VI. Air Pollution and Protection of the Atmosphere

In one of the earliest legal cases involving transboundary air pollution, fumes from a smelter at Trail, British Columbia, caused damage to orchards and crops across the border in the state of Washington during the 1920s and 1930s. The United States and Canada agreed to create an international tribunal to arbitrate this dispute. In a widely quoted passage, the Trail smelter tribunal declared that

No state has a right to use... its territory in such a manner as to cause injury... to the territory of another or the persons or property therein, when the case is of serious consequence and the injury is established by clear and convincing evidence.

The tribunal required Canada to pay damages to the injured U.S. parties and to establish a regime to monitor and abate pollution from the smelter.

Today the most common case of transboundary air pollution is acid rain. Acid rain results when airborne sulfur and nitrogen oxides, emitted primarily by power plants, industrial processes, and automobiles, combine with moisture in the air to form sulfuric and nitric acids. These then precipitate out of the atmosphere in rain and snow (or sleet, hail, mist, fog, dew, or frost). A similar result occurs when dry sulfate particulates combine with moisture on the ground or on stone surfaces.

The accumulation of these human-made acids in lakes and streams causes drastic reduction of fish stocks and destroys other forms of aquatic life. Once an aquatic ecosystem degenerates, regeneration is very difficult. Moreover, there is evidence that sulfur oxides and acid rain may damage crops, retard forest growth, destroy the surfaces of stone buildings and monuments, corrode materials, reduce visibility, and contaminate drinking water (by leaching toxic metals from water conduits).

In all affected regions, acidifying pollutants originate partly in transboundary sources. The United States and Canada exchange airborne pollutants across their common border, and much of the sulfur in the air over Scandinavia comes from the upwind countries of northern Europe. To deal with the environmental threat caused by these airborne pollutants, in 1979, 34 industrialized nations of Europe and North America negotiated and signed the Geneva Convention on Long-Range Transboundary Air Pollution. This convention was followed by the implementing protocols—1985, 1988, and 1994—discussed below.

During the 1980s, international environmental efforts shifted from transboundary or regional air pollution concerns to threats to the global atmosphere. This shift was prompted by scientific evidence that emerged in the mid 1970s. This evidence linked the release of chlorofluorocarbons (CFCs) and other chlorine-based substances with the destruction of the stratospheric ozone layer. The ozone layer shields people, animals, and plants from the harmful effects of solar radiation. CFCs are used in refrigeration, air conditioning, and foam furniture among other applications, but they are replaceable by ozone-friendly chemicals. To curtail and reduce the use of these substances and protect the global atmosphere, the 1985 Vienna Convention for the Protection of the Ozone Layer and the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer were adopted. Because the 1987 protocol effectively implemented and incorporated the 1985 convention’s basic aims, the international regime to protect the ozone layer is usually referred to as the Montreal Protocol.

Another issue involving the world’s atmosphere is global warming. It encompasses many underlying environmental concerns, including air
pollution, energy consumption, deforestation, and management of the global commons. For purposes of this module, the issue will be discussed in the chapter on air pollution and protection of the atmosphere. The primary international agreements relating to global warming are the United Nations Framework Convention on Climate Change, signed at the Rio de Janeiro Earth Summit in 1992, and the Kyoto Protocol of 1997. Each of these issues—transboundary air pollution, protection of the ozone layer, and global warming—will be discussed below.

1979 Convention on Long-Range Transboundary Air Pollution (Acid Rain Convention)

In 1979, the United Nations Economic Commission for Europe (ECE) helped forge the international consensus for the Convention on Long-Range Transboundary Air Pollution. This accord was signed by 34 industrialized nations of Europe and North America and was the first multilateral agreement to specifically address the transboundary air pollution problem.

The convention established important avenues of international cooperation in monitoring and research activities and put in place a valuable structure to assemble information on national emissions as well as pollution and energy policies. The accord also imposed notification and consultation requirements, applying to national policy changes likely to have a significant impact on levels of transboundary sulfur pollution.

The convention also strengthened the key European pollution data-gathering network, the Cooperative Programme for Monitoring and Evaluation of Long-Range Transmission of Air Pollutants in Europe (EMEP). The EMEP program is designed to provide scientists and governments with information on the transport and deposition of transboundary air pollutants. It is implemented in cooperation with the Geneva-based World Meteorological Organization, which has the nearly impossible task of attempting to assure comparability among the national monitoring efforts. EMEP collects emissions data and monitors sulfur oxide levels in most European countries. The EMEP sulfur deposition estimates are now generally regarded as the most accurate available.

