

MONTREAL  
PROTOCOL

20

A SUCCESS IN THE MAKING

THE MONTREAL PROTOCOL ON SUBSTANCES THAT DEplete THE OZONE LAYER



For more Information on the Montreal Protocol or Ozone depletion, please contact

The United Nations Ozone Secretariat  
United Nations Environment Programme  
Nairobi, Kenya  
Tel.: +254-20-762-3848  
Email: [ozoneinfo@unep.org](mailto:ozoneinfo@unep.org)

CELEBRATING 20 YEARS OF PROGRESS IN 2007

# MONTREAL PROTOCOL ON SUBSTANCES THAT DEplete THE OZONE LAYER 2007: A SUCCESS IN THE MAKING



## Introduction

It is often said that any successful enterprise will have 1,000 people claiming to be its parent. In the case of the Montreal Protocol on Substances that Deplete the Ozone Layer, that cliché rings true, as the effort to control and then phase out ozone depleting substances is replete with stories of hundreds of visionary individuals and institutions who took creative and often courageous measures to address a serious and urgent threat to life on earth.

To date, the results of this effort have been nothing less than spectacular. As of 2006, the 191 Parties which have ratified the Montreal Protocol have, in the aggregate, reduced their consumption of ozone-depleting substances by approximately 95 per cent. Developing countries, despite their many challenges, have achieved a reduction of over 72 per cent, with most of the Protocol's phase-out goals being achieved significantly ahead of the required reduction schedule. In the process, the Protocol and its innovative Multilateral Fund have supported the development and operation of national ozone units in 140 countries, and the design and implementation of over 5,000 projects and activities valued at over 2 billion US dollars.

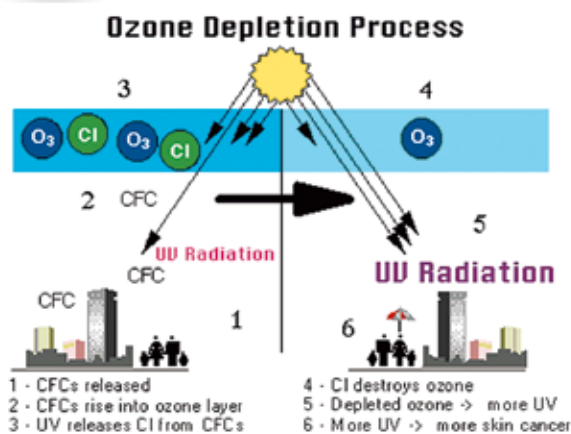
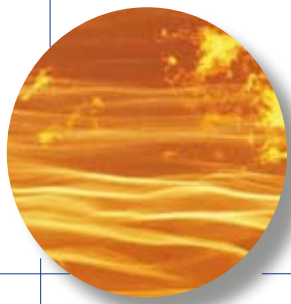
Despite these and many more accomplishments to date, the Montreal Protocol and its mission to protect the ozone layer must still, however, be viewed as a success in the making rather than a completed endeavour. Indeed, the fact that the ozone hole over Antarctica reached record levels in 2006 serves as a reminder that the impact of emissions of ozone-depleting substances will be long lasting, and that there is more work to be done before the world can rest assured that the ozone layer is safe for this and future generations.

This booklet summarizes the story of the development of the ozone issue and the Montreal Protocol. It also provides an overview of the provisions and structures that have enabled global progress on this key environmental issue. Being a summary, it cannot include the names of all of the people, institutions and events that were important to the success of the Protocol. Readers who would like to delve more deeply into these matters are fortunate enough to be able to consult a number of very good books on this subject, most notably the 2002 publication, *Protecting the Ozone Layer*, written by two of the leading figures involved in the Protocol, Mr. Stephen Andersen and Mr. Madhava Sarma, and published for and on behalf of the United Nations Environment Programme (UNEP). In the meantime it is to be hoped that this booklet, coming as it does on the twentieth anniversary of this landmark treaty, will help the public to understand and appreciate more fully the accomplishments to date and the challenges ahead in the continuing global effort to protect the ozone layer.

## I. FROM THEORY TO ACTION

Hovering some 10–16 kilometres above the earth's surface, the earth's protective ozone layer filters out dangerous ultraviolet radiation from the sun and, in so doing, protects the health and environment of all the earth's inhabitants. Modern science suggests that the earth's ozone layer was formed some 400 million years ago and remained practically undisturbed (and, as a consequence, somewhat taken for granted) for virtually all that time. It was therefore with a sense of deep concern that, in 1974, the world community received the hypothesis of two chemists from the University of California at Irvine, that the ozone layer might be threatened by the continuing emissions of chlorofluorocarbons (CFCs), a widely used set of industrial chemicals.

