intervals, and this requires a temperature of 550°C. On heavy vehicles that is no problem, but on cars the temperature of the exhaust gases only reaches 150°C. PSA proposes to use a particle trap, but also to raise the temperature of the exhaust gases and lower that of combustion.

The exhaust temperature is raised by means of a "fifth stroke" – a little extra amount of fuel which is injected into the cylinder when the engine computer signals that the particle trap is getting filled. Adding a cerium solution to the fuel reduces the reaction temperature in the trap just so much that burning off can take place.

The PSA claims that the method reduces the emissions of particles from diesel-driven cars to 4 mg/km. The current EU limit is 80 mg/km, but will be lowered to 25 mg/km in 2005.

Further information can be found at the internet address www.psa.fr/presse/en_99018.html.

Fuel-efficient hybrid from Honda

This autumn Honda will start selling its Insight hybrid in Japan. It is said to achieve 35 km per litre in the Japanese test cycle, and Honda claims it to be "the world's most fuel-efficient mass produced car". The Insight comes as two-door coupé with a petrol and an electric motor.

Great difference from best to worst

It will probably hardly surprise anyone that the various car models differ in the amounts of pollutants that they emit. But few are likely to know that there should be a factor of 1000 between the best and the worst models. Tables showing the emissions of NOx, hydrocarbons, carbon dioxide, etc., can be found on the home page of the UK Department of the Environment, Transport and the Regions: www.roads.detr.gov.uk/vehicle/fuelcon/.

Air Quality Management. August 1999.

Recent publications

Strategies and Policies for Air Pollution Abatement (1999)
Lists the various countries' emissions and proposals for curbing them in the ECE-group. UN Publication, Sales No. E.99.II.E.14. Available from United Nations, Sales Section, Palais des Nations, 1211 Geneva, Switzerland. Tel. +4122-9172601. E-mail: unpubli@unog.ch.

Promoting development while limiting greehouse gas emissions: Trends & Baselines (1999)
Edited by J. Goldemberg and W. Reid and published by the UNDP together with the World Resources Institute.

150 pp. UN Sales No. E.99.III.B.32. Available from UNDP, 1 United Nations Plaza, New York, NY 10017, USA.

The Use of Economic Instruments in Nordic Environmental Policy 1997-1998 (1999)
A comprehensive overview of the economic instruments currently in use for environment policy in the Scandinavian countries. Also summarizes the main environmental problems in the region and explains the reasons for using economic instruments in this policy field.

144 pp. TemaNord 1999:524. Published by the Nordic Council of Ministers, Store Standstraede 18, 1255 Copenhagen K, Denmark. Fax. +45-3396 0202. Internet: www.norden.org.

Ecological Economics and the Ecology of Economics (1999)
By H.E. Daly. A criticism of existing work on ecological economics and the economics of ecology. Discusses changes required to avoid uneconomic growth, that is, when the environmental and social costs of growth exceed the benefits.

208 pp. £49.95. Published by Edward Elgar Publishing, tel. +44-1242 226934, e-mail: info@e-elgar.co.uk.

Integrated Models for the Assessment of Air Pollution Control Requirements (1999)
By M. Johansson. A scientific summing up of the way mathematical models can be used to forecast the effects on soil and ecosystems when depositions of acidifying substances decline, as well as the time needed for recovery.

413 pp. Can be ordered from Matti Johansson, Finnish Environment Institute, Box 140, 00521 Helsinki, Finland.

Acid Rain. Acidification in the UK (1999)
Booklet from the Department of the Environment, Transport and the Regions, briefly describing the acidification problem in Britain and ongoing international activities aimed at reducing emissions.

8 pp. Can be ordered from DETR Free Literature, P.O. Box No 236, Wetherby LS23 7NB, England.

