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**TACKLING REGIONAL, HEMISPHERIC AND GLOBAL AIR  
POLLUTION: THE POTENTIAL ROLE OF THE UNECE CONVENTION  
ON LONG-RANGE TRANSBOUNDARY AIR POLLUTION**

submitted by

the Global Atmospheric Pollution Forum

through the Ad Hoc Working Group of Senior Officials

BACKGROUND DOCUMENT



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# GLOBAL ATMOSPHERIC POLLUTION FORUM

## Tackling Regional, Hemispheric and Global Air Pollution: The Potential Role of the UNECE Convention on Long-range Transboundary Air Pollution

**Category 2 Paper**  
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## I. Executive Summary

Over almost three decades the United Nations Economic Commission for Europe's (UNECE) Convention on Long-range Transboundary Air Pollution (LRTAP) has played a critical role in reducing air pollution in its region. While that work continues, it is now surpassed in scale and urgency by the need to assist other regions in addressing their now far more serious problems, and to promote efforts to tackle emerging hemispheric and global air pollution problems. LRTAP has had the most experience and is generally the best resourced of all the regional systems in developing programmes to reduce air pollution. The Global Atmospheric Pollution Forum, which draws together representatives from regional air pollution networks around the world, considers that the LRTAP Convention now has a major challenge and opportunity to play a leading role in addressing these problems. This report sets out proposals on how this might be done.

It has long been established that air pollution is causing serious health and environmental damage throughout the globe, including millions of advanced deaths each year. But more importantly, a growing body of scientific research is now demonstrating that:

- Though once considered to be primarily a local problem, air pollution has increasingly become a regional, hemispheric and even a global phenomenon;
- There are also important synergies and intricate linkages between conventional air pollution and climate change, and there are a number of opportunities to build cost-effective strategies that simultaneously tackle air pollution and climate – particularly in developing countries; and
- The global community has not yet developed the kinds of processes, common data bases, and framework needed to address these problems effectively.

Over nearly three decades, the UNECE Convention on LRTAP has successfully tackled transboundary pollution by bringing together scientific, policy and legal expertise from its participating nations to build a powerful technical basis for action on specific pollutants. It has undertaken some important capacity-building and outreach efforts to support air pollution control efforts in Central Asia and Eastern Europe; and it has now established a Task Force on Hemispheric Transport of Air Pollution. The Forum considers that this background provides a strong foundation for UNECE to play a leading role in promoting global action on transboundary air pollution issues. It could do this by:

1. **Promoting the infrastructure for inter-regional co-operation**, e.g. by establishing close working links among the secretariats of the different regional networks, and regular consultations between their political leaders.
2. **Promoting scientific and technical co-operation among regional groups** as a basis for joint strategies e.g. by helping initiate development of globally consistent emissions inventories, monitoring protocols, methods for assessing impacts, and potential prevention and control strategies and technologies.
3. **Proposing partnership programmes with other regions to tackle urgent common problems** e.g. climate/air pollution co-benefits; ozone damage to crops and vegetation; and the wider impact of regional-wide concentration of aerosols and particulate matter; and
4. **Using its expertise and experience to open international debate** on the new policies and institutions needed to address hemispheric and global atmospheric pollution.

## **II. Air Pollution: A Serious International Problem**

It has long been well established that air pollution is responsible for a wide range of serious health and environmental problems around the globe. In Asia and the western Pacific regions alone, air pollution is estimated to be responsible for a million advanced deaths each year. The World Health Organization (WHO) estimates that one billion people across the globe are exposed to outdoor air pollution that exceeds recommended health-based air quality levels. Worldwide, air pollution causes tens of millions of respiratory and other illnesses, severely affecting quality of life, and reducing economic activity. Those most vulnerable to air pollution include children, who are particularly susceptible because their respiratory systems are not yet fully developed. Other sensitive groups include the elderly and people who suffer from heart and respiratory disease. Although air pollution has a significant impact on all people exposed, the poor are particularly at risk, having fewer opportunities to avoid exposure to damaging pollutants.

Air pollution can affect people directly – through breathing unhealthy air – and indirectly – by damaging the environment in which they live. Polluted air can damage vegetation and man-made materials, acidify soils, lakes and streams, cause excessive and harmful nutrient growth in water bodies, and degrade visibility. In all of these ways, air pollution contributes significantly to the downward cycle of poverty around the world.