In their June 1974 article in the journal *Nature*, F. Sherwood Rowland and Mario Molina theorized that, when normally stable CFCs reached the stratosphere, their exposure to ultraviolet radiation from the sun



led to their decomposition. Once freed from their bonds, the chlorine atoms earlier contained in the inert CFCs initiated a chain reaction process which destroyed significant quantities of stratospheric ozone – in fact, Rowland and Molina estimated that one chlorine atom could destroy as many as 100,000 molecules of ozone. They also expressed the view that the level of CFCs being released into the environment was unsustainable and, unless abated, could lead to significant drops in stratospheric ozone. The consequences of such ozone depletion would be likely to include increases in skin cancers, genetic mutations, crop damage and possibly drastic changes to the world's climate. It was therefore deemed essential to take action to reduce CFCs.

The Rowland and Molina hypothesis aroused extensive media interest, which led to urgent calls for action to be taken to study this issue and take measures to deal with it; scientists and policy makers alike rose to the occasion.

Throughout 1975 and 1976, further research was carried out which lent support to Rowland and Molina's work and enhanced our understanding of the depletion of the ozone layer. In particular, the work of Paul Crutzen added significantly to the global understanding of the process of ozone depletion. On the policy side, a 1977 meeting of experts organized by UNEP resulted in the development of a world plan of action on the ozone layer, and led to increased cooperative research into the ozone depletion theory. The word "theory" is used in this context because, we should remember, in the mid and late 1970s the notion of stratospheric ozone depletion was still just that – a theory.

Fortunately, however, even though the theory was as yet unproven, many countries were convinced of the immediate need to take precautionary action and in the late 1970's several took action to ban CFCs in non essential aerosol uses.

While these early efforts were important, they were not able to stem the extensive growth in the use of CFCs throughout the world. Accordingly, as research into ozone depletion continued through the early 1980s, so did the calls for concerted global action to deal with the problem of CFCs. In 1985, these efforts gave rise to the Vienna Convention for the Protection of the Ozone Layer. This agreement coincided with the initial proof that the hypothesized stratospheric ozone depletion was actually taking place above Antarctica. It was now that the significant thinning of the ozone layer over Antarctica was first termed an "ozone hole", a phrase that – albeit, strictly speaking, not entirely accurate – captured the public imagination and served international efforts to mobilize support for action.



Professor F. Sherwood Rowland (left) shared the 1995 Nobel Prize for Chemistry with Professor Mario J. Molina (centre) of the Massachusetts Institute of Technology, United States and Professor Paul J. Crutzen (right) of the Max Planck Institute, Germany, 'for their work in atmospheric chemistry, particularly concerning the formation and decomposition of ozone.'

In the light of this first real proof of ozone depletion, many who were concerned about its potentially catastrophic effects were dissatisfied with the emphasis placed by the Vienna Convention on research rather than on action to mandate reductions in the use of ozone depleting chemicals. It must be remembered, however, that while new proof of the existence of stratospheric ozone depletion had emerged, in 1985 the linkage between ozone depletion and human made chemicals such as CFCs was still not proven.

In addition, those who wonder why stronger action was not taken sooner should understand just how prevalent throughout modern society were these substances now being considered for control.



For example, from the moment they rose in the morning they would have encountered CFCs: in the air conditioner that had cooled their house and the food in their refrigerators, the aerosol cans that delivered their deodorant and hair spray, the comfort foam in their mattresses and pillows and under their carpet, and the insulation foam contained in their water heaters and refrigerators. CFCs were also found in the safety foam in their car dashboards and steering wheels. Methyl bromide would probably have been used to grow their tomatoes and fumigate many of the other food products they used on a daily basis, and halons would have been used extensively to provide fire protection in their offices and businesses, as well as in the computer centres and power stations that made their daily life easier.

Ozone-depleting solvents such as CFC 113, carbon tetrachloride and methyl chloroform would have been used by the dry cleaners who had cleaned their clothes, the workers who made the metal parts found in virtually all their electronics, refrigeration equipment and cars, and to perform such tasks as laminating the wood on their desk at work. In fact, as the above illustrates, the use of ozone-depleting substances was intricately woven into the fabric of modern life. In addition, the production and sales of these chemicals and related products involved hundreds of thousands of employees and billions of dollars of invested capital.

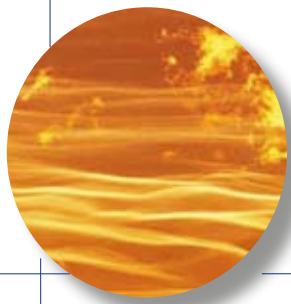
In this light, it may not seem so surprising that the first steps taken by the Vienna Convention were rather tentative and that the countries negotiating the Montreal Protocol only two years later had to confront many fears and entrenched interests in their effort to come to agreement on a binding treaty aimed at reducing or eliminating these substances. Despite these fears, however, the Convention itself did anticipate the development of a Protocol to control ozone-depleting substances.

