EU/ECE perspective on NO_x/O_3 environmental and control policies

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INTRODUCTION

Within the framework of the Convention on Long-Range, Transboundary Air Pollution (CLRTAP), signed in 1979 and in force since 1983, at present 41 of the 55 Member States of the UNECE plus the Commission of the European Communities are co-operating to curb emissions of pollutants to the atmosphere, that are transported over national boundaries within the UNECE region. The main objectives are to protect the natural environment and human health, but also materials and historical buildings. To date, select numbers of Parties have signed and ratified legally binding Protocols on reductions on sulphur emissions (Reduction of Sulphur Emissions or their Transboundary Fluxes by at least 30 percent, 1985 and Further Reduction of Sulphur Emissions, 1994) on nitrogen oxides (Control of Emissions of Nitrogen Oxides, 1988) and hydrocarbons (Control of Emissions of Volatile Organic Compounds, 1991). At present, negotiations are underway for Protocols on Nitrogen Oxides and related substances, Heavy metals and Persistent Organic Pollutants, hopefully all three to be finalized during 1998/99.
In the EU and its forerunner, air pollution control has been over the two last decades and remains an important element in the overall environmental policy. Although much

attention has been given to ambient air quality, a number of directives have also had as objectives to ameliorate environmental and health effects of air pollutants in the whole of the Union. All EU Member States and the Commission are Parties to the CLRTAP, but until recently their have been few instances of coordinated EU inputs to the Protocol negotiations under the CLRTAP. The reason has been that most of the directives, relevant to CLRTAP Protocols - like the LCP directive - have been minim directives. The obvious exception was the ceiling-harmonized directive on car exhausts, which had great impact on the 1988 NO_x Protocol. Recently, a steering body has been established by the Commission and the Executive Body of the CLRTAP to safeguard that relevant decision making within the two bodies should be at least compatible with each other.

1. METHODS OF APPROACH

The methods of approach to achieve the objectives of air pollution control both within the CLRTAP remit and the EC/EU context have developed over time.

In the CLRTAP sphere the initial efforts were to control and/or reduce emissions - pollutant by pollutant (SO_x, NO_x, VOCs)- through legally binding Protocols for each type of pollutant. Reduction targets agreed upon were based on conservative estimates of what could be achieved by applying BAT (not entailing excessive costs!) and the reduction targets were equal to all Parties to the respective Protocols.

In the EC/EU context you could see similar approaches, although the legislative methods tended to be still more piecemeal, where control of a type of pollutant was limited to certain categories of emission sources, without any apparent common strategy behind the legislative pieces.

This has been an approach, which has been considered unsatisfactory by scientists because of the knowledge about chemical interaction in the atmosphere between different types of pollutants and their reactions, when deposited in soils, surface and marine waters and that the sensitivity of the environmental receptors to different pollutants differs widely in the geography. This has been most evident when focusing on acidification, eutrophication and tropospheric oxidant formation, which so far has been

the main targets for air pollution policy within the CLRTAP and EC/EU contexts.
The approach was also considered unsatisfactory by policy makers because there were serious doubts as to its cost effectiveness and did not respond to their overriding needs to know, how far you have to reduce emissions of pollutants to achieve politically assessed, environmental and human health targets. Still it was applied, with reference to the precautionary principle, but essentially because neither scientists nor policy makers could, at that time, give satisfactory, quantifiable definitions of what constitutes sound and sustainable environmental quality.
The first breakthrough towards an approach based on environmental quality came when scientists round 1990 could agree on quantifiable measures for sulphur depositions in aquatic and terrestrial ecosystems, beyond which no harmful effects should occur, *i.e.* the so called *critical load.* This concept was used when negotiating the second CLRTAP Protocol on further reductions of Sulphur Emissions, signed in 1994. This achievement was a first step to base international legislation on an effects related approach and also responded to the needs of getting a fair and cost effective division of measures between Parties to the Protocol. However, it did not respond to the wider need of attacking, at the same time, many interacting pollutants, that contribute to the same environmental and human health problems and thus achieving the cost effective potentials of developing and implementing integrated abatement and control programs.