Pollutants such as particulate matter (PM) and ozone contribute to rising “background levels” (general level of air quality before adding pollution from local sources) and “atmospheric brown clouds” (haze comprised of many pollutants that can be transported far beyond their source region) in various parts of the globe. They also contribute to what has been called the “greying” of the northern hemisphere. They not only increase health damage to crowded urban populations, but also damage the ecosystems that underpin sustainable development.

In rural areas, significant crop damage from the pollutant ozone has been observed in Asia and throughout various parts of the world. Acidification of ecosystems from long-range transboundary air pollution remains a threat in areas with significant emissions from the burning of fossil fuels, particularly in East Asia.

Moreover, study after study around the world has demonstrated that the health and environmental benefits of controlling air pollution far outweigh the costs of control. For example, WHO has estimated that the annual savings in premature deaths and health costs from controlling emissions of particulate matter range from \$ 79-220 billion in Europe alone. According to a study by the U.S. Environmental Protection Agency, the benefits of reducing air pollution in the United States between 1970 and 1990 exceeded the costs by a margin of 40-1. In China the Green National Accounting Study report 2004, produced by the State Environment Protection Administration (SEPA) and the National Bureau of Statistics of China, estimate that health problems, environmental degradation and lost work days from pollution cost China \$ 64 billion a year, accounting for 3% of Gross Domestic Product (GDP). Air pollution was estimated to account for 43% of this and the reduction of GDP is considered a preliminary figure and likely to be underestimated.

Although air pollution affects the disadvantaged and poorest most severely, even nations with advanced pollution control programmes are becoming increasingly concerned about the long-range transport of air pollution, as hemispheric and global pollution threatens to overwhelm many of the advances that have been achieved through local and national control measures. And while environmental improvement is sometimes portrayed as something that comes only at the expense of sustained economic development, experience over the past 35 years has shown that not to be the case. In many nations with advanced air pollution control programmes, pollutants such as sulphur dioxide, nitrogen oxides and volatile organic compounds have been cut significantly, while population, energy use, kilometers travelled and gross domestic product have all grown dramatically.

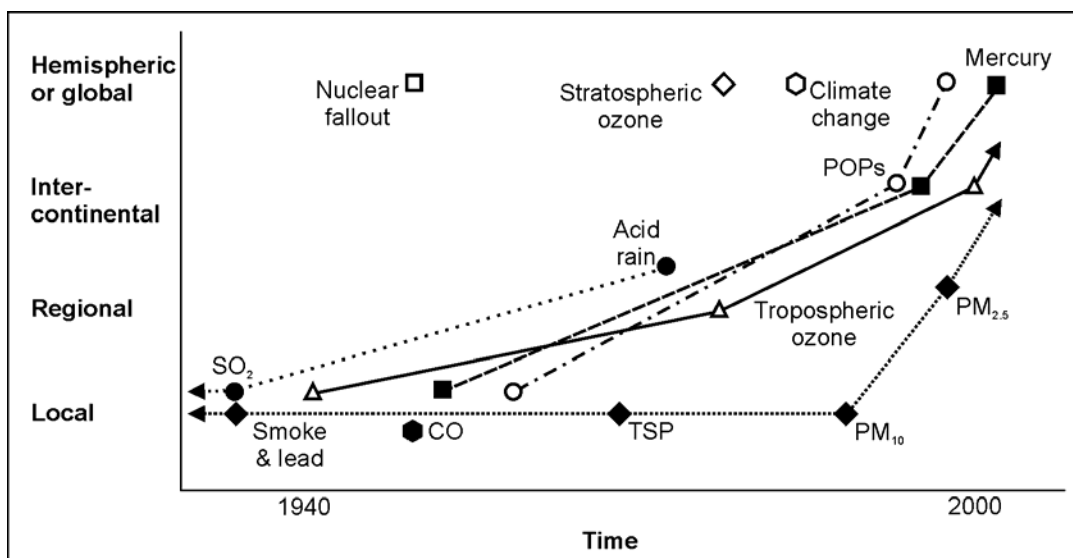
Although the health and environmental impacts of air pollution are well documented and well known, a number of newer trends and findings have recently become apparent. These include:

1. Polluted air does not respect political boundaries and in recent decades air pollution has been recognized as a regional problem. Research has now shown that emissions of various pollutants can affect air quality across broad regions and from one hemisphere to the next and that for certain pollutants, air pollution has become a global problem.