## II. MONTREAL PROTOCOL NEGOTIATIONS

The Vienna Convention initiated a further surge in international activity, reflected by the dozens of meetings and workshops that led up to the 1987 agreement on the Montreal Protocol. This action was spurred by increasingly serious research and a rising sense of public alarm. One important call for action came just two months after the Vienna Convention had been negotiated, when the Governing Council of UNEP requested the Executive Director of that body to convene a working group with a view to adopting a protocol controlling CFCs in 1987.

Over the next two years UNEP, both singly and in concert with the World Meteorological Organization (WMO) and other partners, facilitated a large number of negotiations and meetings, the most important of which took place in Rome, Leesburg, Bilthoven, Geneva, and Wurzburg. During those meetings countries came to a better understanding of the full range of chemicals of concern (which now included halons, carbon tetrachloride and methyl chloroform), the options available for control, the likely consequences of taking or not taking different actions, and the initial positions that different countries might adopt in negotiating a binding treaty.

This period also saw a dramatic and critically important shift in the position of industry. Initially, the industries producing and using CFCs had insisted that no controls should be considered until the link between ozone depletion and these human made chemicals had been proven. In 1986, however, a very important industrial group – the Alliance for Responsible CFC Policy – together with the Dupont company, which produced approximately a quarter of the world's CFCs, announced their agreement to support global limits on the use of CFCs. The contribution that these announcements made to the push for a protocol cannot be overstated.



### III. MONTREAL PROTOCOL

On a cold day in September 1987 in Montreal, 24 countries signed the Montreal Protocol on Substances that Deplete the Ozone Layer. The document itself was rather short – only about eight pages – but the impact that it had on the world community was significant. The Protocol that was signed on that day, 20 years ago, had a number of key elements, all of which have contributed to the success that has been achieved by the Protocol to date.

#### A. Scientific and technical underpinning

The diverse discussions leading up to the scientifically oriented Vienna Convention and the subsequent Montreal Protocol had a significant impact on its structure and terms in some key areas. The negotiators working on the Protocol clearly understood that the science of ozone depletion was evolving quickly and that further actions would have to be taken on the basis of that science, as well as on their technical and economic feasibility. That understanding manifested itself in at least two ways. First, the final Protocol included a provision stating that, at least every four years, a review of the best available scientific, environmental, technical and economic information should be published.

To that end, the Parties to the Protocol would, in 1989, formally establish panels of experts in each of those fields to help aid them in their decision making. These assessment panels have contributed greatly to the success of the Protocol. They are made up of professionals from Governments, industry and civil society within developed and developing countries; these volunteers offer their time and expertise towards achieving the goal of ozone protection. Over time, their assistance to the Parties has increased and developed, and the Technology and Economic Assessment Panel now provides comprehensive annual updates to the Parties in which answers are provided to the numerous technical queries that the Parties pose annually.

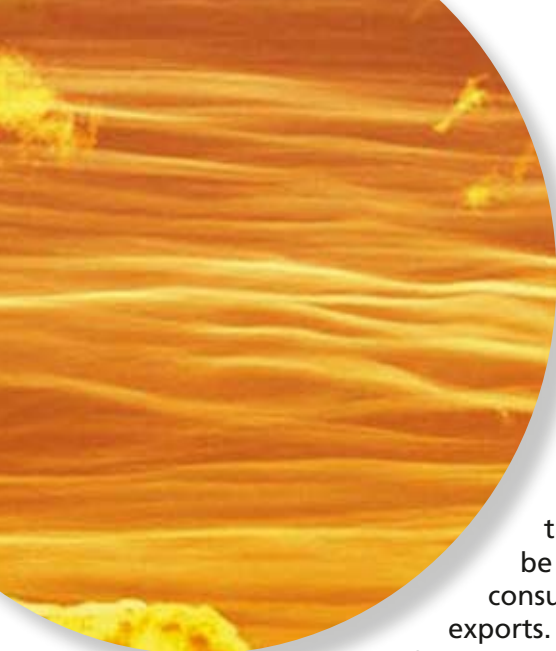
The work of the panels has always carried great authority and as such has played an invaluable role in ensuring that the Parties to the Protocol are provided with the best possible information on which to base their decision making.

Another indication that the initial negotiators understood the need to keep abreast of continuing scientific discoveries can be found in the so called “adjustment” provision, by which the Parties were enabled to accelerate and increase the stringency of controls on previously agreed ozone-depleting substances by simple decision. This key provision obviated the need for the Parties to wait for national ratification of these control changes (often a process involving many years), and allowed them to act swiftly in line with new and emerging scientific discoveries.

While this provision was thought important in the drafting of the Protocol, it is unlikely that many of the negotiating Parties foresaw to what extent it would actually be used, in response to the evolving scientific understanding of ozone issues.