EUTROPHICATION

Great increase seen in algal blooms

Probably due to increased input of nitrogen to the seas

DURING the last few decades algal blooms have become ever more frequent and more intensive along the coasts of North America and Europe. The writers of an article in the scientific journal *Ambio* believe a probable explanation is that the input of nitrogen to the seas, about half of which may be due to air pollution, has increased.

In sea water the availability of nitrogen is a limiting factor for algal growth. As in terrestrial ecosystems, the various species have a varying ability to take advantage of increased amounts of nitrogen. The man-made inputs, while leading to a general increase in primary production, also cause some species to increase more than others. Both of these effects have repercussions in large parts of the marine ecosystem.

According to the authors of the *Ambio* article, there is a strong connection, both geographically and in time, between the arising of harmful algal blooms and man-made additions of nitrogen to the seas. That part which comes in via the atmosphere (and is due to emissions of air pollutants, in particular nitrogen oxides and ammonia) is calculated to vary in coastal waters from 25 to 50 per cent.

Around the coasts of the North Atlantic about a fifth of the nitrogen input from land originates from depositions of air pollutants. With that included in the airborne share, the researchers conclude that the nitrogen inputs from land and the atmosphere are of comparable magnitude in the North Atlantic area.

"Anthropogenically-derived Atmospheric Nitrogen Deposition, Marine Eutrophication and Harmful Algal Bloom Expansion: Is There a Link?" By H.W. Paerl and D.R. Whitall. *Ambio* Vol. 28, No. 4, June 1999.

Energy Globe Award 2000

The European award for sustainable energy

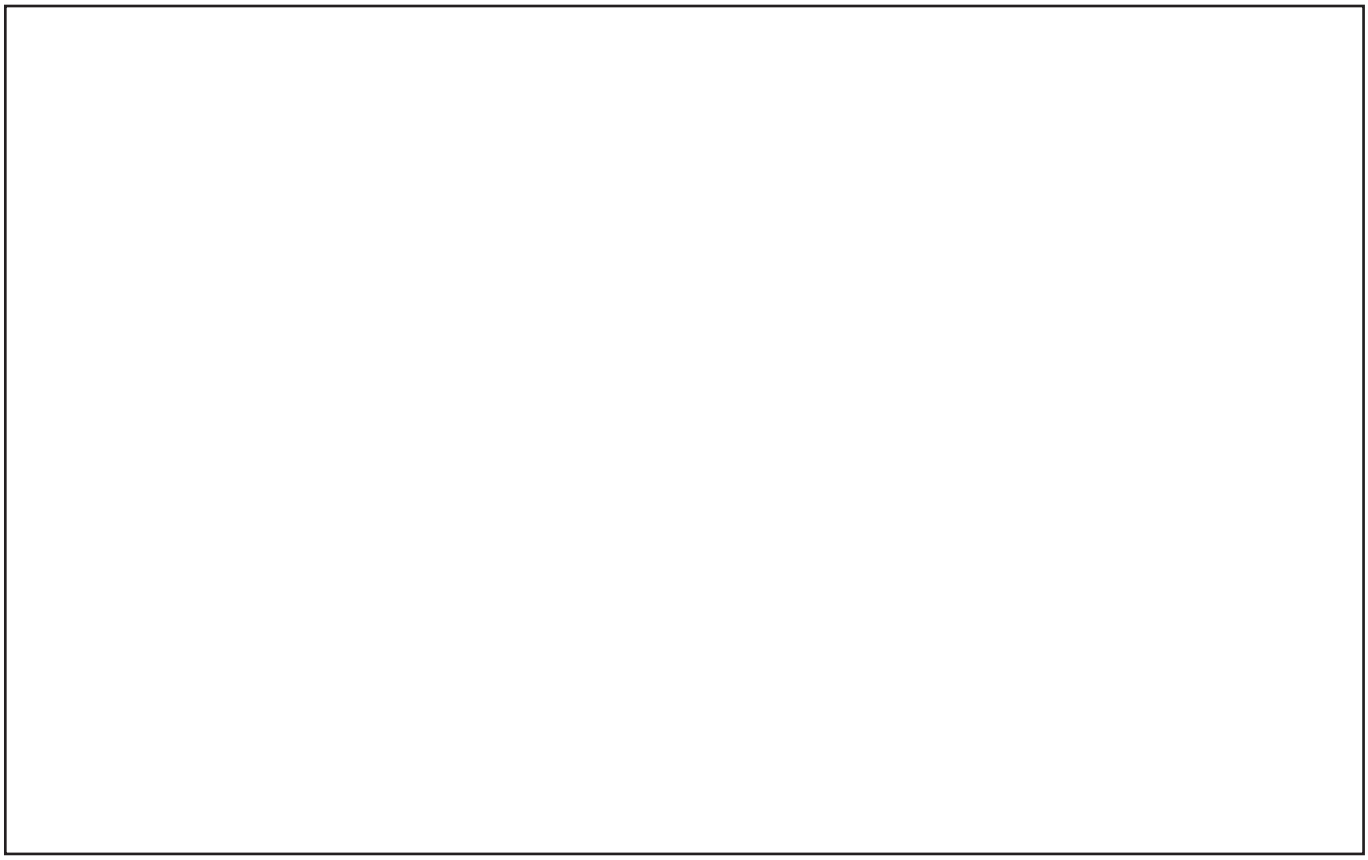
The Energy Globe Award 2000 is an award for projects and initiatives related to energy efficiency and renewable sources of energy. Business firms, public and private institutions as well as individuals anywhere in the world are invited to submit projects for consideration.