As is reflected in Figure I below, a number of different air pollutants – including sulphur dioxide (SO<sub>2</sub>); particulate matter (both fine particles, PM<sub>1</sub> or PM<sub>2.5</sub>, and coarser particles, or PM<sub>10</sub>); persistent organic pollutants (POPs), such as DDT and dioxins; and metals like mercury – were once generally thought of as localized problems. Research has demonstrated these are increasingly being recognized as being regional, hemispheric or even global in nature.

As a result, strategies for effectively addressing these problems must evolve, as well.

**Figure I: How the Perception of the Spatial Scale of Air Pollution has Changed Over Time**



Source: Keating, *et al.* 2004

2. As climate science advances, it is becoming clear that policies designed to address conventional air pollution and those to address climate change need to become increasingly interlinked – with respect to sources, atmospheric processes and environmental effects. Significant co-benefits, including dramatic reductions in conventional air pollutants, could result from future climate policies, depending upon the choices made. The burning of fossil fuels through transportation, power generation and industrial processes are primary sources of a number of conventional air pollutants and greenhouse gases. For example, fossil fuel combustion emits a number of conventional air pollutants – including carbon monoxide, mercury, carbonaceous aerosols, nitrogen oxides and sulphur dioxide – as well as greenhouse gases, like carbon dioxide, methane and nitrous oxide. So, climate change strategies that focus on replacing fossil fuels with renewable energy and conservation efforts can reduce greenhouse gases, as well as the pollutants that cause ozone and particulate matter.

A changing climate can have important impacts on air quality, and various air pollutants can affect climate in both positive and negative ways. As a result, there are a number of opportunities to build cost-effective strategies that simultaneously tackle air pollution and climate. This is especially important in developing countries that are in the early stages of formulating policies and programmes to address both problems.

Importantly, programmes to control conventional pollutants, like ozone and particulate matter, can affect climate, as well. Reducing levels of black carbon (soot) from diesel emissions, for example, can produce both climate and air pollution health benefits. However, other particles (like sulphate and nitrate aerosols) may be unhealthy to breathe, but they reflect heat and radiation and can actually contribute to a cooling of the earth surfaces. As a result, depending on the decisions made, there can be important trade-offs between climate change and air pollution control strategies.

If appropriately planned, climate change policies can have important co-benefits in the form of reduced air pollution and vice-versa. A combined approach to deal with both climate change and air pollution could have positive synergetic effects. However, depending on the decisions made, certain solutions for one problem can exacerbate the other problem. Because many developing countries are in the early stages of considering policies and programs to address air pollution and will likely be developing climate programs in the future, important opportunities exist to build in strategies that tackle both problems in a cost-effective way. Commitment to climate change measures may be unlikely in many developing countries unless they can identify other benefits. Carefully chosen air pollution abatement policies can become a means of securing climate change abatement.

3. The global community has not developed the kind of processes, common data bases, and institutions needed to effectively address these problems.

We do not have international agreements or protocols that call for each nation to use similar processes or collect similar data on air pollution. As a result, various nations use different methods for determining emission inventories, or others do not have any way of determining emission inventories in their country. Various countries use different protocols and methods for monitoring individual pollutants.

As a result, it is often difficult or impossible to compare information or track trends on emissions and air quality from one country to another. There is also no agreement on the use of atmospheric modelling to project future effects if certain emission control scenarios are implemented. And unlike climate change or other environmental issues, there is no global framework or protocol of any kind to address effectively long-range transport of air pollution. The broadest regional agreement of its kind along these lines is the United Nations Economic Commission for Europe's Convention on Long-range Transboundary Air Pollution (LRTAP) covering Europe and North America.

