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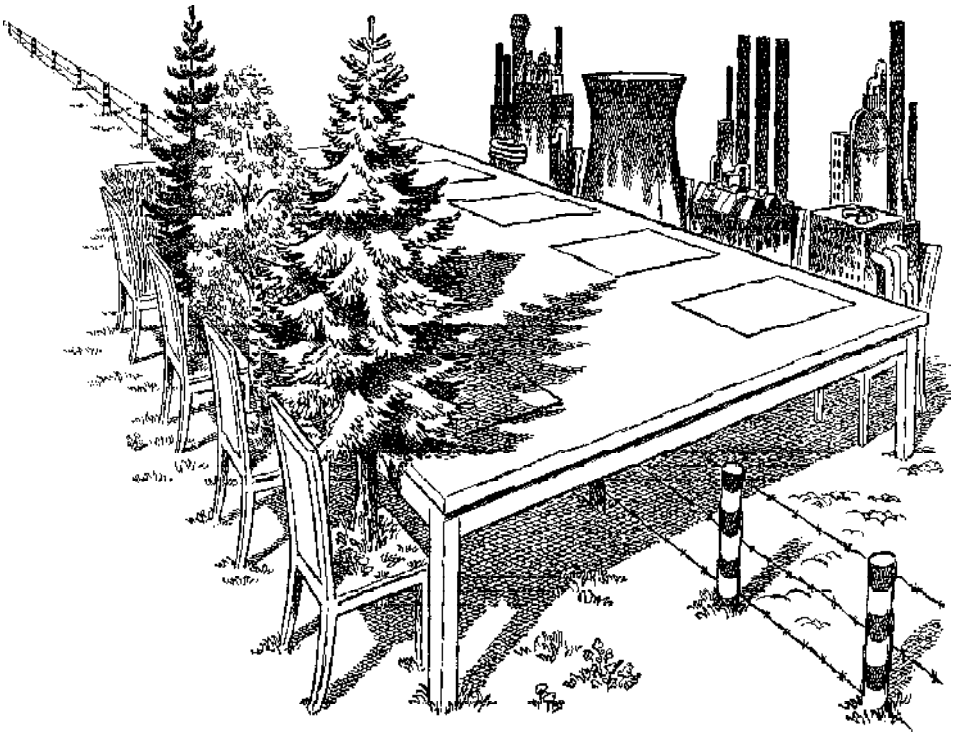

The Convention on Long-range Transboundary Air Pollution

The 1979 Convention on Long-range Transboundary Air Pollution was the first multilateral treaty for dealing with air pollutants. Aimed initially at reducing the effects of acid rain through control of the emissions of sulphur, its scope was later widened to include nitrogen pollutants, volatile organic compounds and photochemical oxidants. Heavy metals and persistent organic pollutants were subsequently also added.

Exports and imports

Since 1977 the monitoring of transboundary air pollution has been done through the European Monitoring and Evaluation Programme (EMEP), covering the whole of Europe. The EMEP network now comprises some 100 monitoring stations spread over twenty-five or so countries. The EMEP collates data on the national emissions of sulphur and nitrogen (ammonia and nitrogen oxides), as well as providing data on their transformation and transport in the atmosphere and subsequent deposition. Since 1989 the EMEP has been reporting on the emissions of volatile organic compounds (VOCs) and on the formation of photochemical oxidants such as ozone. It also produces maps showing the transboundary fluxes of these pollutants, thus providing evidence as to "who does what to whom."

The Convention

A proposal for an international convention on long-range transboundary air pollution, to be adopted by countries in the ECE[1] region, was put forward by Norway early in 1977. Then, referring to the declaration of the 1972 UN Conference on the Human Environment in Stockholm, saying that states have an obligation to ensure that activities carried out in one country do not give rise to environmental damage in others (Principle No. 21), the Scandinavian coun-

[1] United Nations Economic Commission for Europe (ECE) includes more than fifty countries in Europe, as well as the USA and Canada (http://www.unece.org).