The Energy Globe Award 2000 will be presented during the World Sustainable Energy Day 2000 and the *Energiesparmesse*, which will be held in Wels, Austria, March 9-12, 2000. An award of 10,000 euros will go to the winning project in each category, and be made known in EU-wide releases to the media.

Projects must be submitted before November 15, 1999.

They should involve either energy efficiency or renewable energy sources (or a combination of both) or some other solution for sustainable energy.

For further information please contact:
O.Ö. Energiesparverband, Christiane Egger.
Tel. +43 732 6584 4386.
E-mail: energy.globe@esv.or.at.
Internet: www.esv.or.at/energyglobe.



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NUCLEAR PHASE-OUT

Can be done without reneging

Nuclear power can be phased out while yet reducing carbon dioxide emissions

THE NUCLEAR POWER industry and its allies often maintain that it would be impossible to phase out nuclear power while at the same time fulfilling the commitments the EU countries have made by signing the Kyoto protocol under the UN Convention on Climate Change. About 800 TWh[1], or 36 per cent of the electricity in the EU is now generated in nuclear plants.

But WWF believes both are possible as part of the strategy for reducing emissions of CO_2 by at least 8 per cent by 2010.

Proper mix will pave the way

Although it is generally accepted that a sudden nuclear phase-out would neither be easily achievable nor cost-effective in the short term, decarbonization is not sufficient either as a means of achieving a clean energy future. The money now being used to run nuclear plants would be better invested in cleaner electricity. It would, in the view of WWF, not only be technically feasible for the EU to phase out nuclear generating capacity while meeting commitments under the protocol, but by employing a proper mix of non-nuclear measures it would also be possible to pave the way for greater cuts in emissions when further commitments have to be made post-Kyoto.

Increased use of renewables

WWF believes a combination of the following measures would enable nuclear power to be eliminated from the electricity sector by 2010.

❑ An additional 200 TWh from renewables – a modest figure in view of the fact that the EU White Paper on Renewables aims at a doubling of renewables by 2010, thus providing 340 TWh.

❑ An extra 200 TWh from demand-side measures. A realistic figure. Studies of policies and measures[2,3] have put the savings potential for heavy industry alone at 75 TWh by 2005 and 100 TWh by 2010. Recent estimates[4] also suggest that some 100 TWh are currently being wasted by leaving electronic equipment in offices and homes on stand-by when not in use.