#### B. Control of chemicals

At the very heart of the Protocol lie the controls placed on ozone-depleting substances – which chemicals are to be controlled, the manner of their control, and the extent of their control. The negotiators meeting in Montreal in September 1987 could initially only agree on the control of eight chemicals (compared with nearly 100 controlled today). Furthermore, the agreement required only a 50 per cent reduction in CFCs and only a freeze in halons (compared with the total phase-out of halons that would be agreed just five years later).



In terms of the manner of their control, the negotiators gave careful thought as to whether controls should be applied to production alone or also to emissions and whether related chemicals should only be controlled in developed countries. In recognition of the global nature of the problem of ozone depletion, the Parties agreed that controls should extend to all countries. In terms of what was to be controlled, the negotiators agreed to control both production and consumption, the latter being defined as production plus imports minus exports. This unique definition had the consequence of capping both the level of production and the quantity of the substances that actually remained in the country each year (whether such substances were used or not). This latter provision would enable countries to accumulate stocks for future use.

### C. Flexibility of implementation

One of the hallmarks of the Montreal Protocol was that, while the countries agreed to meet specific numerical reduction targets within agreed timeframes, no rules were laid down as to how those reductions were to be achieved. This allowed countries to experiment with different approaches tailored to their specific circumstances (e.g., controls on specific use, economic incentives and disincentives) and to develop, manage and adjust their implementation plans to enable them to achieve the agreed targets in the most efficient way possible.

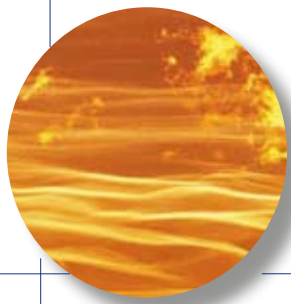
### D. Trade controls

Recognition of the global nature of the ozone issue also played a role in the Protocol's negotiation of trade controls. It was thought that, by restricting trade with countries not party to the Protocol, countries that still wanted to use CFCs would have to become Parties and agree to have their consumption and production controlled by the Protocol. The Protocol's trade provisions benefited from the input of the secretariat of the General Agreement on Tariffs and Trade (GATT), and have, over time, served the Protocol very well. The sanctions for which provision is made have never had to be specifically enforced and the provisions have never been challenged. They have, however, undoubtedly contributed to the near universal participation in the Protocol. Indeed, as noted above, at the time of its final negotiation in Montreal, the Protocol was signed by 24 countries and the European Economic Community. Today, it comprises more than 190 Parties.

### E. Participation of developing countries

The Protocol's negotiators had hard-hitting discussions on whether and how to apply the control measures to developing countries and, in keeping with the global nature of the issue, they settled on inclusion, albeit with what has become known as a "grace period" for developing countries to comply with the same requirements that would have to be met by developed countries. In so doing, they put into practice what is perhaps the first use of the concept of common but differentiated responsibilities.

In addition, the negotiators recognized in both Articles 5 and 10 of the Protocol that the developing countries would need assistance to enable their compliance with the agreed control measures. These provisions can be seen as the genesis of the 1990 creation of the Multilateral Fund for the Implementation of the Montreal Protocol (see chapter V below).



## F. Compliance regime

The Montreal Protocol required annual reporting of data on production, imports and exports of the controlled substances, to enable an annual review of the Parties' compliance with the Protocol control provisions. The Protocol also included a provision in Article 8 that envisaged the establishment of a regime for dealing with non compliance. This non-compliance regime, which has now been bolstered by the inclusion of an indicative list of actions that might be taken in cases of non-compliance, was agreed by the Parties on an interim basis in 1990 and on a permanent basis in 1992. The regime set up an implementation committee consisting of representatives from all the regions, which would review the data provided by the individual Parties and any other information brought to its attention, and make recommendations as to how the Parties could deal with specific cases of non-compliance.

While the circumstances that have led to non-compliance differ from one case to another, the Committee has evolved a system for the equitable treatment of all Parties, which involves working with the Party to establish a reasonable plan for bringing the Party back into compliance and then seeking appropriate support to enable the plan to be carried out. To date, this supportive regime, concentrating on the needs of the individual Parties, has been extremely successful. It has given Parties facing difficulties the confidence to know that, if they volunteer information on their non-compliance, they will be treated fairly and will be engaged in a spirit of cooperation to enable them to come into compliance in a reasonable period of time.

## G. Voting procedure

The original Montreal Protocol stated that, in the absence of consensus, any proposed changes to the Protocol would have to be carried by a two thirds majority vote of Parties present accounting for at least 50 per cent of total consumption of the controlled substances covered by the Protocol. In consideration of the fact that this provision placed undue power in the hands of the largest users, it was amended in 1990 to require a majority of both the developed and developing countries (Parties operating under article 5 of the Protocol), present and voting. This change reflected the growing partnership between developed and developing countries in the implementation of the Protocol. The voting procedures of the Protocol in any case have never had to be used, all decisions having been adopted on the basis of a consensus. This is an eloquent testimonial to the dedicated, cooperative and collegial spirit that has prevailed in the Montreal Protocol forum.