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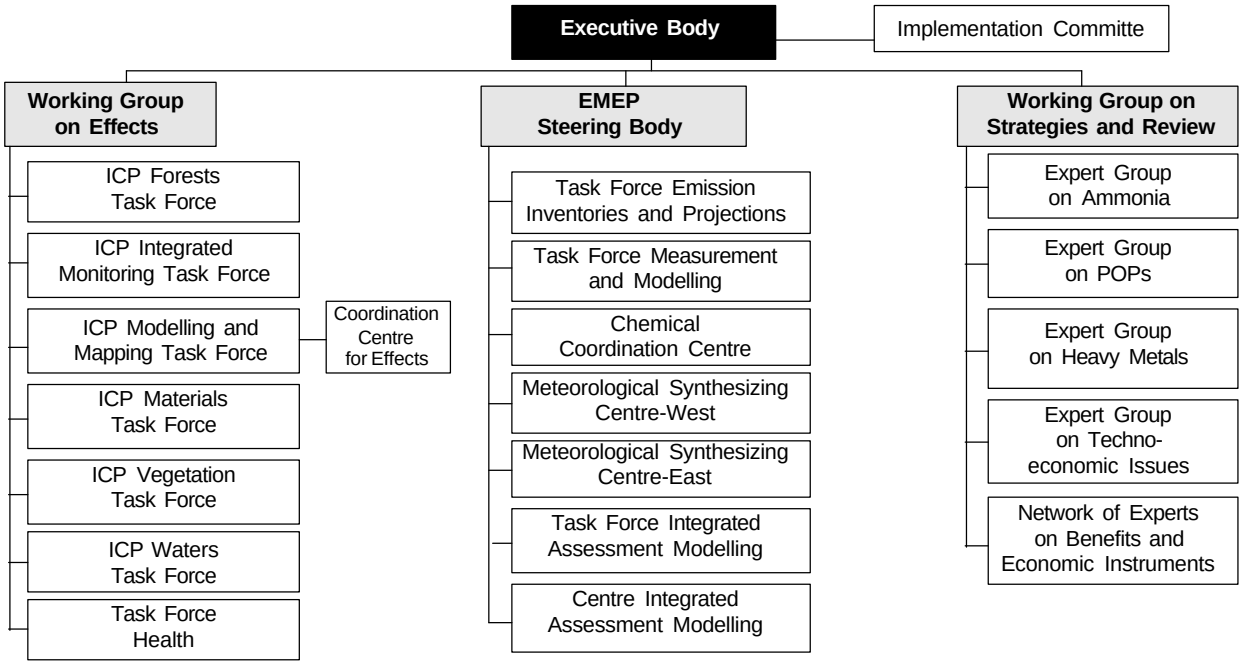
Organizational setup for the Convention on Long-range Transboundary Air Pollution



The Executive Body, which meets annually, is the supreme policy-making assembly on which all parties to the Convention are represented. Subsidiary to the EB are the EMEP Steering Body and two Working Groups, which deal with specific sectors of the Convention's workplan and are open to all parties. Assisting them are various Task Forces and Expert Groups. Six International Cooperative Programmes (ICPs) monitor the environmental effects of air pollution.

tries jointly presented a draft for a convention. After some hard negotiating, the Convention on Long-range Transboundary Air Pollution (CLRTAP) was signed in Geneva in November 1979 by all of the thirty-five countries that were then members of ECE (see table). After ratification by twenty-four of the signatories, it came into force in March 1983. More countries have since acceded, bringing the total number of parties to the Convention (in 2003) to forty-nine.

The Convention does not in itself call for any binding commitments to undertake concrete measures for the reduction of specific pollutants. The text only says that countries shall "endeavour to limit and, as far as possible, gradually reduce and prevent air pollution," and that, in order to achieve this, they shall use "the best available technology which is economically feasible."

One of the first significant decisions made by the parties to the Convention, after its coming into force, was to take over the financial responsibility for EMEP. To this end, a protocol was adopted in September 1984, for long-term financing of the program.

The first sulphur protocol

In the spring of 1983 the Scandinavian countries put forward a proposal for limiting the emissions of sulphur. After two years of negotiating, a protocol was signed in Helsinki, Finland, in 1985. Ratified by more than twenty parties to the Convention, it came into force in September 1987. It requires the signatories to reduce their national yearly emissions of sulphur, or its transboundary fluxes, by at least 30 per cent by 1993 at the latest, from their 1980 levels. The 30-per-cent criterion was to be regarded as the first step in a long-term project for reducing emissions.