❑ An increase of 200 TWh from new and highly efficient co-generation of heat and power (CHP). This comes close to the doubling of electricity production from co-generation as envisaged by the Commission in its CHP strategy. A fifty-fifty mixture of natural gas (specific emissions 300 g CO_2/kWh) and hard coal (450 g CO_2/kWh) would admittedly increase CO_2 emissions by about 80 million tons if substituted for nuclear power – assuming, for the sake of simplicity, that nuclear power is carbon free.

Efficient base-load power plants

❑ 200 TWh from new base-load power plants with a mixture of 50 per cent very efficient advanced combined-cycle gas turbines (conversion efficiency around 58 per cent) and 50 per cent modern coal gasification combined-cycle technologies. With CO_2 emissions of 550 g per kWh, this fuel mix would generate about 110 million tons of CO_2.

Coal is assumed as replacement for about a quarter of the present nuclear power, because some coun-

Further publications

The European Directory of Environment and Health Organisations (1999)
Directory containing information about 302 organizations. Can be found on the internet at www.oneworld.org/uned-uk/health/dircontsh-tm. For more information, or to purchase a hard copy, contact Rowshan Hannan, fax: +44-171 930-5893, e-mail: una@mcr1.poptel.org.uk.

Trends in the Transport Sector 1970/1997: 1999 Edition
Report from ECMT (European Conference of Ministers of Transport) giving the latest statistics on the situation in the transport market in Europe today. It shows what has occurred between 1970 and 1997 and includes an analysis of the transport situation in western and eastern Europe, as well as in the Baltic States and the CIS.

70 pp. 60.00 francs. Available in English and French from OECD, 2, rue André-Pascal, 75775 Paris Cedex 16, France. E-mail: bookshop@oecd.org.

Energy Efficiency Update (1999)
A comprehensive review of the policies and measures implemented or so far planned by the 24 member states in the International Energy Agency (IEA).

Available on the agency's website at www.iea.org/pubs/newslett/eneeff/table.htm. Can also be ordered from OECD, address as above.

Economic evaluation methods of environmental measures (1999)
Paper from a seminar on the subject held in Brussels by the European Environmental Bureau on December 11-12, 1998. 110 pp. Avialable from EEB, Bd de Waterloo 34, B-1000 Brussels. E-mail: cleanair@eeb.org.

NAPAP Biennial Report to Congress: An Integrated Assessment (1998)
Presents the results of the first evaluation of the costs, benefits, and effectiveness of the US Acid Deposition Control Program. Gives a lot of data on acidic emissions, trends, state of the environment, etc.

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tries now relying considerably on nuclear power, such as Germany and Spain, also have large domestic coal reserves and would be unwilling to substitute natural gas for all their nuclear power, since that would strongly increase their dependence on imported fuels.

Further measures needed

Taken together, these four packages could make up for the electricity that would otherwise have been generated by nuclear plants in 2010, but emit an additional 190 million more tons or so of CO_2. And with nothing further being done, and emissions being allowed to increase drastically under a business-as-usual scenario, the EU total would come to 700 million tons above the Kyoto agreement for an 8-per-cent reduction below 1990 levels.

To help the EU to meet its Kyoto commitments, the following measures could be applied.

❑ By using the remaining 140 TWh from renewables envisaged in EU's White Paper, a further 120 million tons could be cut from CO_2 emissions. Much fossil fuel could also be replaced in the southern member countries by an extension of solar thermal power – a renewable source of energy that can almost pay for itself. Although solar thermal could contribute some 45 GW or one-sixth of the installed power capacity in the Mediterranean region during the next decade[5], it has surprisingly not been mentioned in the White Paper.

Combined heat-and-power

❑ A trebling of CHP in the EU, bringing it up to 300 TWh by 2010, as envisaged by the co-generators themselves, would reduce the emissions of CO_2 by another 80-120 million tons. Several researchers[6] have suggested that the technical potential for CHP in the EU would in the longer term be of the order of 850-1000 TWh a year.