However, the convention did little to move beyond the declaration of the 1972 Stockholm Conference in defining national responsibilities to control transboundary pollution or to compensate for the damage it causes. It provided merely for the sharing of information, collaborative research, and continued monitoring of pollutants and rainfall. It contained no numerical goals, limits, timetables, abatement measures, or enforcement provisions. Parties to the convention merely agreed to endeavor to limit, and as far as possible, gradually reduce and prevent air pollution, including long-range transboundary pollution. They also agreed to adopt “the best available technology economically feasible,” (emphasis added). With all this wiggle room, no country had to alter its status quo unless it chose to.

In 1982, however, Germany—which had signed the Acid Rain Convention very reluctantly three years earlier—learned that its forests were being severely damaged by airborne pollutants from Central and Eastern European countries (Germany’s domestic vehicle emissions also contributed to this forest decline). Germany joined Canada, a victim of airborne pollutants from the United States, in calling for a protocol to implement the broad goals of the 1979 convention. In 1985, 21 industrial countries (excluding the United States, the United Kingdom, and Poland) adopted the so-called SO2 Protocol, pledging to reduce their 1992 SO2 emissions by 30% over the levels prevailing in 1980.

Three years later, in 1988, the United States joined the other countries of Europe and North America in pledging not to increase nitrogen oxides (NOx) emissions, even in the face of a sharp increase in the number of motor vehicles—the primary source of NOx. In December 1993, the EMEP released a report summarizing the data on sulfur and nitrogen oxides emissions in Europe from 1980 to 1992. The data reveal that while the ECE Convention has been effective in reducing sulfur emissions, it has not resulted in reductions of nitrogen oxides. The report indicated that during that period emissions of sulfur were reduced by 37%. Those of nitrogen oxides,
however, were found to have remained almost exactly the same, amounting to about 22 million tons both in 1980 and 1992.

The ECE Working Group on Abatement Strategies, a unit of the Acid Rain Convention’s executive body, reported in 1991 that reduction of emissions should in the future be negotiated on the basis of the effects of those emissions rather than an equal percentage rollback for every country. This is called the critical loads approach. Its goal is to cost-effectively reduce the emission of air pollutants to levels below critical loads or ceilings, based on the environment’s ability to withstand pollution.

In 1994, the critical loads approach was incorporated into the latest protocol to the Acid Rain Conventions, superseding the SO2 Protocol of 1985. Under the new protocol, different SO2 reduction targets are set for each country. The targets are the maximum permissible emissions of SO2 per target year.

Perhaps the most important result of the ECE Convention and Protocols is the impact they had on other international organizations. The consensus on the severity of the problem and the commitment to pursue pollution abatement played an important role in facilitating a European Union–wide standard for SO2. By making national governments more conscious of transboundary pollution concerns, the convention enhanced the prospects for future cooperative abatement efforts.

1987 Montreal Protocol on Substances that Deplete the Ozone Layer

Like the 1979 ECE Acid Rain Convention, the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer was able to move beyond symbolic pledges to substantive standards. The protocol sets firm targets for reducing consumption and production of a range of ozone-depleting substances. The standards set forth in the 1987 protocol were made even more stringent and expanded to cover additional ozone-depleting substances through amendments adopted in 1990 and 1992. These amendments were prompted by the development of new technology and alternative substances. The protocol’s ability to respond to and incorporate scientific/technological developments has been widely praised and has provided a model of constructive flexibility for future international environmental agreements.

One of the major innovations of the Montreal Protocol is its recognition that all nations should not be treated equally. The agreement acknowledges that certain countries have contributed greatly to ozone depletion while other countries have made very small contributions. The agreement also recognizes that a nation’s obligation to reduce current emissions needs to reflect its technological and financial ability to abate CFC pollution. Because of this situation, the agreement applies more stringent standards and a more accelerated phase-out timetable to the countries that have contributed the most to ozone depletion.

The Montreal Protocol also includes innovative funding provisions in which less affluent member countries are given financial and technical incentives (such as the transfer of technology and patents) to encourage such states to switch as quickly as possible to non–ozone-depleting substances and production methods. Specifically, Article 10 of the protocol established a fund to facilitate technical cooperation and technology transfer to assist developing states.