### **III. LRTAP: an air pollution success story**

The five UNECE environmental conventions form a cornerstone for the Commission's international environmental policy and the basis for many national actions to protect public health and the environment for sustainable development in the region. One of these conventions – the Convention on Long-range Transboundary Air Pollution (LRTAP) – has enjoyed a nearly 30-year history as the most successful multi-lateral effort addressing a variety of serious transboundary air pollution problems. A major part of its success is that the various LRTAP protocols were developed by bringing together scientific, technical and policy expertise from all of its participating nations to build a powerful technical basis for action on several pollutants.

With the worldwide growth of industrial and mobile source emissions over the past two-and-a-half decades, the need to address transboundary air pollution from non-European (non-ECE) countries continues to grow, as well. LRTAP has taken an important step by establishing a Task Force on Hemispheric Transport of Air Pollution to develop a more complete understanding of the intercontinental transport of various pollutants in the northern hemisphere.

Like LRTAP, a number of regional organizations around the world – such as the Air Pollution Information Network in Africa (APINA), the Malé Declaration in South Asia, and the Clean Air Initiatives in Asia, Africa and Latin America – are grappling with the often very difficult challenges associated with improving air quality and combating local and long-range transboundary air pollution. These organizations are taking a number of important steps to build their capacity to address local and transboundary pollution. However, in many cases, they lack the technical capacity and resources to build the programs necessary to solve their air pollution problems.

Through its extensive work under the LRTAP Convention, the UNECE is in a unique position to take the lead in addressing this phenomenon by providing technical support to the rest of the world, particularly to developing countries that are looking to reduce the health and environmental damage caused by air pollution. The UNECE/LRTAP member nations have extensive technical and legal capabilities that could help developing nations in other parts of the world address problems associated with long-range transboundary pollution. The Convention, although primarily focusing on transboundary air pollution, also provides incentives for emission control and reduction on the local scale, including the increasing problems in many mega-cities in developing countries and industrial point source hotspots.

#### **IV. UNECE/LRTAP plans for outreach to other parts of the world**

While the LRTAP Convention is basically geared towards addressing the specific air pollution problems in the UNECE region, it offers tangible examples and strong incentives for action beyond UNECE Member States in other regions, where integrated approaches, including concerns for economic development, sustainability, food security and poverty alleviation, take centre stage.

The Convention on LRTAP, while continuing to be the prime instrument for priority action in the UNECE region, is fully aware of the need for considering a wider scope as compared to its original objectives for its own region and of the crucial significance of good political governance in all countries to facilitate necessary and timely progress. UNECE/LRTAP has recently focused its attention on pursuing opportunities for greater outreach to other regions and looking for possible synergies with various other regional programmes around the world. The UNECE has recognized that the lack of established mechanisms for cooperation with other regions may hamper the outreach activities with other regions.

UNECE has also expanded its capacity-building and outreach efforts on air pollution in some UNECE member States, including those in Central Asia. A three-year project called CAPACT (Capacity Building for Air Quality Management and the Application of Clean Coal Combustion Technologies in Central Asia) has developed a national implementation plan for Kazakhstan and provided training workshops for Central Asian experts. The workshops have been extended throughout the Eastern Europe, Caucasus, and Central Asia (EECCA) region.

In December 2006, the Executive Body of LRTAP considered for the first time the possibility of opening the Convention and its protocols to countries from outside the region. Similar steps have already been taken by some other UNECE conventions. After its deliberations, the Executive Body agreed to continue efforts to attract participation from non-UNECE delegations and experts at meetings under the Convention. It also agreed to develop further and extend outreach activities to regions developing their own agreements on air pollution, including consideration of possibilities for interregional collaboration. Memorandums of understanding or special events or seminars were suggested as possible mechanisms for this.