2. THE MULTI-EFFECTS/MULTI-POLLUTANTS APPROACH TO AMELIORATE ENVIRONMENTAL AND HEALTH EFFECTS FROM NO_x AND RELATED SUBSTANCES

The scientific development over the last few years, that has been initiated within the CLRTAP framework and then also applied in the EU context now makes it possible to follow a multi-effects/multi-pollutant approach, using critical loads for acidification and eutrophication and critical levels for ozone relating to forests, crops and human health. Owing to historical developments, the pollutants and the environmental effects attacked are slightly different in the two legislative fora, but these discrepancies should be

manageable. In the CLRTAP context, taking into account the existence of the 1994 separate sulphur abatement regime, the nodes are nitrogen compounds, which (together with sulphur compounds) contributes to acidification but also to eutrophication and, in combination with VOC's, to formation of tropospheric ozone. In the EU context the Commission has recently adopted an acidification strategy (SO_x, NO_x and NH_3) and is presently developing an ozone strategy (NO_x and VOC's). In both fora political negotiations based on these effects approaches will soon be initiated.

This is not the place to go into detail in describing the scientific and technical assumptions on which the multi-effects/multi-pollutants approach is based and from which strategies for abatement of the relevant pollutants are derived, which will serve as guidelines for intergovernmental negotiations on emission reductions in the CLRTAP as well as in the EU context. Suffice it to say that the main components are mapping of critical loads for (sulphur), nitrogen compounds and ozone all over Europe, EMEP transport and atmospheric chemistry models and cost curves for abatement measures. Several computer models are used to draw up different cost effective emission scenarios based on integrated assessment modelling. The main instrument is however the RAINS model, developed by IIASA, while other models serve to explore uncertainties in their specialties. In principle, participating governments are responsible to provide input data on emissions and emission projections, critical load data for sensitivity mapping and costs of emission reduction measures. The international co-ordination of all these data is however managed by a number of task forces, mainly manned by government designated experts and scientists involved in the scientific networks that supports the many-faceted R&D needed to solve the issues at hand. The output from the task forces are assessed by working groups of government designated experts on effects, EMEP, abatement techniques and strategies, which are advising the Executive Body of the CLRTAP on the soundness of the scientific and technical state of the art. The Executive Body, when satisfied, mandates the Working Group on Strategies to negotiate a draft protocol for adoption by the EB, which then generally meets at ministerial level.

Through the integrated assessment modelling you can provide negotiators with a number of optional optimized scenarios. It is already evident that the costs, implementation difficulties and thus political readiness to achieve critical loads and levels in one step

will not be realistic, although it will be an ultimate target in the Protocol. What you can foresee is a step wise approach in which you, as a first step, will be closing the gaps of present (or from a given historical date, say 1990) depositions of (sulphur), NO_x and NH_3 and concentrations of O_3 to the year 2010. Further steps in narrowing the gaps could then be taken, after thorough review processes in assessing the problems and when and if the Parties through its Executive Body will find it suitable to do so. The whole process is foreseen to be regulated within the framework of the Protocol.

In the Acidification strategy, adopted by the European Commission a fifty percent gap closure has been suggested, but they will refrain from target setting until they will see the implications of the optimized ozone strategy, which is presently under development and also, most likely, until they have seen reactions from the EU Council of Ministers for the Environment. Where the CLRTAP Parties will land on target setting for a first step is still an open question.

A first step with reasonably ambitious emission reduction targets will be expensive to implement for all or most of the Parties. But there are also significant benefits to be reaped, both in monetary and environmental terms. The study that the EC Commission has performed on benefits to be gained, following different reduction scenarios in its Acidification Strategy, indicates, that almost every EU Member State would get benefits well beyond their reduction costs, even when only focussing on effects areas which can be reasonably well assessed in monetary terms, *i.e.* health and materials. Similar studies performed in the CLRTAP context give the same message. The gains in ecosystem protection are still beyond the capacity of economic theory to assess in monetary terms, but are related to natural and cultivated resources of great importance to all national economies in the region.

Although the multi-effects/multi-pollutant strategy has been adopted by the Executive Body as a basis for negotiations, there are still most likely a number of Parties, that will have reservations as to the realism of conducting negotiations on such very complicated and far from well understood simulations of reality, which is the output of the integrated assessment modelers' creative work. Still, everyone seem to be convinced of the potentials for international co-operation in air pollution control policy by adhering to the strategy and therefore prepared to give it a good try to get it transformed into an

international, legally binding agreement. My own assessment, as chairman of the negotiations, is that such an agreement will be possible to achieve, provided that

- all elements in the strategy can be made transparent and thus fully understood by the negotiators and their political peers;
- it will be considered to result in a fair distribution of emission reductions among Parties;
- it will reasonably well respond to the different priorities of each of the signing Parties;
- it will be possible to evaluate.