# IV. EVOLUTION OF THE MONTREAL PROTOCOL IN RESPONSE TO NEW SCIENTIFIC DISCOVERIES

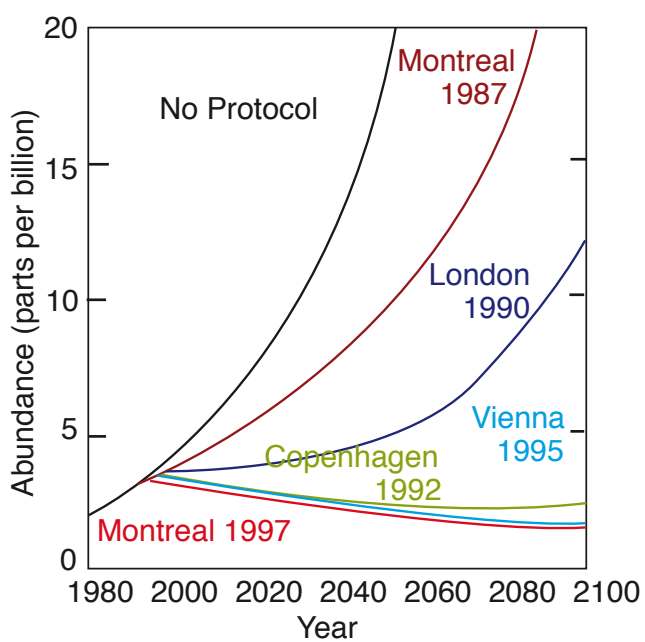
In retrospect, it can be seen that the years following the negotiation of the 1987 Protocol witnessed a continued underestimation of the problem on the part of the world community in several key aspects. First, there was an underestimation of the reductions that would be necessary to protect the ozone layer. Indeed, while some may have thought that the provisions of the original Montreal Protocol would prove sufficient to protect the ozone layer, the chart on page 7 clearly shows that, without significant subsequent action, the world environment would surely have been in grave jeopardy.

Second, there was an underestimation of the ability of industry to adapt to change and convert to non ozone-depleting substances. This can probably best be illustrated by looking at the difference between the Protocol's initial and subsequent treatment of fire fighting halons. In 1987, halons were considered so essential that the Parties could only agree to a freeze in their production and consumption at historical levels. Just five years later, however, in 1992, the Parties agreed to phase them out completely in developed countries by 1994.



While halons provide the clearest example of the flexibility of the Parties and the way industry stepped up to meet the challenges presented by the phase-out of ozone-depleting substances, almost every use sector showed similar efforts on behalf of the Parties and innovations by industry, and the confluence of scientifically defined need and industrial innovation allowed the Parties to take wide-ranging measures to control additional chemicals and strengthen the controls on existing chemicals.

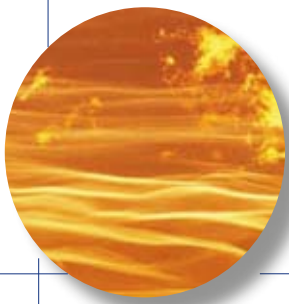
Many representatives of Governments, non-governmental organizations and the scientific world worked together to advance the Protocol, but the art of negotiation and persuasion also played a critical role. In particular, the importance of the role played by the UNEP Executive Director at the time, Mostafa Tolba, cannot be overstated. Possessing an expert knowledge of both ozone science and the ozone community, he formed a network of relationships that came together in informal consultations within a group of key delegates that he referred to as "Friends of the Executive Director". Members of this group, speaking in their personal capacity, were able to explore the scientific facts at their disposal and test the limits of their flexibility, and this was crucial to enabling the Parties to negotiate their way to consensus.



Smaller groups of Parties and non-governmental organizations also worked together to persuade and cajole their colleagues and superiors in their capital cities in a manner that fostered a sense of community and focused the group on their common goals. In that light, the Protocol as it developed can be seen as a confluence not only of policy and science, but also of individuals, committed to a common path, who were willing to take risks to achieve the measures they believed to be urgently necessary for environmental protection.

This period was also noteworthy for the reliance of the Parties on the use of decisions, adopted at meetings of the Parties, to clarify the intent of certain Protocol provisions and to advance their efforts to ensure adequate implementation. In this way, certain key elements of the Protocol, such as the process for allowing and controlling exemptions, the requirements related to data reporting, and the approval of plans to enable Parties to get back

into compliance, were agreed by decision, rather than by the time-consuming process of amendment. Although this decision process has proved to be a robust and effective mechanism in advancing the implementation of the Protocol, there are some occasions, such as the creation of the Multilateral Fund, when an amendment to the Protocol is absolutely necessary.