A 20 March 2007 paper prepared by the UNECE secretariat ("Implementation of UNECE Multilateral Environmental Agreements") included a number of conclusions on important issues related to implementation of environmental agreements. Included among these are several positive statements about the need for outreach on UNECE conventions. For example:

- *We know that other regions in the world face environmental challenges similar to those of UNECE, and several conventions have links with organizations in other regions or are linked to global initiatives with common interests. The experience and achievements of the conventions may provide a guide for environmental measurements, knowledge for dealing with transboundary environmental issues and assistance with the development of legal instruments.*
- *Exploiting synergies with other international organizations is particularly important given the limited resources generally available.*

- *The UNECE conventions are effective instruments for protecting the environment and human health and for strengthening international cooperation. They are excellent models, and “exporting” their experience through outreach and international collaboration can benefit other regions facing similar problems. Further efforts for outreach activities and exchange of information with other regions of the world should be made.*

## **V. The Global Atmospheric Pollution Forum Supports UNECE technical support and outreach on air pollution**

The Global Atmospheric Pollution Forum, an organization that draws together representatives from regional air pollution networks around the world, applauds these proposals to export LRTAP experience to other regions. The Forum encourages the UNECE to be more proactive in these efforts. We believe it is not only helpful in terms of reducing air pollution and helping improve health and reducing illnesses and environmental degradation around the globe, but that it is in the long-term interest of the UNECE region to help achieve and maintain its own long-term air quality goals.

As hemispheric and global atmospheric pollution grows, many of the gains made to date through the Convention on LRTAP could begin to be reversed from the long-range transport of the ever-increasing emissions of pollutants from other nations and other continents. This is a critical issue that calls for a serious policy-level response from the UNECE.

The Forum believes that the UNECE/LRTAP nations have a special responsibility and a unique opportunity to accelerate the progress of developing nations around the world in their efforts to reduce transboundary air pollution. This should be done in ways that target solutions to the needs of the individual developing countries. The Forum applauds, for example, the UNECE for its capacity-building and outreach efforts on air pollution through the CAPACT project in Central Asia and Eastern Europe.

In addition to the benefits of transfer of expertise on technical issues, UNECE/LRTAP expertise could also be very valuable for protocol development in the regions. The Southern African Development Community, for example, is currently starting development of an environmental protocol and could benefit from UNECE/LRTAP expertise. The Malé Declaration in South Asia may also be heading in this direction in a 5 -10 year timeframe.

In limited cases, technical methods developed under the LRTAP Convention are already being used in developing nations. For example, some of the protocols and methods developed under the LRTAP Convention for biomonitoring for ozone pollution damage and assessing corrosion damage to materials have been transferred by the RAPIDC (Regional Air Pollution in Developing Countries) Programme (a Swedish International Development Cooperation Agency-funded effort) managed by the Stockholm Environment Institute (SEI) to South Asian and African countries, through their regional networks. In these kinds of ways, the LRTAP experience can be helpful in informing the process of regional cooperation and providing technical support.

## **VI. Recommendations to support UNECE/LRTAP expansion of outreach efforts**

The Global Atmospheric Pollution Forum has developed a number of recommendations to the UNECE Ministers on specific ways it can help support the efforts of developing nations around the world to address growing concerns associated with long-range transboundary air pollution. The recommendations are broken down into four areas:

- 1) processes by which UNECE/LRTAP can help support developing country efforts;
- 2) specific areas of technical support that regional networks need from UNECE/LRTAP;
- 3) programmes to specifically target ozone and particulate matter; and
- 4) requirement for UNECE support and direction in helping develop a global framework to address air pollution.

1. **Promote the infrastructure for cooperation between the UNECE/LRTAP nations and regional air pollution networks to provide assistance to developing nations in Asia, Africa and Latin America**

There are a range of options that LRTAP could consider in determining how best to expand its outreach efforts and share expertise with developing nations and other regional air pollution networks around the world. These options range from the informal to the very formal:

- Initiating a series of informal meetings between LRTAP experts and officials from the various regional networks. This would include helping fund and participating in a series of joint conferences with other regional networks around the world. The GAP Forum would be pleased to work with the LRTAP secretariat to help develop appropriate mechanisms for the UNECE/LRTAP to support capacity-building efforts with developing countries in Asia, Africa and Latin America.
- Pursuing more formal partnerships with non-member countries to provide them with technical and financial assistance. This could occur, for example, through formal memoranda of agreement with the various individual regional networks (e.g. the Malé Declaration, APINA, the Clean Air Initiative for Asia) to share information and expertise and establish specific ways that LRTAP could support their efforts to reduce transboundary air pollution.
- Inviting other groups of countries to join the LRTAP Convention.