Some of the greatest polluters, such as the United States, Poland, Britain, and Spain, did not sign the protocol – despite the fact that adherence had, in the public view, become something of a test of environmental commitment on the part of governments.

Between 1980 and 1993, the twenty European countries that had ratified the protocol had reduced their annual emissions by 55 per cent, while total European emissions of sulphur had dropped by 43 per cent, according to EMEP data.

The NOx protocol

On November 1, 1988, in Sofia (Bulgaria) twenty-five nations signed an agreement to limit their emissions of nitrogen oxides. This protocol merely stipulates that, after 1994, emissions shall not exceed their 1987 level. In other words, it does not call for any actual reduction. It does however lay the ground for a second step, involving measures to reduce emissions, taking into account internationally accepted critical loads (see box, p. 4).

Twelve of the signatories showed their displeasure at the weakness of this protocol by proposing separately, in a joint declaration, to reduce their NOx emissions by 30 per cent by 1998 at the latest.

After having received a sufficient number of ratifications, the NOx protocol came into force in February 1991, and by 1994 the European emissions had fallen by about 16 per cent from their 1987 levels. From the reported emission data it appeared however that three of the countries that had ratified the Protocol – Greece, Luxembourg, and Spain – had not even managed to fulfill a modest commitment to freeze emissions. And of the twelve that were aiming at a 30-per-cent reduction, only four or five have succeeded.

The VOC protocol

This protocol on volatile organic compounds was signed in Geneva in 1991 by more than twenty countries. It aims principally at reducing the scale and the number of episodes where the ozone concentrations are particularly high.

Most of the signatories have commit-

ted themselves to reducing their emissions by at least 30 per cent by 1999, taking 1988 as the base year. Some countries have however elected to take an alternative base year. Two, Norway and Canada, are confining their 30-per-cent reduction to certain specified areas – so-called Tropospheric Ozone Management Areas (TOMAs), and some small emitter countries (so called) were given the possibility of signing the protocol even if they undertook only to freeze emissions.

Because ratification was long drawn-out, the protocol could not come into force until September 1997. According to officially reported emission data for 2003, seven of the twenty-one countries that had ratified the protocol were in remiss. Among these are Finland, Italy, Luxembourg, Norway, and Spain. Between 1988 and 1999 the European emissions of VOCs had however fallen by nearly 30 per cent.

The second sulphur protocol

The first outcome of the critical loads approach was this protocol, signed in June 1994 in Oslo by 28 parties to the Convention. It sets differing requirements for each country – the aim being to attain the greatest possible effect for the environment at the least overall cost. It also contains some specific requirements, not very rigorous, for large combustion plants. The text for basic obligations says that "parties shall control and reduce their sulphur emissions in order to protect human health and the environment from adverse effects," and that they shall ensure that sulphur depositions do not, in the long term, exceed critical loads. The scientific analysis underpinning the protocol showed that if the long-term goal was to be attained, the emissions of sulphur would have to be reduced by at least 90 per cent. As a result of the countries' commitments under the protocol, total European emissions of sulphur can be expected to have fallen by about 50 per cent by 2000, and 58 per cent by 2010, as from 1980. This protocol came into force in August 1998.

Heavy metals and POPs

Two protocols for these substances were signed in June 1998, the one aiming at reducing emissions to the atmosphere of heavy metals concentrating initially on cadmium, lead, and mercury. The other is to control, reduce, or eliminate emissions of persistent organic pollutants (POPs) to the environment. Sixteen substances are the declared targets of a first step, although – as in the case of heavy metals – new ones can be added later. Both protocols are expected to enter into force in 2003 or 2004.

Status of the Convention in September 2003. S=Signed. R=Ratified.