❑ Improved insulation, double glazing, etc. could save energy for residential and office space heating. This would, according to EUROACE, reduce CO_2 emissions by yet another 400 million tons by 2010 – a figure supported by estimates from EURIMA, representing the European insulation industry. Some 50 million tons could also be cut from CO_2 emissions by a more efficient use of materials in manufacturing and heavy industry.[6]

❑ As estimated by WWF, about 300 million tons of CO_2 could be saved by setting a tougher target for fuel economy in the transport sector (such as no more than 2-3 litres per 100 km for new cars by 2010) and by shifting spending away from new roads to improvements in mass transportation[7]. Also needed would be a switch to natural gas and fuel cells in urban public transportation, coupled with an EU-wide road pricing and more investment in freight transport by rail.

Fifteen-per-cent reduction

Excluding emissions of greenhouse gases other than CO_2, these proposals for energy policy could reduce the emissions of CO_2 by at least 950 million tons by 2010. If the extra CO_2 emissions resulting from the nuclear phase-out are added, this could bring down CO_2 emissions in the EU by 760 million tons below 1990 levels – a reduction of more than 15 per cent, which would be consistent with the EU's pre-Kyoto negotiating target.

These figures show the fallacy of the assertion that it will be necessary to retain nuclear power if the climate problem is to be solved. They also show up the weakness of the Kyoto targets in consideration of the high potential for domestic action.

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Article originally published in Climate Network Europe's newsletter Hotspot, May 1999.

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[1] Association of German utilities (VDEW), 7.8.98: www.strom.de/zf_sz_33.htm.

[2] Utrecht University, Zeist (Netherlands), 1996. Policies and measures to cut CO_2 by energy efficiency and renewables. Report to WWF.

[3] EU Expert Group, 1997. Policies and measures.

[4] German Federal Environment Agency & Environment Ministry 1.1.99: PR Nr. 3/99.

[5] Electric Energy Supply with Renewables. Chapter 3 and 8. Springer Heidelberg, 1999 (in German).

[6] Utrecht University, Zeist (Netherlands), 1996. Policies and measures to cut CO_2 by energy efficiency and renewables. Report to WWF.

[7] Wuppertal Institut, 1998. Passenger car technology for the next decade. Report to WWF; Utrecht University, 1998. A review of the stage of implementation of European Union policies and measures for CO_2 emission reduction. Report to WWF.

Reducing nitrogen-oxide emissions

CONVENTIONAL three-way catalyzers cannot be used to reduce the emissions of nitrogen oxides from diesel engines. But the makers of heavy vehicles will soon be forced by EU standards to have found solutions for this problem, and there are already at least four under development. One that seems to be ahead in the race is the EGR system devised by a Swedish company, STT Engineering AB.

The STT system is claimed to be able to halve the emissions of nitrogen oxides from heavy vehicles. By limiting the emissions to 3.2 g NOx/kWh, it will already fulfill the EU requirements that are scheduled for introduction in 2006 (Euro IV; see AN 1/99, p.8). Tests have been going on for the last half-year with twenty buses running on urban routes, so far with good results.

In Exhaust Gas Recirculation, which is what EGR stands for, the flow of oxygen to the engine is reduced by returning some of the exhaust gas, thus obtaining an ideal mixture for combustion (see diagram).

To prevent damage to the engine, the return exhaust gases have to be cleaned by passing them through a particle filter. The system comes under the low-pressure category because the return gases are mixed with the intake air before the turbo unit.

The STT system can be fitted to existing vehicles together with a particle filter and an oxidizing catalyzer. The particle filter does not only enable the system to function, but also reduces the emissions of particles by more than 90 per cent (by weight).

The estimated cost for the whole system, when made in small series, would be about 14,000 euros, about half of which would be for the particle filter/catalyzer (of CRT type). The yearly cost for a complete system on buses would be at most 2500 euros per vehicle, but lower if produced in greater volume.