2. **Promote scientific and technical cooperation among regional air pollution networks.** This work will help developing nations build stronger programmes to reduce air pollution. It will also help develop globally consistent technological and scientific basis for controlling air pollution and better analyzing and evaluating air pollution progress and trends. This is particularly important in developing countries that are looking to tackle air pollution and greenhouse gases at the same time. These specific areas in which additional help is required include:

A. Effects

- Air quality monitoring protocols, including quality assurance and quality control practices, and trend networks to track longer-term progress;
- Monitoring to identify vulnerable ecosystems, including natural vegetation and crops;
- Modelling and methods of calculating critical loads and levels for various air pollutants and their effects.

B. Strategies and Technologies

- Identification of cost-effective technologies and appropriate control methods for existing sources;
- Identification of best available technologies and prevention strategies for newly built facilities; and
- Identification of technologies and strategies that can cost-effectively address both air pollution and greenhouse gases.

C. Policy/Legal Support

- Technical and legal support in the development and preparation of new protocols and agreements.

3. Pursue partnership programmes with other regions to tackle climate change/air pollution co-benefits and other urgent problems

Climate change and air pollutants such as particulate matter (PM) and ozone are causing a variety of serious health and environmental problems around the globe.

- LRTAP was a major co-sponsor of the Saltsjöbaden 3 conference in March 2007 that examined the interaction between air pollution and climate change, with respect to atmospheric behavior and effects on the environment. The conference brought together scientific and policy experts from around the world and examined policy options. LRTAP leadership in this area and in air pollution in general puts it in a critical position to help focus international efforts in identifying solutions that achieve climate change/air pollution co-benefits.
- Europe and North America have a great deal of expertise in dealing with crop damage associated with ozone. Crop damage from ozone is a serious problem in Asia, for example, and there may be excellent opportunities for the UNECE/LRTAP nations to work with other regional networks on those problems.

4. Use its expertise and experience to open up the international debate on the best framework to address hemispheric and global atmospheric pollution

- There is a growing consensus on the need for coordinated assessment and pollution prevention and abatement strategies at the hemispheric scale, but further progress is likely to be dependent on the consolidation of the scientific base at the regional and national scales. A

comprehensive global atmospheric pollution framework or convention would likely be a positive outcome to address effectively hemispheric and global pollution issues. It will take some time for such a convention to be developed, but there are opportunities to build on the efforts to date by existing regional initiatives, networks, and institutions.

- With the technical, policy and legal expertise developed through the Convention on LRTAP, the UNECE is in the unique position to take the international lead in developing a hemispheric or global agreement. The LRTAP Convention's decision to establish the Task Force on Hemispheric Transport of Air Pollution was an important and helpful step in this direction. Significantly expanding its outreach efforts to other regional air pollution networks around the world would further underscore the UNECE's international leadership in this area.

### **The Global Atmospheric Pollution Forum**

Founded in 2004, the Global Atmospheric Pollution Forum supports the development of solutions to air pollution-related problems by promoting effective cooperation among nations at the regional, hemispheric and global scales. It is undertaking this work in a rapidly evolving global context where climate change, energy dependency, economic development and sustainability are all critically interrelated with air pollution. The lead partners in the Forum are the Air Pollution Information Network for Africa (APINA); the Clean Air Initiatives (CAI) in Africa, Asia and Latin America; the Inter-American Network for Atmospheric/Biospheric Studies (IANABIS); the UN ECE Convention on Long-range Transboundary Air Pollution (UNECE/LRTAP); the UN Environment Programme (UNEP); and the Forum's founders, the International Union of Air Pollution Prevention and Environmental Protection Associations (IUAPPA) and the Stockholm Environment Institute (SEI).

The Forum is using grant money from the Swedish International Development Cooperation Agency (Sida) and others (e.g. USEPA) to help strengthen regional organizations around the world and explore global and other options for alliances to address atmospheric pollution. The Sida grant is designed to help pursue Sida's overall objectives of poverty alleviation and build on the Forum's unique ability to help integrate air pollution prevention and control programmes with national and regional sustainable economic development efforts.

UNECE remains an active and important participant in the Forum, and the regional organizations involved with the Forum recognize the capacity of the ECE/LRTAP nations to provide technical and policy support to help find solutions to transboundary atmospheric pollution.