## V. ESTABLISHMENT OF THE MULTILATERAL FUND



The global nature of the ozone issue led the Protocol's original negotiators to conclude that all countries of the world had to be included within the Protocol's control regime. At the same time, the Protocol negotiators understood that, given their limited contribution to the problem, and also their limited ability to divert scarce resources to deal with it, developing countries would need assistance if they were to become true partners in the struggle to protect the ozone layer. If there was any doubt about the necessity for such assistance, the facts spoke for themselves: two years after the adoption of the Protocol, fewer than 10 out of over 140 developing countries had ratified its provisions.

Several ideas were discussed and investigated as to how to provide the necessary assistance. The developing countries felt strongly that the costs incurred should be borne by the developed countries which were responsible for the problem and that funding should be additional to traditional aid flows rather than deducted from them. For their part, the developed countries were concerned about the potential costs of the phase out, the manner in which costs would be assessed (whether the so-called "incremental cost" should be paid by grant or loan), and that limits should be set on the creation of any new institutions. Following a year of discussions on these and other issues, the 1990 London Amendment to the Protocol was adopted. It included an agreement establishing the Multilateral Fund with several key components, relating in particular to its governance and its funding, as described in the following sections.

### A. Governance

The Fund was to be supported by a secretariat, co-located with UNEP but directly accountable to an Executive Committee made up of seven developed countries and seven developing countries. This governance structure accomplished several key objectives. First, by co-locating the secretariat with UNEP but retaining its independence in a policy context, the Parties and their appointed Executive Committee were provided with direct control over the Fund's policies. Second, the balance of developed and developing countries on the Executive Committee signalled a major departure from the historic donor-driven nature of funding bodies that existed at the time, and reflected the spirit of equality that had come to typify and underpin the Montreal Protocol engagements.

This spirit of equity was also strengthened through a voting structure which required, if consensus could not be reached (a contingency never encountered in the 17 year history of the Fund), a two thirds majority of both the developed and the developing countries. In addition, it was agreed that activities would be prepared and implemented primarily by existing international agencies, including the World Bank, UNEP, the United Nations Development Programme (UNDP), and later, the United Nations Industrial Development Organization (UNIDO). Finally, donor countries were given some latitude to undertake bilateral projects.

### B. Contributions

The agreement called for additional contributions to be made by developed countries only, so as to meet, on a grant or concessional basis, the agreed incremental cost of certain activities needed to enable the developing countries to comply with the Protocol. This agreement embodied key compromises in such areas as the provision of additional resources, incremental costs, and whether assistance was to be provided in the form of grants or loans (both of which would be allowed). Activities eligible for funding were specified in an indicative list of categories of incremental costs. Following an initial capitalization of the Fund of some \$240 million over the first three years, the Fund has undergone five replenishments, each covering a three year period. Available funding has averaged approximately \$120 million per year over the last 17 years.



## VI. EVOLUTION OF THE MULTILATERAL FUND

As the Multilateral Fund was a new endeavour with few, if any, comparable institutions to emulate, the entire enterprise had to be started from scratch with only the vision of the Parties to guide it. It fell to the first Chief Officer of the Multilateral Fund Secretariat, Omar El-Arini, to hire staff and begin work on proposals for everything from operational matters to project templates to enable the Fund's Executive Committee to carry out its duties. Under his steady leadership, and with the help of the first three chairs of the Executive Committee (Ilkka Ristimäki from Finland, Juan Antonio Mateos from Mexico and Eileen Claussen from the United States), each of whom had been active in the negotiation of the Fund, the Fund developed core policies which have evolved to enable it to face the complex variety of work that had to be done.

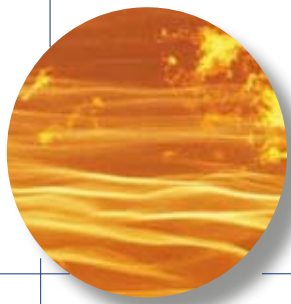
### A. Defining incremental costs

The Protocol states that funding should be given on the basis of agreed "incremental costs", but the Parties did not define this term, or suggest how it should be applied to projects as diverse as converting facilities manufacturing refrigerators, eliminating the use of a pesticide (methyl bromide) on farms, and producing public awareness materials. Over time, the Fund developed a clear definition of incremental cost, which, by and large, ensured that the entity undertaking the project at issue was left, at completion, in a financial sense, equivalent to where it was before the project was started. While the use of this concept had to be adapted to address different types of activities, such as the closure of plants producing ozone-depleting substances, this innovative definition of incremental cost was soon a part of other environmental treaties, and the ground breaking work performed by the Fund became used extensively in contexts such as in the Global Environment Facility.