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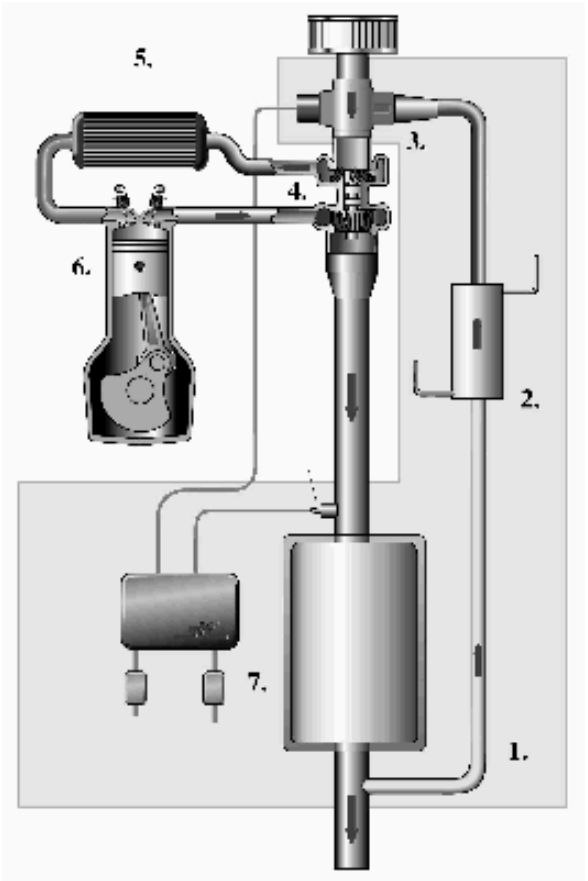

The SST system for cleaning diesel exhausts

1. Some of the cleaned gases are returned to the engine. 2. Cooled on the way. 3. Mixed with cleaned air. 4. Turbo unit to increase pressure and raise temperature. 5. Intake air cooled. 6. Mixing exhaust gases with intake air lowers oxygen content, making for lower combustion temperature and so less forming of nitrogen oxides. 7. Exhaust gases from the engine are passed over a catalyzer, which reduces the hydrocarbons and carbon monoxide, and through a particle trap.

Further information can be obtained from Glenn Berglund, STT Engineering AB, Pl. 7219, 862 40 Njurunda, Sweden. E-mail: turbo@stt.se. Internet: www.stt.se.

Other systems that are being developed for reducing NOx emissions from diesel vehicles are SCR (Selective Catalytic Reduction), NSSCR (Non-Selective Catalytic Reduction) and NOx-adsorption. The SCR system is already in use in power plants and aboard ships.

Must and can be phased out

Environmental and economic trends have made a global phase-out of coal both necessary and feasible, according to the Worldwatch Institute.

"Coal's share of world energy, which peaked at 62 per cent in 1910, is down to 23 per cent" notes Worldwatch research associate Seth Dunn. "While coal's market price is at an historic low, its environmental and health costs have never been higher."

Hastening the decline of coal will be imperative if climate change is to be slowed during the next century, says Dunn. Coal is the most carbon-intensive of fossil fuels and it accounts for 43 per cent of the world's annual carbon emissions.

Two main ingredients of coal smoke are particulate and sulphur dioxide pollution, which cause 500,000 premature deaths and millions of new respiratory illnesses each year in urban areas all over the world. In rural areas, coal smoke from cooking accounts for as many as 1.8 million deaths annually.

Dunn notes that so far only scattered efforts have been made to attack these problems.