	1979 Conv.[a]	1984 EMEP [b]	1985 SO_2 [c]	1988 NOx [d]	1991 VOCs [e]	1994 SO_2 [f]	1998 POPs [g]	1998 HMs [h]	1999 Multi-eff.[i]
Armenia	R						S	S	S
Austria	S+R	R	S+R	S+R	S+R	S+R	S+R	S	S
Azerbaijan	R								
Belarus	S+R	S+R	S+R	S+R					
Belgium	S+R	S+R	S+R	S+R	S+R	S+R	S	S	S
Bosnia & Herz.	R	R							
Bulgaria	S+R	S+R	S+R	S+R	S+R	S	S+R	S	S
Canada	S+R	S+R	S+R	S+R	S	S+R	S+R	S+R	S
Croatia	R	R				S+R	S	S	S
Cyprus	R	R					S	S	
Czech Rep.	R	R	R	R	R	S+R	S+R	S+R	S
Denmark	S+R	S+R	S+R	S+R	S+R	S+R	S+R	S+R	S+R
Estonia	R	R	R	R	R				
Finland	S+R	S+R	S+R	S+R	S+R	S+R	S+R	S+R	S
France	S+R	S+R	S+R	S+R	S+R	S+R	S+R	S+R	S
Georgia	S+R								
Germany	S+R	S+R	S+R	S+R	S+R	S+R	S+R	S	S
Greece	S+R	R		S+R	S	S+R	S	S	S
Holy See	S								
Hungary	S+R	S+R	S+R	S+R	S+R	S+R	S	S	S
Iceland	S+R						S+R	S	
Ireland	S+R	S+R		S+R		S+R	S	S	S
Italy	S+R	S+R	S+R	S+R	S+R	S+R	S	S	S
Kazakstan	R								
Kyrgyzstan	R								
Latvia	R	R					S	S	S
Liechtenstein	S+R	R	S+R	S+R	S+R	S+R	S	S	S
Lithuania	R						S	S	
Luxembourg	S+R	S+R	S+R	S+R	S+R	S+R	S+R	S+R	S+R
Malta	R	R							
Monaco	R	R			R	R			
Netherlands	S+R	S+R	S+R	S+R	S+R	S+R	S+R	S+R	S
Norway	S+R	S+R	S+R	S+R	S+R	S+R	S+R	S+R	S+R
Poland	S+R	R		S		S	S	S	S
Portugal	S+R	R			S		S	S	S
Macedonia[1]	R								
Rep. Moldova	R						S+R	S+R	S
Romania	S+R	R					S	S	S
Russian Feder.	S+R	S+R	S+R	S+R		S			
San Marino	S								
Serbia & Mont.	R	R							
Slovakia	R	R	R	R	R	S+R	S+R	S+R	S
Slovenia	R	R				S+R	S	S	S
Spain	S+R	R		S+R	S+R	S+R	S	S	S
Sweden	S+R	S+R	S+R	S+R	S+R	S+R	S+R	S+R	S+R
Switzerland	S+R	S+R	S+R	S+R	S+R	S+R	S+R	S+R	S
Turkey	S+R	S+R							
Ukraine	S+R	S+R	S+R	S+R	S	S	S	S	
United Kingd.	S+R	S+R		S+R	S+R	S+R	S	S	S
United States	S+R	S+R		S+R	S		S	S+R	S
Eur. Community	S+R	S+R		R	S	S+R	S	S+R	R
Total	**33/49**	**22/40**	**19/22**	**25/28**	**23/21**	**28/25**	**36/16**	**36/14**	**31/5**

[1] The Former Yugoslav Republic of Macedonia.

[a] Convention on Long Range Transboundary Air Pollution (adopted 1979; entry into force 1983).

[b] Protocol on Long-term Financing of the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmissions of Air Pollutants in Europe (1984; 1988).

[c] Protocol on the Reduction of Sulphur Emissions or their Transboundary Fluxes by at least 30 per cent (1985; 1987).

[d] Protocol concerning the Control of Emissions of Nitrogen Oxides or their Transboundary Fluxes (1988; 1991).

[e] Protocol concerning the Control of Emissions of Volatile Organic Compounds or their Transboundary Fluxes (1991; 1997).

[f] Protocol on Further Reduction of Sulphur Emissions (1994; 1998).

[g] Protocol on Persistent Organic Pollutants (POPs) (1998).

[h] Protocol on Heavy Metals (1998).

[i] Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (1999).