### B. Developing a system based on precedent and equality

While each conversion project was unique, over time the Fund developed cost norms for individual project types, and initiated a cost effectiveness regime to ensure that the finite resources available were used to get the optimum ozone protection return for the money spent. To balance the different scales of economies and ensure that smaller countries would have equal access to the Fund, special cost norms were developed for them. The cost effectiveness regime applied by the Executive Committee helped introduce a high level of consistency into the system and the resulting equality of treatment enabled all Parties to achieve compliance. This steady focus sometimes had the result of recognizing that the reduction of one tonne in one country – a small country – to ensure compliance was as important as the reduction of 1,000 tonnes in another, much larger, country where an amount of 1,000 tonnes was not crucial to that country's achievement of compliance. In any case this focus has facilitated a very high level of compliance on the part of all developing countries – both large and small regardless of their level of consumption.

Finally, the Executive Committee sought to assure equitable treatment by agreeing not to fund organizations that began operating with ozone-depleting substances long after alternatives were available. This policy ensured a more level playing field for firms that had taken a progressive decision to convert from ozone-depleting substances at an early date.



### C. Enabling compliance by transferring technologies

Technology transfer has been a cornerstone of the Fund's success. In order to enable compliance, the Fund had to provide developing countries with newer, non ozone depleting technologies. Over time, this led to a technological revolution in several sectors of the developing country economies. For example, dozens of developing countries that had once produced refrigerators reliant on CFCs were given the technology and the equipment to produce new refrigeration equipment, and over 50 developing countries that produced CFC based foams were provided with new equipment and training to produce to a level that would fast become a new global standard.

In many cases, this assistance enabled them to compete in a marketplace that, during the 1990s, was becoming much more global. In addition, the new equipment by and large helped to produce products that were more energy efficient, thereby yielding additional environmental benefits; most important from the standpoint of the Protocol, however, was that this transfer process of technology and knowledge has enabled Parties to eliminate their reliance on ozone depleting substances and comply with the goals of the Protocol. Thus, the Protocol and its Multilateral Fund stand as a testament to the fact that, with appropriate assistance, developing countries are willing, ready and able to become full partners in global efforts to protect the environment.

### D. Promoting sustainability by supporting national capacity

The Fund's Executive Committee was aware from the outset that the will of the developing countries to comply was in many cases compromised by their lack of ability to divert scarce resources to the ozone effort. Accordingly, the Committee abandoned the early expectations of some Parties that the developing countries would bear their own administrative costs, and agreed to fund the creation of national ozone units in these countries. The benefits of this early decision are incalculable. Since agreeing to support institutional strengthening, the Fund has helped create national ozone units in 140 developing countries. The levels of funding provided for this purpose vary, depending on national consumption of ozone-depleting substances, but related funding is designed to ensure that in even the smallest countries at least one full time staff member is provided for and basic office and communication costs for ozone units are also covered.

These units have been an invaluable asset, not only in ensuring the effective implementation of conversion projects, but also in developing and pushing through national laws and legislation to ensure appropriate control of ozone-depleting substances. Without this assistance, which amounts to \$6 million per year, it is unlikely that the 240,000 tonnes of reductions in consumption of ozone-depleting substances logged to date, or the record level of compliance reported under the Protocol could have been achieved.

## VII. CONTRIBUTION OF THE GLOBAL ENVIRONMENT FACILITY TO THE MONTREAL PROTOCOL

Before leaving the issue of support for compliance, it is important to note the significant contribution of the Global Environment Facility to the achievement of the success of the Montreal Protocol. In particular that body, under the leadership of Mohamed El-Ashry, its first Chief Executive Officer and Chair, agreed to support the phase-out efforts of countries with economies in transition, which were not otherwise eligible for funding by the Multilateral Fund. This support enabled many of those countries to achieve the compliance goals of the Protocol.



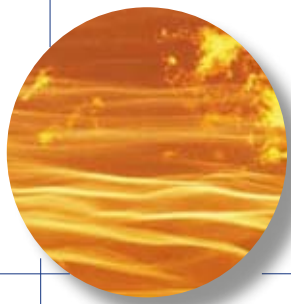
## VIII. ACHIEVEMENTS TO DATE OF THE MONTREAL PROTOCOL REGIME

The positive results achieved to date through implementation of the Protocol can be seen on several fronts. In terms of cooperation, the Montreal Protocol can boast a greater degree of global participation than virtually any other United Nations treaty. In terms of performance, as things stand today, developed countries have phased out the production and consumption of over 99 per cent of all the chemicals controlled by the Montreal Protocol. With the assistance of the Multilateral Fund, by the end of 2005, developing countries had had projects approved for the phasing out of 231,000 tonnes of consumption and 156,000 tonnes of production, and had achieved a reduction of 72 per cent from their historic level of consumption of ozone-depleting substances. Further, where the future is concerned, they have already agreed on projects designed to reduce nearly 90 percent of the remaining chemicals that must, under the Protocol, be dealt with by 2010. In the process of the phase-out, many countries, both developed and developing, have exceeded expectations and met their phase-out targets before the deadline. In terms of scientific results, global observations have verified that atmospheric and stratospheric levels of key ozone-depleting substances are going down, and it is believed that with full implementation of all of the provisions of the Protocol, the ozone layer should return to pre-1980 levels by 2050 to 2075.