This fund, now administered by the Global Environment Facility, depends on the support of the developed countries. While this system seems fair, it also creates a rather large loophole in the protocol through which many less developed countries will be able to avoid meeting the standards set out in the protocol.

Finally, the protocol also contains provisions to deal with the problem of nonparties (the few nations that have not signed the protocol and continue to produce and consume ozone-depleting products) by banning trade in ozone-depleting substances with these states. Thus, parties to the protocol are prohibited from importing such substances or exporting CFC production technology and equipment. This comprehensive trade ban places both economic and diplomatic pressure on all nations to join the protocol.
U.N. Framework Convention on Climate Change and Kyoto Protocol

The Climate Change Convention was prompted by several scientific studies in the late 1980s that indicated that increased levels of carbon dioxide (CO₂) in the atmosphere were likely to cause global temperatures to rise. This potential increase would be an intensification of the natural greenhouse effect, by which the sun’s heat is trapped above the earth’s surface by CO₂ and other gases. The Climate Change Convention was adopted to reduce the amount of CO₂ emitted into the atmosphere and to preserve and increase the earth’s carbon-absorption capacities.

In addressing the global warming issue, the international community chose to follow the process successfully employed in the ozone/CFC context. Just as the highly specific 1987 Montreal Protocol was preceded by the more general, aspirational 1985 Vienna Convention, so too the 1992 Framework Convention represented the first step in the international community’s attempt to stop global warming. Its purpose was to demonstrate and forge consensus, and to provide the diplomatic foundation for a more substantive agreement.

Article 2 of the convention states that the ultimate objective of the framework agreement is to “stabilize the concentrations of greenhouse gases at a level which would prevent dangerous interference with the climate system.” This broad and general phrasing of this objective provided participating countries with flexibility in terms of implementing strategies.

The Climate Change Convention was only a broad blueprint, but some significant principles and provisions were negotiated. Most of these provisions reflect North-South tensions. First, it was agreed that financial commitments should be based on the principles of respective capabilities and appropriate burden sharing and equity, meaning that wealthier nations should be required to contribute more than poorer nations. Second, the convention states that developed countries “shall take all practical steps to promote, facilitate and finance, as appropriate, the transfer of, or access to, environmentally sound technologies.” In addition, the Framework Convention also specifies that a newly created Global Environmental Facility will act as the financial mechanism for allocating environmental resources to developing countries.

Although the Climate Change Convention is modeled on the Montreal Protocol, it will not be easy to move from the aspirational framework stage to the binding implementation stage. This is because the global warming issue lacks many of the elements that formed the foundation for the Montreal Protocol. Most importantly, there is a lack of scientific consensus, a lack of available alternatives to thermal power and liquid fuels for transportation, and the lack of involvement of all nations, North and South, in both the problem and its solution.

In December 1997, the Third Conference of Parties to the Framework Convention on Climate Change met in Kyoto, Japan. After much contentious dispute and negotiation, the parties agreed and signed the Kyoto Protocol. The major industrialized countries agreed to reduce their greenhouse gas emissions by an average of 5% relative to their 1990 levels, in the period 2008 to 2012. Japan agreed to reduction of 6%, the United States agreed to 7%, and the European Union agreed to 8%. (The actual reduction in the United States is expected to be about 30% relative to the increase in emissions that could be expected in the absence of government intervention—sometimes called the “business as usual” scenario. This commitment is still theoretical, since the United States has not ratified the protocol.)

Developing nations rejected taking on any new commitments and only agreed at the last minute to allow emissions trading among developed countries. The United States successfully argued that each nation should be free to achieve the convention’s objectives in its own way.

China and India seem prepared to resist emissions trading schemes (sometimes called marketable emissions permits) because they want industrialized countries to bear the major costs of greenhouse gas reductions—even though such reductions may be achieved in energy-inefficient developing countries at much lower cost. But Article 12 of the Kyoto Protocol introduces a clean development mechanism whereby
developed countries can implement carbon-reducing projects in developing countries. This provision is largely undefined.

A major unresolved issue is how to treat forestry and land-use issues. Leaving forests uncut and planting trees seem to be low-cost ways to absorb carbon, although scientists disagree over the role of forests in the carbon cycle.

Although many large automobile and energy companies have publicly resisted the Kyoto Protocol, others seem to be getting the message that greenhouse gas reductions are inevitable. BP and Shell have announced large investments in renewable energy technologies, and Ford Motor Company and Mercedes-Benz will begin producing a super-efficient fuel-cell car as early as 2004.