Multi-effects and multi-pollutants protocol

Signed in Göteborg, Sweden, in December 1999, this protocol aims at noticeably lessening acidification, eutrophication, and the formation of ground-level ozone by setting national ceilings for emissions of the four pollutants that give rise to these effects, namely SO_2, NOx, VOCs, and ammonia. Starting from the critical loads approach, and by attacking several environmental problems and several pollutants simultaneously in a coordinated manner, the overall level of cost-effectiveness could be improved even further.

The protocol also contains binding requirements in the form of emission limit values both for stationary and mobile sources, as well as fuel standards. There is moreover an annex aimed at bringing down the emissions of ammonia from agricultural activities.

Provided that the signatories to the protocol stick to their undertakings, the European emissions of SO_2, NOx, VOCs, and NH_3 may be expected to fall by respectively 63, 40, 40, and 17 per cent between 1990 and 2010. In order to attain the internationally agreed long-term aim of no more exceeding of the critical loads, a stepwise approach involving reviews of this protocol is foreseen. The first such review is to start within one year after the entry into force. Although it has been signed by thirty-one countries, by mid-2003 only five had ratified this protocol.

Process itself important

Through its subsidiary bodies (see figure, p. 2), the Convention has helped generate a lot of data. It has moreover promoted the exchange of knowledge and experience – thus in turn influencing the decisions of various countries with regard to their measures for curbing emissions.

One important aspect of the process of negotiation is that it hastens the production of new data, both because the negotiations require it and because there is often a deadline for conclusion of the agreement. It is also important for the formation of opinion. No matter whether the agreement can be regarded as "good enough" from environmental point of view, there will always be pressure from public opinion to get a protocol signed and respected.

In order to further develop and improve abatement strategies, as well as to ensure effective implementation of existing undertakings, it is crucial that governments provide adequate funding to support the core activities of the Convention. The use of the critical-loads approach has in itself enhanced the cost-effectiveness of emission abatement. Combined with the new multi-effects and multi-pollutants concept this approach has resulted in more countries becoming actively involved in the elaboration of strategies for the abatement of emissions. The modern ones employed by the Convention have brought forth smart solutions which have saved many billions of dollars – on account both of their cost-effectiveness and avoidance of the damage that air pollution would otherwise have caused.

The critical loads approach

In 1988, the Convention appointed a new working group to develop a common understanding of the critical-loads approach and to evolve abatement strategies based on that approach. After three years of preparation, the report "The critical load concept and the role of the best available technology and other approaches" was presented to the Executive Body of the Convention. It was then agreed that this concept provided an acceptable, effects-based, scientific approach by which to devise strategies for the abatement of air pollution.

The essence of the critical loads approach is that reductions of emissions are to be negotiated with a view to the effects of air pollutants, rather than by setting an equal percentage of reduction for all countries. The aim is to reduce, in a cost-effective manner, the emissions of air pollutants to levels where, ultimately, the critical loads will no longer be exceeded.

It is further said in the report that because of economic, technological, and other constraints, the needed reductions may not be attainable everywhere, or in one step. An approach involving several steps was therefore likely to be needed.

The following shows in rough outline how the critical loads approach is being used in working out agreements for reducing emissions of air pollution.

Taking current and projected emissions together with monitoring data, estimates are made for the current and projected loads and levels of various pollutants. This is done by using computer models such as RAINS, developed by IIASA, the International Institute for Applied Systems Analysis.

Each country is to make maps, depicting the critical loads and levels for various areas, receptors, and pollutants in its own territory. The resulting data are assembled by the Convention's Coordination Centre for Effects (CCE), and used in the production of Europe-wide maps for critical loads. Data on the current depositions and concentrations are subsequently used to make maps showing where and by how much the critical loads and levels are being exceeded.

Computer models for integrated assessment, such as RAINS, will enable comparisons to be made of the cost and effectiveness of various strategies for achieving specified interim targets for environmental quality and the protection of health. Such targets can be expressed, for instance, as specified levels of protection for ecosystems from depositions in excess of the critical loads, either in specific countries or in Europe generally.

Agreements on the reduction of emissions are arrived at by negotiating the levels for interim targets, strategies for the abatement of emissions, and the way reductions are to be allocated among the various countries. A likely outcome of such agreements will be the setting of varying, possibly intermediate, ceilings for emissions from each country, which must be met by a specified year.