I should also like to add, provided that the very good ambiance in which negotiations have been conducted within the CLRTAP framework over the last decade will prevail and not be disturbed by external problems in the wider sphere of international politics in the UNECE region.

I think it is fair to say, that the strategic work model that has been developed within the CLRTAP framework has been taken over by recent strategic developments in the EU in the field of air pollution policy. The Commission has used the same scientific network and other actors, not least the RAINS model, to provide them with the necessary input for policy making. Baring the different institutional set up in the EU and the different geographical scope, the streamlining between the CLRTAP and EU in air pollution policy making relating to the primary effects areas and pollutants we are here discussing, has come far, and does not need a separate description in this context.

3. CLRTAP FUTURES IN RELATION TO AN EXPANDING EU

This "policy merger" between CLRTAP and EU is, of course, in a way a necessity. After all, the 15 EU Member States, the Commission and the 3 EEA States and the Central and East-European States that have association agreements with the Commission and consider themselves as incumbent Member States in a foreseeable future are together forming a strong majority in the CLRTAP family. There is and will be a demand of a

coordinated and coherent air pollution policy in order to safeguard that the countries obligations in the two different international environmental legislative fora will be compatible between themselves, when implementing their obligations in their respective countries.

It is, however, a development, which has certain complications in the CLRTAP set-up, considering the fact that some very important Parties to the Convention are and will not likely become EU Member States, like the US and Canada. The effects-based approach is closely linked to the geographical scope of EMEP, which is, simply put, Europe west of the Urals. The interchange of pollutants like sulphur and NO_x over the Atlantic has so far been deemed to be insignificant. This might not be the case when you are considering the increase of background ozone in Europe and clearly not in relation to *e.g.* persistent organic pollutants.

When The US and Canada joined the CLRTAP in 1979 this was probably more an act of foreign policy than to safeguard national and international environmental policy objectives - as was incidentally the case of most of the initial signatories to the Convention. At least at that time there were no scientific evidence on transboundary fluxes from North America to Europe and still less the opposite way. The US has also had a particular relationship to the CLRTAP. The US is only Party to one of the Protocols, *i.e.* the 1988 NO_x Protocol - although it signed the 1991 VOC Protocol but has so far not ratified its signature. While participating very constructively in the development of the 1994 Sulphur Protocol, the US Government found that they could not sign it because it would run into conflicts with the Clean Air Act. There is a clear risk that this dilemma will occur also when negotiating the multi-effects/multi-pollutants Protocol. Although health concerns relating to NO_2 and O_3 are added to the environmental objectives of this Protocol and thus closer to the main objective of the Clean Air Act than was the case of the 1994 Sulphur Protocol, it is still unclear whether the health concerns will be the limiting factor for reduction targets of the relevant pollutants in Europe.

The Canadian situation is slightly different. Canada was one of the active driving forces behind the 1985 Sulphur Protocol (obviously then motivated by their bilateral difficulties with the US on the Acid Rain issue). It is also Party or Signatory to the other reduction

protocols and much involved in the development of the multi-effects/multi-pollutants protocol and, particularly, of a POP's protocol. Although Canada is developing a system of critical loads mapping for acidifying substances and ozone, this, to my understanding, is not integrateable with the European system.

You might, of course, uphold, that the importance in an international air pollution policy lies in the level of reduction targets achieved and not in the methods, from which these targets are derived. If for instance the reduction achievements in North America under the NAFTA Agreement give satisfactory contributions also to the sustainability of European ecosystems and the health of its population, and *vice versa,* if that is at all relevant, so much the better for all practical and political purposes. I think that this should be the pragmatic approach to the issue. But you can not avoid reflecting on the potential risk that the CLRTAP in the long run might fall apart, if the critical loads and levels approach, for very good reasons used on the European scene, will not be the overall method of approach from Vladivostok to Alaska counted westward.[1)]

[1)] A separate point in case is, of course, the Russian Federation and Ukraine, which are not likely to become EU Member States. Part of their combined huge realm is covered by EMEP and the interchange of airborne pollutants between an (expanded) EU and at least the European part of Russia and Ukraine is significant. Russia and Ukraine are no doubt explicit supporters of the critical load's approach, but their countries' capacity to implement abatement policies, but in a distant future, in line with the shares allotted to them in optimized emission reduction scenarios may be questioned. Also this situation may have certain problematic implications for the CLRTAP when EU expands eastward.