These results highlight how dramatically different the global environmental situation would have been without the critical measures taken by the Parties to the Montreal Protocol. As the chart on page 7 shows, if the world community had not acted, global chlorine levels would have shot up. Instead we are now seeing reductions rather than increases in chlorine loading levels. What really stands out, however, is the resulting environmental and health benefits. While the Protocol's assessment panels have not made specific estimates of the number of cancers, cataracts and other health issues that are thereby avoided, the latest estimate by the United States Environmental Protection Agency is that, by the year 2165 actions to protect the ozone layer will have saved some 6.3 million lives in the United States alone, that would have otherwise been lost to skin cancer. They also estimate that efforts to protect the ozone layer will produce an estimated US\$4.2 trillion in social health benefits in the United States over the period 1990–2165. Moreover, because ozone-depleting substances are themselves global warming gases, the global reduction in ozone-depleting substances from peak 1990 levels had, by 2000, achieved a net integrated reduction in global warming gases of approximately 25 billion tonnes of carbon dioxide equivalents. This is a huge number and it makes the Montreal Protocol one of the prime global contributors to the fight against global warming.

In 1995, recognition of the importance of the ozone issue, and the contribution of science to this effort to protect the globe came in the form of the Nobel Prize for Chemistry, which was awarded to Sherwood Rowland, Mario Molina and Paul Crutzen for their pioneering work on ozone depletion. In addition, in 2003, recognition of the Protocol from the political side came in the statement of United Nations Secretary General Kofi Annan, that "perhaps the single most successful international environmental agreement to date has been the Montreal Protocol, in which States accepted the need to phase out the use of ozone-depleting substances." Finally, the Montreal Protocol is recognized in the United Nations 2006 report on the Millennium Development Goals, under Goal 7, as a global success story for its work in catalysing global action to help us reduce the amount of chemicals damaging the ozone layer.



## IX. CHALLENGES AHEAD

While the results of the Protocol to date are impressive, the fact remains that a great deal of additional action will be essential to ensure that the ozone layer remains safe for this and future generations. Most important, the Parties to the Protocol will have to maintain their momentum to complete the job. Indeed, between the beginning of 2007 and the end of 2009, developing countries will have to eliminate the last 20 per cent of their production and consumption of CFCs and halons, and the last 15 per cent of their consumption of carbon tetrachloride. Experience has shown that this final amount is always the hardest to phase out, and this case is no different, particularly when we realize that the majority of the remaining CFC consumption is used for servicing millions of refrigerators and mobile air conditioners. While some projects have already been approved to deal with these sources, and others are still in the process of being approved, the phase-out of these remaining tonnes will not be easy to achieve.

Another challenge arises from the continuing success of the Protocol itself. Experience demonstrates that as the final phase-out approaches, the incentive for illegal trade might increase. This is particularly true in areas where continued production for non controlled uses is still allowed. Accordingly, the world community must redouble its effort to deal with this issue.

The phasing out of hydrochlorofluorocarbons (HCFCs), which also contribute to global warming, is likely to prove a huge challenge for both developed and developing countries. The final phase-out of these chemicals, which were a common but transitional replacement for CFCs, could require still more technical breakthroughs of the kind that were observed early in the phase-out process. While much progress has been made to phase out the use of the agricultural fumigant methyl bromide, it is apparent that the final phase-out will not be easy and will require sustained effort from the global community. Finally, on the chemical side, it will become more urgent to find alternatives for the remaining use of halons in new airframes and military equipment as stocks of halons begin their inevitable decrease over the coming years.

Key questions also remain about how to deal, in an environmentally sensitive manner, with the very large banks of ozone-depleting substances currently in use systems or inventories. These substantial stocks will, unless acted upon, eventually be emitted over the coming decades. Finally, in relation to chemical controls, the Parties to the Protocol must be on the lookout for new chemicals with the ability to deplete the ozone layer, and new issues which could threaten the global communities hard won gains. In that regard, it is important to remember that many had believed the ozone issue to be solved by the original 1987 Montreal Protocol agreement, only to find a short time later that the threat was significantly greater than originally anticipated.

On the organizational side, the Parties also face an administrative challenge in ensuring that the significant national and organizational expertise built up to address the Montreal Protocol issue is adapted and retained to meet current and future needs. Indeed, the remarkable lessons learned under the Montreal regime with regard to both chemical controls and management, as well as their financing, should be used to meet the new environmental challenges faced by the global community.

While many challenges remain, it is hoped that the continuing efforts to protect the ozone layer will move forward in the same spirit of dedication, cooperation and innovation that characterized the initial efforts, and that the Protocol will go on to achieve its goal of protecting the ozone layer for this and future generations.