"It's time to move ... toward a more comprehensive strategy to phase out coal," says Dunn. One key measure towards "de-coalizing", he adds, will be to reduce the large subsidies that are encouraging its use in some countries. China has more than halved its coal subsidy rates since 1984 – a move that contributed to a 5.2-per-cent drop in Chinese coal consumption in 1998. Since slashing or ending coal supports over the last fifteen years, Belgium, France, Japan, Spain, and the United Kingdom have collectively halved the use of coal. Opportunities exist for still further reductions. The remaining coal subsidies total some $63 billion annually: $30 billion in industrial nations, $27 billion in the former Eastern bloc, and $6 billion in China and India. The total in Germany is equivalent to US$21 billion, including direct supports averaging more than $70,000 per miner.

For more information, apply: Worldwatch Institute, 1776 Massachusetts Ave NW, Washington, DC 20036, USA. Internet: www.worldwatch.org.

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INFRASTRUCTURE

Little good coming from new roads

Experts find it would seldom pay to encourage traffic growth.

In a country with a sound economy and a well-developed transportation system, a great outlay on new roads can only have a marginal effect on economic growth. Very often the social gain would be much greater if one tried to reduce the volume of traffic instead of encouraging its growth, as by expanding the road network, for instance.

In a report entitled *Transport and Economy*, published in August, the British government's expert group, the Standing Advisory Committee on Trunk Road Assessment, SACTRA, has examined the effects of transportation policy and the pricing of transport on the development of the economy. Hardly surprisingly, it concluded that the closer one can get to a pricing based on marginal social cost, the more the transportation system will contribute to economic development – broadly defined as prosperity, a healthy environment, and so forth.

But prosperity will be affected whenever transport prices are no longer set in accordance with the principle of marginal social cost – either through too low or too high taxation.

"The circumstances where reducing traffic levels could contribute usefully to economic performance are, in general, those where transport prices are currently below marginal social costs, primarily because of the existence of external costs of congestion and environmental damage. In these circumstances, traffic reduction policies which result in a better alignment of prices and costs not only reduce the incidence of such external costs, but also, in doing so, can increase economic welfare."

The standing committee points out that exactly the same will apply if the existing transport prices exceed the marginal social cost. It concludes moreover that great road-building schemes, aimed at eliminating congestion, are often damaging to the nation's economy.

"If transport prices are currently too low, due to uncharged congestion or environmental effects, then a transport improvement could lead to additional costs for the economy."

The committee thinks it is likely that a sound traffic policy would in many cases lead to reduced transports – while at the same time emphasizing that the conditions can vary sharply, making it difficult to draw any general conclusions.

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Source: www.roads.detr.gov.uk/roadnetwork/sactra/index.htm

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Coming events

Action Day on Aviation and Environment. October 29-30, 1999. *Information*: The Right Price for Air Travel Campaign, c/o Friends of the Earth Netherlands. Tel. +31-20 550 73 00. Internet: www.milieudefensie.nl/airtravel.

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

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

Critical loads. Copenhagen, Denmark, November 21-25, 1999. A conference under the Convention on Long Range Transboundary Air Pollution. *Information*: E-mail: bt@dmu.dk. Internet: www.dmu.dk/critical_loads_copenhagen.

EMEP/WMO Workshop on Fine Particles – Emissions, Modelling and Measurements. Interlaken, Switzerland, November 22-25, 1999. *Information*: Robert Gehrig, EMPA, 8600 Duebendorf, Switzerland. E-mail: robert.gehrig@empa.ch.

III Seminar on Air Quality in Spain. Seville, Spain, November 24-26, 1999. Organized by EU Commission DGXI and the Spanish Environment Ministry. *Information*: Proymasa, C/Tutor, 3 Dpdo. 1° Dcha. 28008 Madrid, Spain. E-mail: proymasa@arrakis.es.

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

14th Annual POLIS Conference. December 1-3, 1999, Rotterdam, The Netherlands. Transport solutions for tomorrow's cities and regions. *Information*: Maarten van Bemmelen, tel. +31-10-489 7122, e-mail: m.bemmelen@obr.rotterdam.nl.

Council of EU Environment Ministers. Brussels, Belgium. December 13-14, 1999.